



**The London School of Economics and Political Science**

Authoritarianism, capitalism and institutional  
interdependencies in the Chinese economy:  
Implications for governance and innovation

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## **Abstract**

Recently, the field of comparative political economy has turned to the Chinese economy. Coherent interpretation of the drivers and fundamental institutions of China's economic system had been frustrated by the coexistence of, on the one hand, continuously developing capitalist institutions and a burgeoning market economy, and on the other, the persisting and proliferating authoritarian system of economic administration. Therefore, commonplace dichotomous frameworks of capitalism/ socialism, or coordinated/market economies are but of little avail.

Building on concepts from regulation theory, this thesis argues that the current system is one wherein state and market institutions support a distinctively industrialist orientation. The Leninist apparatus of bureaucratic controls has come to instill a dynamic wherein economic performance begets political influence, and political stature commands control of capital. Financial markets complement industrial demands for capital, while the ostensibly 'liberalist' reorganization of the public sector and welfare system have attenuated the financial pressures on enterprise exerted by labor. As a result of the common interest of political actors and industrialists in the continuous expansion of productive capital, growth has occurred predominantly through investments in fixed capital.

Stringent limitations exist which undermine achievement of long-term sustainability of the current state-industrialist nexus. Lack of compensatory mechanisms for disenfranchised constituents and the dearth of indigenous innovation are pertinent problems, and moreover, mutually reinforcing. On the one hand, without a continuous increase in relative surplus value (i.e. output per worker) a more egalitarian distribution of income seems unlikely, while on the other, the lack of individual purchasing power subverts intentions to transition towards a model of growth premised on domestic consumption. Indeed, exceptions exist (for example within the telecommunications industry, but ultimately growth in upstream sectors requires commensurate growth in downstream industries. The Chinese 'variety of capitalism' is indeed an idiosyncratic one, but seems to have exhausted its potential.

## Acknowledgements

The stereotype of the PhD student as a monomaniac, working in solitude at a project incomprehensible or worse yet, of no interest to most, is well established. Not so with this PhD, which owes to, and has at times been suffered by many. Over the course of these three-and a half years, there have been many people who have contributed greatly to both my insights and enjoyment of the PhD trajectory. I am grateful to each and every one of them, but some deserve special mention. First off, I would like to thank my supervisor, Dr. Jonathan Liebenau for his patience and support. The approach towards completion of the thesis has been circuitous, but I am indebted to Jonathan for allowing me the full range of my theoretical perambulations (on a related note, he ought to also to be duly acknowledged for adding the word ‘circuitous’ to my vocabulary). His forbearance towards my conceptual erraticism, along with his subtle guidance and unwavering confidence in my capacity to see this project through have allowed me to explore, consider and internalize a variety of theoretical perspectives and substantive topics, which I believe will stand me in good stead.

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## LIST OF ABBREVIATIONS

<b>3G</b>	Third generation (mobile communication standards)
<b>4G</b>	Fourth generation (mobile telecommunication standards)
<b>ABC</b>	Agricultural Bank of China
<b>AMC</b>	Asset management company
<b>BCC</b>	Basic Construction Commission
<b>CAS</b>	Chinese Academy of Sciences
<b>CC</b>	Central committee of the Chinese Communist Party
<b>CCP</b>	Chinese Communist Party
<b>CME</b>	Coordinated market economy
<b>GSM</b>	Global system for mobile communications
<b>ICT</b>	Information and communication technology
<b>ISDN</b>	Integrated services digital network
<b>LME</b>	Liberal market economy
<b>MEI</b>	Ministry of Electronics Industry
<b>MEP</b>	Ministry of Electric Power
<b>MII</b>	Ministry of Information Industry
<b>MIIT</b>	Ministry of Industry and Information Technology
<b>MOR</b>	Ministry of Railway
<b>MOST</b>	Ministry of Science and Technology
<b>MPT</b>	Ministry of Post and Telecommunications
<b>NBS</b>	National Bureau of Statistics
<b>NDRC</b>	National Development and Reform Commission
<b>NIE</b>	New institutional economics
<b>NIS</b>	National innovation systems
<b>NPC</b>	National People's Congress
<b>PBC</b>	People's Bank of China
<b>PLA</b>	People's Liberation Army
<b>RT</b>	Regulation theory
<b>S&amp;T</b>	Science and technology
<b>SASAC</b>	State Assets Supervision and Administration Commission
<b>SEC</b>	State Economic Commission
<b>SEZ</b>	Special economic zone
<b>SIPO</b>	State Intellectual Property Office
<b>SOE</b>	State-owned enterprise
<b>SPC</b>	State planning commission

<b>SSTC</b>	State Science and Technology Commission
<b>TACS</b>	Total access communication system
<b>TD-LTE</b>	Time division long term evolution ( a mobile communications standard)
<b>TD-SCDMA</b>	Time-division synchronous code division multiple access (a mobile communication standard)
<b>TVE</b>	Township and village enterprise
<b>VoC</b>	Varieties of capitalism
<b>VoIP</b>	Voice over IP

# CHAPTER 1

## INTRODUCTION

### **Chinese development: Practical implications and theoretical challenges**

The remarkable success of China's economic development since the initiation of the policies of 'reform and opening up' (*gaige kaifang*) appears as an undisputed fact to all save for its staunchest detractors.<sup>1</sup> Between 1978 - the year in which reforms commenced - and 2010, China's gross domestic product increased more than twenty-fold, from 364.5 billion to 40.26 trillion yuan (NBS, 2012, table 2-5).<sup>2</sup> In that same period, average per capita GDP in constant units grew from 1,366 to 20,086 yuan, putting China well ahead of India, Indonesia and Thailand.<sup>3</sup> While primary industry accounted for 28.2 per cent of GDP, and 69.6 per cent of employment in 1978, by 2010 these ratios had changed to 10.1 and 35.6 per cent respectively. China's economic rise has had implications which far transcend its national boundaries. In 2006 China became the world's largest exporter,<sup>4</sup> and in 2010, China surpassed Japan to become the second largest economy (World Bank, 2013). However, for a country which looms so large within the global economy, the drivers of its astonishing development have often been poorly understood. In particular, China's obstinate defiance to attempts to reconcile it with extant conceptualizations of capitalism provides a profound challenge.

The aim of this thesis is to contribute to the field of comparative capitalism,<sup>5</sup> and in particular, to the budding literature that examines the fundamental characteristics of China's economic system (Peck & Zhang 2013; McNally 2007, 2012; Fligstein & Zhang 2011; Boyer 2012; Redding & Witt 2009) and its capacity to sustain innovation (Liu &

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<sup>1</sup> See for example (Young 2003).

<sup>2</sup> US\$ 148.2 billion. and 5.93 trillion respectively at current prices (World Bank, 2013).

<sup>3</sup> US\$ 155 and 4,430 at current prices (World Bank, 2013).

<sup>4</sup> A status reversed in 2012, when China's account balance surplus was surpassed by that of Germany.

<sup>5</sup> The term 'comparative capitalism' is admittedly somewhat of a misnomer, comprising approaches which range from the neo-institutional to radical and Marxian economics and an equally broad spectrum of economic systems, but is used here in favor of 'comparative political economy' which designates a yet more theoretically and substantively diverse program of research.

White 2001; Gu and Lundvall 2006; Gu et al. 2009). From its revival in the 1990s (Becker 2009) comparative capitalism has developed into a diverse and prolific field. Driven by antipathy towards the empirical indifference of equilibrium and rational choice analyses (Aglietta 2000), this research sought to explain patterns of economic organization and productive outcomes through historical analyses of discrete institutional systems.

Traditionally, developed economies have been the mainstay of studies of comparative capitalism. More recently, the economic development of a number of large countries (Brazil, Russia, India, China) has challenged established precepts about the functioning of economic systems. These countries pursue trajectories of development that in many ways fit poorly with typologies inducted from Western capitalist economies (see Morgan 2011; Lane and Myant 2007; Schneider 2009). Although the structured approach of comparative capitalism provides analysis with a certain consistency, insights from studies on China have been varied, and in some cases contradictory. To an extent, this divergence is attributable to theoretical/ ideological premises that shape conceptualizations of the (capitalist) economic system and guide analytic foci. However, even those authors who work from within the same strand of comparative political economy at times reach contrasting conclusions about the fundamental features of China's economic system. Lack of consensus about the structural features and driving forces of China's economy emphasizes the scope for further empirical research and theoretical advancement within the framework of comparative political economy (Fligstein & Zhang 2011). The study of 'deviant cases' (such as China's), which defy conventional understandings of national economic systems is clearly the way by which theoretical advancement can be made. Moreover, the importance of a sounder understanding of the structure and drivers of the Chinese economy extends beyond the theoretical, as China's economic rise increasingly poses a challenge to the global hegemony of Western liberal capitalism.

Three main questions guide this research. First, can a main coordinating mechanism be identified amongst the various institutional influences that are held to direct patterns of capital distribution over actors and processes of production and allocation? The second



question regards the sustainability of the endogenous dynamics of distributive patterns. Whether regularities in the allocation of capital will lead to over-accumulation and socio-economic divergence or will promote productivity and increase material wellbeing depends on innovation. The second main question this thesis seeks to answer regards the extent to which current patterns of capital distribution can be sustained by the extant capacity for innovation within the Chinese economic system. Bridging the first and second themes is the issue of *comparative institutional advantage*. Institutional arrangements predispose actors to engage in particular productive processes and detract from the pursuit of others. Have the allocative influences of China's institutional architecture been accompanied by the commensurate development of coordinating and incentivizing mechanisms for innovations, giving rise to a distinct set of industrial competences?

This chapter begins with an overview of recent contributions to the comparative capitalism literature on China. These studies adhere to one of three general perspectives. The *exceptionalist* interpretation maintains that China's economic system is the culmination of informal institutions, inherited through centuries of cultural transmittance, or the political apparatus- a legacy of China's distinctive experience of Maoism-Leninism. While China's economy has undeniably changed over the course of nearly four decades of modernization and integration within the global economy, dynamic change and exogenous influences are ultimately embedded within, and subordinate to indigenous social or political institutions. The *transitionalist* view holds that, while China's economic institutions are indeed unique, their idiosyncrasies owe to their transient and hybrid nature. According to this perspective, China is on a gradual but irreversible trajectory from socialism towards capitalism, spurred on by the self-reinforcing dynamics of market production and exchange. Finally, the *universalist* conception asserts that, there is a limited set of feasible economic archetypes. Universalist attempts to include China within extant taxonomies have resulted in classifications ranging from the 'statist' to 'market-based'.

The divergence of these interpretations reflects certain inherent conceptual flaws. Using the concepts of 'theoretical degrees of freedom' (Campbell 1975) and 'conceptual

stretching' (Sartori 1970), it is argued that extant perspectives may be prone to either under-specification of the relevant attributes of economic systems, leading to indeterminate classifications and potentially incomplete analyses, or to over-specification, resulting in a mismatch between theoretical constructs and empirical observations. The *varieties of capitalism* literature<sup>6</sup> (Dore et al., 1999; Hall & Soskice, 2001; Lazonick & O'Sullivan, 1995), which has recently come to extend its scope of analysis to China is a point in case. VoC's analytic approach is firmly rooted within Western capitalism, causing it to assume certain conditions that are incongruent with the Chinese context. Fortunately, this problem is allayed by the theory of *regulation* (Amable 2003; Hollingsworth & Boyer 1997; Boyer 1988; Aglietta 2000). While arguably not sharing the mainstream success of varieties of capitalism (its impact largely confined to continental Europe), regulationist analysis appends the former by allowing for the simultaneous analysis of the economic implications and political qualities of patterns of production and exchange.

A related concern is the sustainability of such patterns, and by extension to the economic system at large. This depends ultimately on whether the utilization of capital results in the systematic increase of economic value, allowing for a virtuous circle of reinvestment and increased consumption. Most comparative literature duly acknowledges the importance of innovation. However, analytic emphasis on the reciprocity between economic institutions and patterns of capital distribution has in certain instances detracted from inquiry into the causes of technological development. These studies have taken for granted the incentives and coordinative mechanisms required for actors to engage in the research, development, diffusion and implementation of technologies. The literature on national systems of innovation has been very much pertained with the dynamics and institutions relevant to instilling within the overall economy the motivation and capacity for technological development. Nevertheless, the systemic incentives and coordinating mechanisms that govern the constellation of social relationships which comprise the national innovation system are embedded within those of the economic system at large. Joint consideration of both the patterns of capital allocation and innovative activity and the relevant institutional context allows for comprehensive analysis of the features,

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<sup>6</sup> Subsequently referred to as VoC

capacities and limitations of the Chinese economic system.

### **The Chinese economy and insights from comparative capitalism**

In recent years comparative capitalism has turned to examining the institutions and social organization of the Chinese economy, heretofore predominantly the purview of specialist research. These studies have resulted in an array of categorizations of the Chinese economy and postulations regarding its main drivers. Generally, these interpretations accord with one of three perspectives. Exceptionalist views assert that China's unique social and/ or political institutions cause its economy to intrinsically differ from other varieties. Transitionalist perspectives acknowledge China's idiosyncratic status, but ascribe this to an institutional disequilibrium that will dissipate as the economy moves from one archetypal system to the other. Universalist interpretations hold that the Chinese economy ought to be understood as a member of a set of national systems belonging to one of a select number of ideal types. Below, the three perspectives will be discussed in more detail.

#### *The exceptionalist perspective*

While the exceptionalist literature is broad and diverse, its common dominator is the insistence on the inability of general analytic frameworks to account for the idiosyncrasies of the Chinese economy. Emphasis on the path-dependent and contextual evolution of the institutions that govern processes of production and exchange induce a tendency towards inductive concept development. For example, Redding and Witt's (2006, 2009) analysis of the Chinese business system attempts to reconcile the emerging features of China's capitalism - a transition from central to decentralized control and the substitution of the profit-motive for a general concern for welfare - with the informal institution of Confucianism. The analytic concerns underlying this analysis strongly resonate with the themes expounded in Weber's seminal work, which juxtaposed the rational and functional orientation of economic organization of the West with the moral and relational qualities of production and exchange in China (Weber 1963). Thus, argue Redding and Witt, China's economic system is characterized by 'personalistic' rather than

contractual association, precipitating a kind of ‘network capitalism’ (Redding & Witt 2010, p.211), a preoccupation with position within the social hierarchy over the pursuit of profit as the overriding individual imperative, and the distinctly paternalistic quality of management-labor relations.

Others have come to focus not on China’s distinctive cultural heritage, but rather on the particular manner in which ongoing economic reforms have interspersed with the legacy of socialism. The latter encompasses an extensive hierarchical apparatus of state and Party organizations and an elaborate centralized system of personnel control that support the pervasive engagement of the Chinese Communist Party within all spheres of the economy and society (Lin 2011). However, decentralization, corporatization and marketization have prompted reconfiguration and functional transposition of socialist institutions. The growth of the market economy has been accompanied by a commensurate expansion of the constellation of Party committees perpetuating political control. Although within public industry, operational and financial authority has devolved into state-owned enterprise, leaders within enterprise and bureaucracy are controlled through the socialist system of personnel administration, ensuring strong reciprocity of industry and state and alignment of corporate and political objectives. Consequently, argues Lin, within China’s ‘centrally managed capitalism’, economic entitlement continues to be predicated on political influence rather than market institutions.

While reiterating the importance of central personnel controls, Xu (2011) contends that the dynamics of the central-local government dyad - rather than state-market relations - constitute the distinguishing feature of the Chinese economy. According to Xu, the devolution of fiscal control from center to provincial government in the initial stages of economic reform has brought about a condition of ‘regionally decentralized authoritarianism’, wherein central Party-state control is paired with extensive fiscal and regulatory authority of provincial government to promote fervent growth-based competition between localities. The exceptionalist literature highlights an array of institutional particularities, often overlooked or poorly understood in generalist accounts. However, the sheer diversity of institutional attributes that are purported to constitute the

main coordinating mechanism within the Chinese economy raises a methodological concern about the validity of theoretical constructs underlying exceptionalist research.

### *The transitionalist perspective*

Transitionalist interpretations of China's economic system are rooted within the broader paradigm of transition economics, occupied with the analysis of post-communist institutional developments. For transition economists, the shift from socialism to capitalism appears as a historical fact and economic necessity borne out of the inherent constraints of the socialist system.<sup>7</sup> With regards to the Chinese context, Naughton (1996) asserted a self-perpetuating capitalist dynamic, following the establishment of a market component. Scarcity of consumption goods impelled rapid entry and market expansion. The development of non-public producers in turn exerted competitive pressures on state-owned enterprises, promoting corporatization and price rationalization. Meanwhile, increases in household savings provided additional investment for the market economy, allowing for its continuous expansion. In a similar vein, Hart-Landsberg and Burkett (2004), echoing Kornai's assertion that economic systems comprise inextricable institutional arrangements (1980), argue that the introduction of market institutions, initiated by the state under the header of 'market-socialism'<sup>8</sup> impelled a trajectory of institutional change reflecting the inherent logic of capitalism, prompting changes within contiguous institutions.

Other transitionalist research has eschewed emphasis on self-reinforcing dynamics in favor of a Polanyian interpretation of capitalist development.<sup>9</sup> Chu and So (2010) use the concept of 'state neo-liberalism' to characterize China's current political economy. The neo-liberal state comprises "a[n] apparatus whose fundamental mission was to facilitate condition for profitable capital accumulation on the part of both domestic and foreign

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<sup>7</sup> According to Kornai (1980) these constraints derive predominantly from the preoccupation of central planning with accelerated growth and the pervasiveness of soft-budget constraints, resulting in a persistent condition of resource shortage.

<sup>8</sup> See Lange, 1937.

<sup>9</sup> Polanyi argued that the liberal market economy, far from being the result of a spontaneous reorganization of production and exchange was the result of a massive socio-political project of institutional transformation, central elements of which were the commodification of labor and land, see Polanyi, 1957.

capital” (ibid, p. 49). This mission commenced with the initial market reforms of 1978, initiated by Deng Xiaoping, and intensified under the Jiang-Zhu administration in the 1990s. Its general features, it is argued, have been the ongoing privatization of industry, the progressive corporatization of public enterprise and the increasing commodification of labor and welfare.

Szelényi in a manner reconciles the above perspective by arguing for transition within transition, a trajectory away from initial entrepreneurial, decentralized and peripheral capitalism towards a centralized state-corporatist form. Nevertheless, he posits, in spite of the continued economic influence of the single-Party state and the ambivalence of property rights “the historical trend [towards market transition] is undisputable” (2010, p.207).

In comparison to the exceptionalist perspective, transitionalist arguments present a more coherent whole, their differences originating in diverging understandings of the process of transition. However, tracing institutional developments to a pre-determined end point likely promotes neglect of phenomena incongruent with, or countervailing the purported convergence towards capitalism. As concerns the dynamics of this convergence, a similar problem presents itself. Explanations premised on the endogenous transformative qualities of capitalism may prove insensitive to the political drivers of change and vice-versa.

### *The universalist perspective*

The universalist line of research, promoting a general conceptual and methodological approach, has only recently come to extend its scope of enquiry to the Chinese economy. Among the various literatures that have emerged in this area, the ‘varieties of capitalism’ (VoC) which emerged during the mid-1990s (Hall & Soskice 2001; Dore et al. 1999; Lazonick & O’Sullivan 1995) has had particular traction in recent years. Focusing in particular on four advanced economies (that of the United States, United Kingdom, Germany and Japan), these studies sought to provide an institutionally-based explanation for patterns of national industrial specialization. According to VoC, the nature of economic activity that comes to predominate within a nation is conditional on the affinity

between a constellation of interrelated institutions.

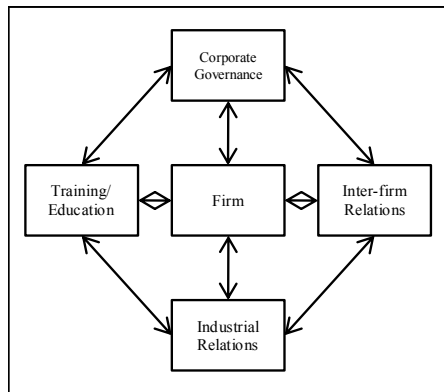


Figure 3: Enterprise and institutional interdependencies in Varieties of Capitalism

Source: (Hall & Soskice 2001)

Within each of these institutional domains, a distinction can be made between a ‘coordinated’ and ‘liberal’ variety. Institutions for corporate governance coordinate interaction between financiers and enterprise management. VoC recognizes two archetypal forms, bank- (credit) and investor- (equity) based. Banks alleviate agency problems by acting as a proxy for a host of owners, thereby mitigating the individual costs of close supervision. Investment funds do not monitor the actions of enterprise management with like rigor, depending instead on a set of universal metrics of enterprise efficiency. However, because investment funds typically face low exit costs due to the extensive market for securities (allowing funds to both divest of extant equity and acquire stakes in alternative enterprise), management has an incentive to ensure firm performance does not significantly or consistently fall below market returns.

Institutions for training and education envelop academic and vocational institutes, responsible for the cultivation of a skilled workforce and the development of scientific knowledge. Here as well, VoC distinguishes between a variety characterized by strong science/education-enterprise coordination and one wherein constituents are more loosely affiliated. In the former, education and research focus on the development of specialized and applied knowledge and skills that are intimately related to the productive processes within enterprise. By contrast, in the liberal variety, education focuses on the

development of generic knowledge and skill and basic scientific research is more prominent. Industry and enterprise generally refrain from large investments in specialized education, emphasizing general skills and competences that are more fungible.

Industrial relations concern the coordination of the distribution of costs and proceeds of production over labor, management and financiers. Coordinated institutional relations are characterized by long-term employment, considerable worker benefits, and standardized, negotiated wages. The commitment of enterprise to employees seeks to ensure stability in worker-management relations, by ensuring consistent and egalitarian outcomes. Thus, wage differentials tend to be relatively low in bargaining-oriented systems and volatility is mitigated by corporate efforts to retain workers. Liberal industrial relations are characterized by an unmediated relationship between employee productivity and wages. Extensive arrangements intended to shield employees from conjunctural movements within the economy are absent, and enterprises are comparatively free to attract or divest of labor as they see fit. Conversely, employees face relatively few constraints in pursuing more lucrative opportunities at competing enterprises.

Finally, inter-firm relations ascribe to the prevailing character of association between economic actors. Coordinated institutions prompt enterprise to build extensive relational networks with suppliers, clients and other producers, in order to capitalize on economies of scale and scope and knowledge exchange. Moreover, enterprises may benefit from reduction of environmental turbulence, since partners may be willing to support temporarily underperforming enterprise. Within the market-based variety, the extent of inter-firm cooperation does not generally extend beyond the terms stipulated by contract, and thus competition tends to be more intensive. Although firms forego the potential benefits of close inter-firm coordination, they are not encumbered by reciprocal obligations and are able to predicate exchange relations purely on concerns of need and profitability. Consideration of these four institutional domains led to an archetypal empirical distinction between liberal market economies (LMEs), exemplified by the U.S. (and to a lesser extent, the U.K.) and coordinated market economies (CMEs), most adequately represented by Germany (and to a lesser extent Japan).



Arguably to pre-empt allegations of analytic bias induced by the distinctively Western origins of VoC, Witt (2010) points to China's idiosyncratic forms of state and enterprise. Establishing the decentralized character of state-market relations and the multi-faceted nature of public and private ownership, Witt continues to evaluate the institutions for finance, industrial relations, education, intra-firm control and inter-firm associations.

China's financial institutions, states Witt, are most profoundly influenced by China's political-economic particularities. While corporate financing is bank –rather than equity-based, a clear divide runs between the state-owned economy, which is the recipient of the overwhelming majority of loans, and the private economy, which has had to resort to financing mechanisms other than credit or equity. Furthermore, while VoC postulates that the bank-enterprise nexus will motivate close monitoring of the latter by the former, enabling long-term, growth-oriented corporate strategies, this is not the case in China. Rather, the main coordinative impetus derives from central and local government, which allocates loans on basis of its broader economic interests, but does not habitually engage in corporate governance. The directive influence of the state thus results in a financial system that is neither coordinated nor liberal.

For the remaining institutions, VoC appears to provide a better fit. While Chinese industrial relations are characterized by comprehensive formal institutions for worker representation and protection, in fact employee autonomy is found to be marginal, as China's labor union functions as an extension of the state and contracts generally provide little rights to redress. Thus, in absence of a functional bargaining mechanism, industrial relations are considered most akin to the liberal variety. Within the context of limited provisions for long-term financial and corporate strategies and unstable employment relations, it is unsurprising that few corporations invest heavily in vocational training, and education is overwhelmingly of the generic variety. While within China, enterprises habitually engage in a range of forms of longer-term association, such networks are generally not conducive to the development and diffusion of knowledge, which can be easily appropriated due to the deficiencies of the intellectual property regime. Rather, actors convene to exploit economies of scope and scale. The lack of long-term vehicles

for joint development and exploitation of knowledge causes Witt to once again opt for the liberal predicate. Finally, intra-firm relations are also considered to be of the liberal variety, with operational authority generally concentrated at the very apex of the enterprise. On basis of this analysis, Witt proposes to classify China as a liberal market economy.

Fligstein and Zhang (2011), repeating the comparative exercise, come to the opposite conclusion. The suggestion that China's economic system might be approximating something like a liberal market economy is immediately dismissed due to the undeniable persistence of state influence. The analysis thus proceeds as an attempt to define an organized [i.e. coordinated] capitalism that according to the authors is a function of the institutionalized relationships among state, enterprise and workers. Characterizing the Chinese system as one "where government control is high, state ownership of firms remains central to the economy, workers are less organized, and a private sector has emerged but in the shadow of the state" (2011, p.51), Fligstein and Zhang conclude that it bears salient resemblance to the French coordinated market system. However, the authors admonish that such a comparison ought to serve as a benchmark for further analysis rather than a definitive classification. A great strength of the varieties of capitalism literature is that it specifies not only the institutional components of economic systems, but also their interdependencies, preventing the kind of indeterminacy regarding theoretical constructs with characterizes exceptionalist and transitionalist accounts. However, due to its binary taxonomy, it shares with the latter the fact that it only allows for a limited set of outcomes. The need to achieve a close fit between the orientation of the overall system and the character of the individual institutional spheres prompts caricaturization of the 'liberal-coordinated' concepts, which in consequence lose much of their explanatory power.

### **Theoretical concerns**

*'Theoretical degrees of freedom' and 'conceptual stretching': Under- and over-specification of economic systems*

All of the above literature has made important contributions to knowledge about the

Chinese economy. Exceptionalist studies have served as a potent exhibit of the consequentiality of indigenous cultural and political phenomena. Transitionalist research has explicated the discontinuous nature of China's economic institutions. Universalist literature provides a comprehensive and generic representation of the institutions that jointly comprise economic systems, adding to the completeness and comparability of analysis. All three paradigms, however, are prone to certain defects. These can be aptly framed within the terminology of 'theoretical degrees of freedom and 'conceptual stretching''. Campbell expounds how, given the plethora of terms which could be introduced to substantiate the relationship between an outcome or state –in this particular case, that of the Chinese economy- and a purported coordinating influence, finding 'an "explanation" that seems to fit perfectly becomes inevitable, through [...] total lack of "degrees of freedom" ' (1975, p.179). Explanations wherein two observations are linked in discretionary manner through introduction of a multitude of terms (i.e. where the number of 'variables' greatly exceeds the number of observations) are prone to conceptual bias, and analysis may simply serve to substantiate foregone conclusions. A straightforward manner in which the risk of such bias can be mitigated is by defining *a priori* the terms that together ought to account for a particular outcome. Not only does this impose stringent limits on the number of explanatory or mediating influences that can be advanced over the course of analysis, but it also ensures comprehensiveness of the conceptual construct. Nevertheless, stipulation of theoretical terms in advance may impel another problem, as empirical observations may not acquiesce with the postulated attributes of those constructs. In such instances, adherence to a universalist idiom is likely to result in 'conceptual stretching' (Sartori 1970), causing concepts to overflow the boundaries of their original meaning.

The problems of theoretical degrees of freedom and conceptual stretching are similar, but clearly, the former is prone to affect exceptionalist accounts, while universalist analyses are likely to suffer from the latter; the transitionalist perspective occupies somewhat of a middle ground between the two and is to an extent vulnerable to either shortcoming. From a methodological viewpoint, while both impel manipulation of explanatory terms, lack of theoretical degrees of freedom forces unjustified selectivity,

whereas conceptual stretching promotes inaccurate use of pre-established constructs. Because it is easier to assess *ex ante* the incongruence between universal concepts and the Chinese idiosyncrasies identified by exceptionalist research than to determine the validity of any exceptionalist account, the approach adopted here is to adhere to an essentially universalist conceptualization. The following section considers in detail certain fundamental assumptions of varieties of capitalism that confound analysis of the Chinese economy.

### *The theoretical postulations of varieties of capitalism and incongruent cases*

Exceptionalist studies are often unclear as to what constitutes an economic system, and without articulation and consideration of its constituent elements it is impossible to assay whether purported coordinating influences can truly account for distributions of capital. Universalist interpretations are more explicit in this regard but likewise, a great deal is taken for granted.

As regards varieties of capitalism, incompatibility derives not from a flaw in the various institutional categories (finance, industrial relations etc.), but rather from the underlying assumptions regarding the two basic notions of ownership and exchange. VoC considers coordinating mechanisms, the main social mechanisms by which production and exchange are organized, only insofar as they aid in the mitigation of transaction costs. This bias is induced both by the conceptual indebtedness to the new institutional economics (NIE)<sup>10</sup> and an empirical focus of VoC on national economies where the distribution of rights and responsibilities associated with ownership, utilization, and transfer of factors of production are firmly embedded within the (superordinate) institutions of property right and contract law (Hamilton 2006). These property rights specify the nature of interactions that arise over the course of use of property (Furuboth and Pejovitch 1972). How costs and utility derived from the transfer or use of a resource are deposited amongst actors becomes of primary importance, because utilization of that resource implies benefits or detriments beyond those incurred directly by the actor (i.e.

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<sup>10</sup> In the introduction to 'Varieties of Capitalism' (2001), Hall and Soskice draw extensively on the work of Williamson, citing him nine times.

externalities, Demsetz 1967). The whole question of coordinating mechanisms (i.e. the market and the hierarchy) comes forth out of the incapacity of property and contract law to fully encompass the range of externalities that may arise out of transaction (Williamson 2000). Consequently, analysis focuses on processes of alleviating such transaction costs. This problem is ultimately reducible to two perennial problems; that of information asymmetry (Akerlof, 1970; Coase, 1937; Stiglitz, 2002), and that of asset specificity (Williamson, 1983).<sup>11</sup> Accordingly, the responses within each institutional domain are either to 1) avoid exchanges and production prone to effect the onset of such problems (i.e. to align productive processes to the utilization of generic and widely available resources) and to rely on (relatively) unambiguous informational cues for allocative decisions or, 2) to rely on *ex-market* institutions, providing a greater degree of interdependence to assuage the problems of information asymmetry and asset specificity<sup>12</sup>.

Perspectives that treat the property rights regime as a given rather than the outcome of the historical development of exchange relations within a specific spatial context are both empirically and conceptually misguided. First, they ignore coordinating mechanisms other than those grounded within the principle of contractual obligation. Consideration of exchange relations premised on reciprocity rather than contract reveals at least two alternative archetypal coordinating mechanisms, those of the state and of the civil society (Hollingsworth & Boyer 1997). The consequences of allowing for alternative mechanisms of coordination are not merely taxonomical but necessitate an expansion of the ‘institutional motive’ beyond the mitigation of transaction costs. Both society and state distinguish themselves from the coordinating mechanisms typically considered by VoC by the relatively lesser importance of *ex ante* specification of rights.<sup>13</sup> Rather, whether and how constituents can hold their counterparts accountable is dependent on the

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<sup>11</sup> *Information asymmetry* relates to the degree to which the nature of a resource or a course of action prohibits *ex ante* full conveyance of its utility.

*Asset specificity* refers to limitations on the deployment of that asset within productive configurations other than the contractually stipulated one.

<sup>12</sup> Again see Williamson (1983).

<sup>13</sup> Even in democratic societies, citizens generally do not dictate the rationale and nature of government action *ex ante*, but rather reciprocate *ex post* by way of the voting mechanism.

distribution of political influence within the system. Because different constituencies will tend to display diverging preferences for the distribution of the factors of production and its output, the distribution (hierarchy) of political influence becomes a crucial determinant of the patterns of economic activity within national systems. Thus, if in advancing the logic of eliminating transaction costs, the NIE and comparative approaches it inspired provided the main coordinating mechanisms of market and hierarchy, the argument has to be extended to allow for the crucial role of institutions in shaping and perpetuating the distribution of political influence over constituents.<sup>14</sup>

		<b>VoC</b>			
<b>Institutional Motive</b>		Efficiency		Entitlement	
<b>Institutional Principles</b>	<b>Ownership Exchange</b>	Property Contract		Status Obligation	
<b>Coordinating Mechanism</b>		Market (LME)	Hierarchy (CME)	State	Society
<b>Institutional Domains</b>		Finance/ capital Labor Inter-actor alignment			

*Table 1: Universalist frameworks, assumptions and extensions*

The centrality of the institutions of property and contract and the overriding importance of eliminating transaction costs within the VoC are at odds with China's trajectory of institutional development. The immediate motivations for the restructuring of property relations and mechanisms of coordination following the establishment of the People's Republic were clearly political. Property under communism, while nominally under the common purview of the people, was in fact internalized in an economic dictatorship administered by way of a central plan. Although the reforms that commenced in 1978 allowed for the gradual development of private ownership, property rights and contract law have retained a tenuous quality throughout. Only in 2007 did the state officially endorse the right to private property. Moreover, explanations based solely on the logic of transaction costs ignore the patently political quality of the allocation of capital. From the

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<sup>14</sup> A focal concern within the sociological institutionalism (Meyer and Rowan 1977; DiMaggio and Powell 1983; Barley and Tolbert 1997 etc.).

many accounts (both internal and external) of rampant rent-seeking that pervades all tiers of the economic administration to the myriad more complex inter-actor dynamics founded on status and reciprocity, it ought to be obvious that analysis on basis of Coasian and Williamsonian principles alone, disregarding political influence<sup>15</sup> will fail to appreciate many fundamental aspects of the Chinese ‘variety of capitalism’.

A second problem within the VoC is the assumption that the systemic proclivity is towards the steady state. Considering the juxtaposition between the two proposed alternatives (i.e. market-based or organized coordination), it is perhaps not surprising that institutional systems are expected to exhibit a systemic propensity towards either close coordination or market exchange. This intuition is formalized through the concept of institutional complementarity. According to Hall and Soskice, “institutions can be said to be complementary if the presence (or efficiency) of one increases the returns from (or efficiency of) the other” (2001, p.17). The influence of such complementarity is held to be self-asserting, because “the constraints and possibilities defined by a given institution favor other institutions’ functioning” (Amable 2000, p.656).<sup>16</sup> On account of the purported increasing returns obtained through the reciprocal alignment of the overall institutional system, tendencies towards deviation within individual institutional domains are constrained, promoting the onset of a relatively immutable ‘institutional equilibrium’.

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<sup>15</sup> We can further explicate the necessity to distinguish between transaction-cost and politically impelled mechanisms of coordination. While rent-seeking and opportunism clearly has a central place in the NIE discourse, the fundamental distinction is between the factors prompting such behavior. For transaction-cost economics, the scope for opportunism derives from the inability of contracts to account for the contingencies which arise as a result of the attributes of assets. By contrast, within politically driven processes of allocation/appropriation, actors’ capacity for expropriation is a result of the coercive influence derived from their status within the socio-political hierarchy.

<sup>16</sup> Examples of such institutional complementarity abound. Equity (i.e. investment)-based finance is complemented by an extensive market for managerial labor. The threat of replacement acts as an additional incentive for corporate management to act in accordance with the interests of enterprise owners. Another example of such institutional complementarity occurs at the intersection of the institutions for education and industrial relations. Long-term employment provides incentives for workers to acquire skills and knowledge particular to one industry or enterprise, while industry-wide wage standardization mitigates the risk of skilled staff ‘defecting’ to rival enterprises, promoting corporate investment in vocational training. However, the trajectory of institutional change has been markedly erratic and has been characterized by continuously alternating relationships between the institutions for labor, finance and governance.

This assumption too is problematic within the Chinese context. Transitionalist accounts aptly describe continuous processes of institutional change and a constantly evolving structure of production of the Chinese economic system. The logic of VoC might apply if the patterns of change would point consistently towards a definite institutional configuration or convergence on a set of technologically and organizationally compatible productive processes. However, transformation across the various institutional domains has been uneven, unfolding at different speeds and, in certain instances, occurring in opposite directions.

### *Reconciling economics and politics: regulation theory*

Regulation theory<sup>17</sup> (Aglietta 1998; Aglietta 2000 [1979]; Boyer 1990) has likewise sought to elucidate the manner in which institutional arrangements promote a coherent productive logic, and shares many of the assumptions of VoC. Yet, owing to its Marxian origins, RT has been more sensitive to the political qualities of economic activity, and subsumes both institutional motives of efficiency and entitlement. Within the varieties of capitalism, the composition of institutional architectures, and therefore the institutional motives that they espouse follow from the technical and organizational qualities of the productive process (fungible/ transient, specialized/ persistent). By contrast, regulation theory considers the cognitive and normative postulations providing the fundamental premises for the social organization within economic systems to result from the purposive discursive projects of political-economic elites. Underlying each economic system is a paradigm for economic development, a *concept of control* which forms the basis for deliberate efforts to construct, develop and perpetuate a particular mode of production (Lipietz 1988; Van der Pijl 2012). Such concepts do not indiscriminately represent society at large, but promote the interests of a dominant class.<sup>18</sup> At the same time, in order to be

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<sup>17</sup> Subsequently, regulation theory is at times referred to as RT. 'Regulation' is to be understood as 'normalization' (of social relations), rather than government supervision of industrial activity (Aglietta 1998).

<sup>18</sup> Van Der Pijl follows Marx in defining the interest groups within the capitalist system by the functional forms of capital, that is the mode by which returns are extracted. *Commodity capital* is used exclusively as a medium for the exchange of goods (e.g. commercial credit). If commodity capital allows for the exchange of extant commodities, *money-capital* (e.g. corporate loans and equity) enables the exchange of current for future capital. Investors and creditors (individual or represented in the aggregate by banks and other financial institutions)



broadly perceived as legitimate, these concepts need to account for the interests of other constituents. As such, they encompass both notions of efficiency and entitlement.<sup>19</sup>

It would, however, be erroneous to hold the distribution of capital within any economic system to be a direct expression of the concept of control. After all, the myriad variations and divergences that naturally accrue during the continuous reproduction of relationships of production and exchange - factors simply unaccounted for within a given conception and deliberate strategies of defection - all cause modes of accumulation to differ from the comprehensive strategies of reproduction within concepts of control (Jessop 1990). Rather than determining economic activity in direct fashion, such concepts provide actors with a conceptual and discursive point of reference, creating expectations as regards behavior of other parties<sup>20</sup> and delineating a space in which legitimate processes of institutional formation and contestation unfold. In order to appreciate the nature and degree of pressure to which a concept of control is subjected (and thus the degree to which the economic-political compromise propagated by that concept is validated or contested), the overall quality of the distribution of capital has to be considered separately. Regularities in the allocative process are expressed in a *mode of accumulation*, a systemic relationship between production and consumption, in turn intimately associated with the overall characteristic of economic growth. Within the *extensive* mode of accumulation, increases in productivity result from the exploitation of

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allocate capital on the basis of the prospect of future returns. Commodity and money capital, representing the interests of traders and rentiers, espouses a logic of international economic liberalism, in which the circulation of capital is unimpeded and frictionless. In contrast to these concepts, in which rents are extracted through arbitration between the myriad potential allocations of capital, the industrial capitalist considers rents to be the exclusive outcome of the productive process. *Industrial capital* (e.g. retained earnings), commanded by the captains of large enterprise seeks to perpetuate and expand production. Ensuring the continuity of full-scale production at times of economic downturn causes the industrialist conception to advocate the intermediation of the state within the circulation of capital.

<sup>19</sup> The notion of ‘concepts of control’ invokes comparison to the notion of ‘institutional logics’, “the socially constructed, historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality” (Thornton & Ocasio 2008, p.101).

<sup>20</sup> Compare Hall and Soskice (2001, p.13): “[W]hat leads the actors to a specific equilibrium is a set of shared understandings about what other actors are likely to do, often rooting in a sense of what it is appropriate to do in such circumstances”.

heretofore unutilized resources and labor (Aglietta 2000; Andreff 1978). Expansion of economic activity unfolds without comprehensive technological change. Under *intensive* accumulation, growth occurs primarily because of reconfiguration of productive processes where surplus value is created by the substitution of capital for labor, and thus the relative share of labor within the productive process decreases (Lipietz 1988). Limits exist to the capacity for expansion and thus, sustainability of extensive accumulation. On the one hand, these reflect physical constraints on the exertion of the worker (Brenner & Glick 1991). On the other, the direct trade-off between working wages and actualized surplus value within extensive accumulation prevents the formation of sufficient consumption power (and demand) to enable capitalization on scale economies.

Economic considerations aside, the direct (negative) correlation between the expansion of capital and consumption expenditure exerts strain on social stability. When the creation of surplus value depends on the direct exploitation of labor, the social strain exerted by the expansion of production is exacerbated (Aglietta 2000). These qualities of extensive growth precipitate crisis, necessitating an eventual transition towards a (predominantly) intensive pattern of accumulation. Indeed, regulation theory holds the succession of extensive by intensive growth the primary characteristic of the trajectory of capitalist development (ibid). However, to the extent that increasing returns of capital impels reinvestment in fixed capital, and in consequence, the progressive substitution of labor (see De Schweinitz, 1957), intensive accumulation too will exhibit an endogenous, socially destabilizing dynamic.

Ensuring the continuity of processes of accumulation is the *mode of regulation*, the set of institutions that mitigates destabilizing tendencies by validating certain social relationships and behavioral norms. Such a mode of regulation needs to address the wage relation (i.e. principles for the disbursement of surplus value to workers), the compartmentalization of production (and in particular the nature of competition), and the nature of money (and in particular the conditions upon which money is made available) (Jessop 1992).

Notwithstanding its inherent finiteness, extensive accumulation can be sustained for a considerable period provided labor and material is available in ample supply and unmet

demand exists (Brenner & Glick 1991). Under such conditions, accumulation is expedited by constraints on wage growth, and commodity money. The first condition ensures that the cycle of production and investment can proceed in an unfettered manner. Moreover, imposition of longer work days and more strenuous demands allows for extraction of absolute value from labor which in turn may be used for the further expansion of production.<sup>21</sup> Likewise, with access to capital directly contingent on supply of commodities, actors will seek to maximize output, which in turn promotes continuous addition of fixed capital and labor. Finally, production is organized in accordance with economies of scale and scope furnished by extant demand. The distinct impetuses and antagonisms of intensive accumulation demand an altogether different mode of regulation. Growth occurs predominantly through increases of per worker output, attenuating tendencies towards the direct expropriation of workers. Yet, wages ought to allow for redistribution of attained surplus value to counteract the marginalization of labor occurring through its progressive substitution by capital, and to create the capacity for consumption required to absorb the increase of output. The financial regime needs to accommodate for technological reconfiguration, and capital is supplied on the basis of future expectations rather than current output. Technological development also requires enterprise to have considerable discretion in determining the scale and scope of production.

Together, concept of control, mode of regulation and accumulation regime comprise a coherent construct for the analysis of economic systems, better suited to deal with the idiosyncrasies of the Chinese case which confound research within the vein of varieties of capitalism. Through introduction of the concept of control, regulation theory departs from the type of technological determinism<sup>22</sup> that characterizes explanations of institutional configurations within the VoC, and explicates the distinctly political influences within the process of institutional formation. The establishment of concepts of control is a ‘hegemonic project’ (Jessop 1990, p.6), which advances the interests of a dominant class,

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<sup>21</sup> Marxian economics distinguishes between *absolute* and *relative* surplus value, the former referring to fact that increases in value correspond directly to increases in labor and capital, while the latter signifies that value is realized through an increase of labor productivity.

<sup>22</sup> On technological determinism, see Skinner, 1976.

but in order to become feasible nevertheless needs to garner the support of other economic constituents by explicating the general advantages of the proposed strategy for production. In this manner, regulation theory subsumes both issues of efficiency and entitlement. Concepts of control are a crucial formative influence on modes of regulation since they provide the communal logics and norms for deliberate attempts at institution building.<sup>23</sup> However, the mode of regulation is not fully encapsulated by such coordinated, purposive action, but also subject to reflexive and peripheral deviations from normalized practice. Nevertheless, by promoting the continuous reproduction of particular sets of social behavior, regulation is instrumental in attenuating –although not altogether eliminating- the inherent destabilizing tendencies of the process of accumulation. Chief amongst these are the inherent limitations of extensive accumulation that necessitate, at some point, a transition towards intensive growth. *Prima facie*, regulationist insistence on the disruptive dynamics of accumulation seems to accord better with the observed impermanence of Chinese patterns of production and institutional configuration than the equilibrium orientation of VoC. Of like importance, the regulationist concepts introduced above are predominantly focused on describing the dynamics of accumulation and institutional formation, but refrain from stipulating the impetus behind these dynamics. Whereas within the VoC, the ‘coordinated’ and ‘liberal’ institutional forms are directly retraceable to the archetypal forms of the hierarchy and market, regulation acknowledges that the incentive structures and organizing principles underlying patterns of accumulation may likewise be instilled by way of society or state.

*The dynamic aspects of system performance: the issue of innovation*

Notwithstanding the utility of regulationist concepts one question persists. Transition from extensive to intensive accumulation cannot simply be accounted for by a shift in regulation. Certainly, such a transition requires technological conditions that allow for the development and introduction of more efficient methods of production. Earlier

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<sup>23</sup> For similar arguments within the space of organizational institutionalism, see for example Dorado, 2005; Fligstein, 1996.

regulationist accounts availed themselves of the concept of techno-economic paradigms<sup>24</sup> (Dosi 1982; Perez 1983; Breschi et al. 2000) to explicate patterns of innovation and the institutional influence of technology (Roobeek 1987; Lipietz 1988; Boyer 1988). However, referral to an external and universal technological logic can hardly explain the persistent differences in the rate or substantive distribution of technological advances between economic systems. Reasons for such diverging patterns must lie in the manner in which extant institutions facilitate or constrain the development and diffusion of new technology. Here, another body of work within the general space of comparative political economy (Amable 2000) is of avail.

The institutional foundations of innovation within economic systems are the main focus of work within the area of national innovation systems (NIS, Freeman, 1987; Lundvall, 1992; Nelson, 1993). The emphasis of this body of work has been on analysis of the necessary institutional conditions for the invention, development, diffusion and commercialization of technology. According to the NIS, the general requirements are essentially twofold. First, institutions need to mitigate uncertainties inherent in innovation. Uncertainty obtains at each stage of the innovative process; whether scientific understanding is, or will come to be, capable of inducing a certain function, whether such functions can be adequately harnessed and scaled within an industrial configuration (Nelson & Rosenberg, 1999), whether actual demand, sufficient to offset the costs of technological development exists, and whether innovators will be duly compensated for their efforts (Teece 1996). Second, institutions need to facilitate complex coordination between a variety of actors. Innovation involves the transfer of knowledge and skills which are often tacit and originate within distinct ‘epistemological communities’ (Lundvall 1992; Asheim & Gertler 2005). NIS holds that the overall scope and rate of technological development hinges on the capacity within national systems to deal with the twin problems of uncertainty and coordination. However, this systemic capacity extends well beyond the general purview of the aforementioned institutions for labor,

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<sup>24</sup> Techno-economic paradigms focus on explicating long-wave patterns of productivity (e.g. Kondratiev waves) as a result of the interaction of the technological scope resultant from advances in science and the constraints further exerted on technological development and implementation by price and demand characteristics.

finance and the organization of production and calls for coordination across enterprise, market, state and society (Etzkowitz & Leydesdorff 2000).

A related concern is the substantive distribution of technological development. Within economic systems, the pace and magnitude of innovation is not uniform across industries, but rather tends to be concentrated within particular productive processes. Thus, different economic systems tend to display diverging comparative advantages (or weaknesses). An explanation for such technological specialization is found in the manner in which the technical and organizational demands of distinct production processes intersperse with institutionalized patterns of economic behavior (Boyer 2005). Processes of production follow dissimilar trajectories of technological development, some unfolding in cumulative manner, while others display considerable discontinuity (Dewar & Dutton 1986; Soete 1985). Additionally, within certain industries, innovation requires adjustment of a multitude of interdependent processes, while in others it unfolds in autonomous fashion. This implies differences in the commensurate permanence of social ties and complexity of interaction between and within the spheres of science and industry and the demands imposed on finance, labor and inter-actor alignment. In this manner, the matter of national technological specialization bridges the concepts of regulation and innovation system.

## **A framework for analysis of the Chinese economic system**

### *A main coordinating mechanism*

In the preceding sections, a variety of interpretations of the fundamental characteristics of and dynamics within the Chinese economy was presented. Exceptionalist studies emphasized how, in spite of the introduction of market exchange and a private component of the economy, indigenous political and cultural institutions continue to exert great influence over the economy. Transitionalist perspectives have captured the transient character of Chinese institutional arrangements. Universalist literature has added to analytic rigor by providing comprehensive and coherent conceptual frameworks. Two problems were postulated with regards to extant research. First, lack of *ex ante* theoretical specification allows for indiscriminate introduction of explanatory terms, so that any

salient observation may appear a plausible cause for the state of the current economy. Second, most universalist theory is prone to over-specification, having been built on assumptions that originated within capitalist-centric thinking. Two assumptions of the varieties of capitalism which are particularly problematic within the Chinese context are the purported significance of property rights and market coordination, and the institutional proclivity towards a steady state. In order to address these problems while avoiding the risk of theoretical under-specification another universalist perspective, regulation theory, was introduced. Concerned with explicating the political foundations, dynamics of capital-distribution and institutional interdependencies of economic systems, regulation theory does not assume the dominance of market-coordination. Moreover, the inherent dynamism within and across processes of accumulation seems to better agree with the continual change within the Chinese system.

The concepts of regulation theory will form the basis for the first empirical section of this thesis which is concerned with uncovering a main coordinating mechanism. Four such mechanisms have been introduced. The market and hierarchy operate on institutional principles of property right and contract, their chief difference existing in the interdependency between actors, where the immediateness and explicit delineation of actors' rights and responsibilities within markets impels high sensitivity to supply and demand conditions, while the more diffuse quality of intra-organizational contract implies greater forbearance (Williamson 1991). Organization in state and society rather adheres to principles of status and obligation. In contrast to market and hierarchy, the social contract is implicit and communal, and cannot be entered or abrogated at the discretion of any one individual. The difference between state and society consists of the mode of compliance, the former being *de jure* and the other *de facto*.

Universalist analysis does not directly address the issue of the coordinating mechanism, but rather infers it from the observed characteristics and dynamics of production and exchange. The concept of control, providing the cognitive and normative underpinnings for a communal template for production, subsumes both motives of efficacy and entitlement. In specifying the purported roles of economic actors –bureaucrats, labor, financiers, managers etc.-, and coordinating mechanisms, the concept

of control not only describes a functional alignment, but also a socio-economic hierarchy, prioritizing the interests and prerogatives of certain constituents over those of others. Because the mechanisms of state, society, market and hierarchy imply different distributions of authority across these actors, their respective status within the concept of control provides important clues as to the general orientation of the economic system.

Further corroboration of the insights derived from analysis of the concept of control can be derived from the distribution of capital over constituents. Examination of the accumulation regime allows for further specification of control over capital, by considering whether capital displays systemic tendencies to agglomerate within industry, finance, bureaucracy or labor. Moreover, diverging motives associated with each of these spheres will impel different dynamics within the allocation of capital. At least with regards to industry, finance and labor, such relations have been postulated. Thus, the chief concern of industry is held to be the incessant operation and expansion of the productive cycle, ensuring the continuation of the process of valorization (i.e. creation of surplus value) and the “autonomy of the capitalist center” (Aglietta 1979, p.216). For finance, the purported motive is the maximization of returns, and therefore the magnitude of dividends is prioritized over the stability or expansion of production (Van der Pijl 2012). Pursuit of highest returns demands nimble capital, prompting the concentration of capital in debt and equity markets. Labor seeks conditions of full employment and rising wages, which ought to result in a comparative expansion of wages and consumption expenditure. The motives of the bureaucracy are less determinate. Unchecked, government may pursue either expansion of the bureaucracy or the maximization of economic output, since both bestow upon bureaucrats financial benefits (Przeworski & Limongi 1993). However, to the extent that state legitimacy depends on the support of other constituents (i.e. absent direct oppression) their interests will also impinge on the bureaucratic remit. Nevertheless, the prominence of state coordination may be imputed from such indicators as the size of the public sector and volume of fiscal revenue.

A second pertinent characteristic refers to the predominant character of accumulation. Since extensive and intensive accumulation is subject to distinctive dynamics and constraints, they exert different demands on the mode of regulation. Additionally, the



quality of accumulation is of great importance to the long term viability of the overall system, and analysis thereof serves as a necessary prelude to the more intensive discussion of systemic sustainability presented in the second empirical section.

The mode of regulation is not only relevant in explicating the hierarchy of coordinating mechanisms within the spheres of labor, capital and inter-actor alignment, but also in explicating their operative logic. Two aspects are of particular interest. Analysis of the mode of regulation demonstrates how the institutions of the economic system promote establishment of a stable production regime through the continuous replication of distinct patterns of social behavior. Of like importance is the manner in which coordination across institutional spheres allows for a particular distribution of capital over actors and industries.

<b>Concept of control</b>	Institutional Motive	
<b>Accumulation regime</b>	Institutional Principles	<i>Ownership</i> <i>Exchange</i>
	Coordinating Mechanism	
<b>Mode of regulation</b>	Institutional Domains	

*Table 2: The universalist framework contextualized in the regulationist idiom*

Jointly, the concepts of the regulationist framework allow for inference of the universalist principles discussed above. The concept of control, espousing a communal representation of the roles allotted to particular actors and the principal mechanisms of organization, and dictates the import of technical and normative concerns. The accumulation regime describes regularities in the flow of capital, both across investment and consumption and across disparate actors. Such flows are expected to correlate to the manner in which rights to ownership and principles of exchange are deposited, and thus suggest the predominance of either principles of property and contract or status and obligation, and more specifically, the operation of these principles in the coordinating forms of market, hierarchy, state and society. The mode of regulation encompasses the institutional architecture which coordinate labor, capital and the organization of production but moreover emphasizes the interdependence between these institutions. The concept of

institutional complementarity suggests that the functioning of these institutions tends to converge on a single logic, which in turn can be attributed to the specific hierarchy of the mechanisms of market, hierarchy, state and society, thus bolstering insights obtained from study of the accumulation regime (see table 2).

### *Gauging sustainability and competitiveness*

Notwithstanding the merits of the regulationist framework, it is unable to provide a satisfactory means of examining the two remaining questions posed in the introduction. The first of these regards the sustainability of accumulation and thus by extension, of the economic system at large. This depends ultimately on the capacity of the system to engender the continual reconfiguration of capital, labor and knowledge into constellations that yield value over and beyond extant configurations. The incentives and coordinating influences exerted by the institutions that govern the processes of technological creation, development, diffusion and implementation are the focus of the second empirical section. By explicating the quality of relationships required for innovation, NIS allows for the characteristics and outcomes of technological change to be contextualized within the overall orientation and coordinating influences of the national economic system. Nevertheless, it is understood that the ‘national innovation system’ is embedded within the economic system at large. Hegemonic concepts of control expound elite views on the utility of technology as a productive resource as well as the outcome of a production process, and are instrumental in the development of policy. The structure of production and distribution of capital and interdependencies between the institutions for finance, labor and inter-firm coordination will constrain both the identity of actors within, and the scope and orientation of the innovation process.

A final question regards the qualitative aspects of innovation. Dissimilar productive technologies display diverging degrees of homogeneity and interdependency, and therefore development demands dissimilar organizational demands. The capacity within the various institutional domains to sustain technological development is dependent on the capacity to reduce uncertainty and effectuate coordination across the spheres of state, science, and furthermore to do so in a manner commensurate with the organization and

economic characteristics of particular processes of production. The identification and explanation of such instances of institution-industry reciprocity guide the final part of empirical analysis, and provide the basis for a discussion of a potential enduring comparative institutional advantage and its potential implications for the long-term viability of continued accumulation and the tenability of the current mode of regulation.

### *Prospective contributions*

This study draws on, and seeks to integrate a variety of institutional literatures. Departure from pre-established frameworks ought to be validated by provision of insights otherwise unobtainable. A central ambition of this research is to allow for due examination of China's idiosyncratic institutions – a focal point among sinologists – by considering their consistency and degree of influence across units and levels of analysis. In this manner, *a priori* assumptions of exceptionality, resulting from a lack of theoretical degrees of freedom, are avoided. In similar vein, the *a priori* interdependencies of institutional elements assumed within universalist approaches are eschewed in favor of an approach which allows for these interrelations to emerge from empirical observation.

Second, this research seeks to extend insights derived from institutional analysis of the economic system to the crucial area of innovation and technological change. Regulationist approaches have traditionally treated the innovation as an exogenous factor, while the national innovation systems framework focuses narrowly on the subset of institutions and relationships directly relating to innovation, without considering their embeddedness in the economic system proper. Drawing on theoretical propositions from all aforementioned literatures, this research considers the issue of innovation both in terms of scale and scope. Further understanding of the relationship between national institutional architectures and the systemic propensity for engendering technological change is expected to follow from consideration of the aggregate effect of the various institutional domains on the capacity of economic actors to deal with uncertainty and coordination of development, diffusion and implementation. Moreover, by relating institutional orientations to attributes of specific types of technology, -rather than treating technological development as a process exerting homogeneous demands across

industries- this research aims to demonstrate the interdependency between technological development and broader institutional change.

### *A note on methodology*

Generally, the approach adopted here is that of a historical, contextual analysis. The orientation of analysis is both structural and longitudinal. The research considers a comparatively long period, commencing with the establishment of the People's Republic of China and extending into the present. The reasons for doing so are twofold. First, processes of institutional formation, diffusion and adjustment unfold incrementally and generally span decades if not centuries (Williamson 2000; North and Weingast 1989). Adequate description and analysis of institutional structures -that is, if postulated institutional forms are not to appear like *deus ex machina*- requires an understanding of their antecedents and formative factors, and thus adoption of a long-term view. These evolutionary processes are particularly relevant within the context of China where, as mentioned previously, institutional arrangements display a peculiar transience. Disentangling enduring dynamics of coordination from ephemeral interspersions requires repeated observation over time, and thus trajectories of institutional development need to be considered in their entirety. However, frequency is no proxy for centrality, and as such repeated observation of one or the other dynamic within the process of capital allocation alone cannot demonstrate its overriding importance.

Postulation of one or the other coordinating mechanism however prompts expectations of consistency among institutional principles and motives, and correspondingly, among the interdependency of accumulation regime, mode of regulation and concept of control. Thus if one or the other regularity in the distribution of capital over productive processes and constituents is to be considered the coordinating mechanism, its influence ought to be expressed across the constituent parts of the institutional architecture as well as across the analytic units of concept, mode and regime. For example, Aglietta (2000 [1979]) described a 'Fordist' mode of production predicated on a tripartite covenant between enterprise, society (labor) and government, propagated and sustained through the 'corporate-liberal' discourse of the New Deal (Van der Pijl

2012). Under Fordism, long-term finance and extensive corporate control over the organization of labor allowed for bureaucratic planning, promoting the perpetual and incremental reorganization of standardized productive processes to achieve economies of scale and quality improvements. Simultaneously, strong unions and institutional wage increases not only alleviated antagonism between capital owners and workers, but also provided the latter with the requisite disposable income to sustain mass production. Although it is not necessarily so that, at any particular point in time, institutional motive, principle and coordinating mechanism are aligned, such alignment *is* a prerequisite for systemic stability and therefore, ought to be inferable in the aggregate. For this reason too, it is important that analysis takes on a longitudinal character.

The second section of this thesis, examining the capacity of the Chinese economic system to promote and sustain continuous innovation reconciles the conceptual framework of innovation systems with the regulationist theory by analyzing discourse, institutions and patterns of technological development and embedding it within the broader structural analysis.

Because the thesis encompasses a multitude of aspects of the economic systems, it draws on an extensive array of data. Since the development, contestation and propagation of concepts of control is a process unfolding predominantly within the political sphere<sup>25</sup> (Van der Pijl 2012; see also Schmidt 2007), focus is on political discourse. Government's five-year plans (*wu nian jihua*) are of particular use since they are the product of a compromise between various relevant actors. Examination of the mode of accumulation is based chiefly on statistical material, and three datasets in particular. The 'historical national accounts of the People's Republic of China' (1997, State Statistical Bureau of the P.R.C.-Hitotsubashi University) comprises a wide array of macro-economic indicators for the period 1952 to 1978. Until 1978, Chinese national accounting followed the socialist material planning system (MPS), which divided flows of capital on basis of sectoral allocation and output in terms of the output of industrial and consumption goods. Within the 'historical accounts', MPS-data has been converted to estimates of indices of the standard system of national accounts in accordance with the computational practices

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<sup>25</sup> 'Political' here is meant to refer to the political apparatus (i.e. the state and Party).

maintained by the Chinese National Bureau of Statistics (NBS). As such, the data for the period 1952 to from the ‘historical accounts’ is directly comparable with post-reform data from the China Statistical Yearbooks (NBS). The macro-economic data of the ‘historical accounts’ is complemented by the ‘China compendium of statistics 1949-2004’ [*xin zhongguo wushiwu nian tongji ziliao huibian*] (NBS, 2005), which provides a large array of relevant socio-economic indicators and information on state allocations. Finally, analysis of the features of the institutional architecture depends on relevant policy documents and secondary studies.

# **PART I**

## **IN SEARCH OF A MAIN COORDINATING MECHANISM**

## **CHAPTER 2**

### **CHINA'S CONCEPT OF CONTROL: FROM MAOIST-LENINIST INDUSTRIALIZATION TO THE SOCIALIST MARKET ECONOMY**

#### **Introduction**

The theoretical section presented two complementary perspectives on economic systems. Approaches in the vein of comparative capitalism, such as the varieties of capitalism and regulation theory consider the interrelation between dominant interests and principles, structures of governance and patterns of distribution of capital over actors and productive processes. The national innovation systems literature examines how institutionalized incentives and coordination determine the system's capacity to engender technological development, a prerequisite for the sustainability of the social organization of production. This first part of the thesis, follows the comparative capitalism and focuses on the cognitive and normative foundations, instruments and distributive implications of economic governance. The theoretical section demonstrated how national economic systems can be conceived of as composed of three elements; a concept of control, a mode of accumulation and a mode of regulation. This chapter, the first of five empirical chapters, focuses on the concept of control. The concept of control constitutes an elite representation of the social organization of production and distribution of capital. Although clearly, this concept can hardly be held wholly responsible for the actual distribution of capital within national economies, it delineates the discursive space in which the policy programs unfolded that shape formal economic institutions (c.f. Schmidt 2007). By propagating a selective strategy for material reproduction and concomitant scheme for the allocation of capital over economic processes and actors, it mediates between the economic and political spheres. This dual character impels both functional and normative questions.

As regards the functional-economic dimension, how does a particular concept of control promote the consistent and continuous enactment of economic relationships, thereby providing the opportunity for a particular mode of production to sustain itself?



Additionally, since different modes of production imply divergent distributions of capital over actors, it is relevant to ask whose interests are championed by particular concepts of control (Jessop 1992). Nevertheless, the desiderata of one particular constituency must somehow be reconciled with the perceived general interest, if a conception is to garner widespread societal support (Van der Pijl 2012).

The abovementioned functional and normative considerations will guide subsequent analysis of China's concepts of control. The strategy for economic development pursued in the three or so decades following the initial proclamation of the 'reforms and opening up' (*gaige kaifang*) has often been referred to as one of "crossing the river by feeling for stones"<sup>26</sup> (e.g. Dunford & Yeung, 2010; Lin, 2011; Xu, 2011). Accordingly, researchers have emphasized the gradual and incremental aspects of policy (e.g. Cai and Treisman 2006; Heilmann 2008). For example, Deans asserts that "of central importance to understanding the post-socialist state in China is the fact that the current economic system is not the result of a coherent strategic plan. Instead the current economic structure in the PRC is the result of a series of ad hoc and occasionally contradictory reforms implemented over a period of 25 years which were informed by short- and medium-term considerations and were marked by considerable compromise and negotiation." (2004, p.136). Functionalist fallacies aside, such interpretations neglect two important aspects of the reform-era conception of the project of economic development.

Commencing with examination of the predominant template for material reproduction under the communist era, this chapter argues first, that conceptual changes which have since resulted in the current notion of a 'socialist market economy' (*shehui zhuyi shichang jingji*) cannot simply be attributed to 'isomorphic pressures',<sup>27</sup> but have accorded with the inherent criteria for paradigmatic stability. As the post-socialist economic conception has sought to formulate its response to a successive set of developmental conundrums, it has increased in cogency, promoting the perpetuation of

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<sup>26</sup> The adage of crossing the river by feeling the stones (*mozhe shitou guo he*) has often been mistakenly ascribed to Deng Xiaoping, but was in fact first uttered by Chen Yun during a meeting of Government Council in 1950. As shall be related below, Chen Yun's influence on Deng's approach to economic development was far-reaching.

<sup>27</sup> See DiMaggio and Powell 1983; Meyer and Rowan 1977.

the extant socio-economic hierarchy. Secondly, the concept of control which took shape in the subsequent period of reform in many ways represents an extension, rather than a break from, or contradiction of the functional and normative logic of the communist-era political-economic elite. Thus, the reforms of 1978 were in large part an enactment of a pre-existing template for economic governance which had however been suppressed by factional rivalry. Instead of seeking to extract the Party-state apparatus from the economic processes of production and allocation, along the lines of Western-style liberal capitalism, what was envisaged was rather a system in which production and exchange would be governed predominantly by the market while government and Party retained the broad mandate of macro-economic control, which extended to both financial and monetary and developmental policy as well as ownership of upstream and strategic industry.

### **The communist paradigm of industrialization**

The vindication of the communist forces over the Nationalist Party in 1949 heralded a period of great change extending to virtually all aspects of social and economic life. Hitherto, China had been an agricultural empire. In the latter era of the Qing Dynasty, rapid expansion of the population, civil unrest and foreign incursion had resulted in economic stagnation and political impotence. While the establishment of the Republic of China in 1912 spelled the official end of two millennia of imperial rule, warlords continued to administer regions under their purview as local fiefdoms (Schoppa 2000). Constant turmoil and the perpetuation of pre-modern institutions obstructed the process of industrialization which had radically transformed relationships of ownership and production in most of the Western world. China's economic backwardness, framed within the ideological backdrop of an inevitable clash between capitalist and socialist societies, led the Chinese Communist Party, seizing power in 1949, to regard rapid industrialization as the major imperative. Accordingly, the first of China's five-year plans (*wu nian jihua*) stated:

The adoption of a strategy of active socialist industrialization and the prioritization of

heavy industry is necessary for the establishment of a strong army, satisfaction of the people's needs and the creation of a material foundation for a socialist transformation. Therefore, we must make the establishment of a basis for heavy industry the focus of the draft of the first five-year plan for the development of the national economy[...] Agriculture furnishes the conditions for the development of industry. Just like comrade Mao Zedong has said in his "On coalition government:"The peasants...are the main actors within the Chinese industrial market. Only they can provide abundant grain and raw materials, and absorb the major part of industrial products.<sup>28</sup>

The CCP's template for economic development reiterated the basic tenets of the theories of Fel'dman and Preobrazhensky, who propagated that in the division between Department I and II,<sup>29</sup> development of the former ought to predominate. Department II would provide the required investment for the expansion of Department I by way of the 'price-scissors' mechanism, wherein prices for agricultural produce were depressed (Knight 1995). In turn, industry would manufacture producer goods for agriculture, which increased the efficiency of agricultural production and thus yield greater surplus value, which would subsequently be reinvested in the development of Department I. The ensuing pattern of mutually complementary growth of both Departments would effectuate a trajectory of accelerated growth.<sup>30</sup>

In the context of this particular paradigm for the eventual realization of the socialist stage of development, the uprooting of traditional ownership relations was as much an economic necessity as a restoration of the natural integrity of the nexus of labor and production (and abrogation of the predatory features of landlordism), which had been crucial in the CCP's securing support of the peasant class (Selden 1995).

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<sup>28</sup> SPC 1952, *zhonghua renmin gongheguo fazhan guomin jingji de di yi ge wu nian jihua* [First five-year plan for the development of the national economy of the P.R.C.], Chapter 1.

<sup>29</sup> Within Marxian economics, heavy industry (producing producer goods for its own expansion), and industry providing producer goods for the development of agriculture are jointly referred to as Department I, while agriculture, producing goods for consumption, is referred to as Department II.

<sup>30</sup> This expansionary strategy was vehemently opposed by Bukharin who insisted on the simultaneous development of light industry to ensure a steady flow of capital.

The establishment of the People's Republic of China, led by the working classes, and the nationalization of the economic lifelines provide us with the opportunity to develop and transform the Socialist economy in accordance with the plan, and to gradually let China's backward agricultural economy become an advanced socialist industrial nation.<sup>31</sup>

Although consensus existed within the Party-state on the broad principles of socialist industrialization and public administration of heavy industry, there existed considerable divergence in opinion regarding the overall scope of state control and central planning. Contention centered on three interrelated issues: the appropriate ratios of investment and growth ratios of the two Departments; distribution of fiscal influence over the center, local government and the collective and respective roles of economic planning and market exchange within the allocation of resources and goods; and the adequate roles of the social and technical imperatives within the economic production. The immediate occasion for the debate which continued through most of the communist period was the lag in growth of agricultural output under the first five-year plan.<sup>32</sup> Moderates such as Chen Yun, who headed the State Capital Construction Commission, attributed this shortcoming to the excessive burden imposed on the agricultural sector, and therefore proposed a more balanced trajectory of development for the agricultural and industrial sectors..

Experience proves that industrialization with heavy industry at its core cannot and ought not to be undertaken in isolation; it must accord with all other elements, especially agriculture. Agriculture is an indispensable requirement for the development of industry and even the entire economy. Retarding the development of agriculture will not only affect light industry and the improvement of people's livelihood, but will also greatly affect the development of heavy industry and indeed the economy proper, and influence the consolidation of industrial and agricultural unity. Therefore, we must continue to expediently develop agriculture and realize the mutual coordination of the development

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<sup>31</sup> SPC 1952, Chapter 1.

<sup>32</sup> 1953-1957

of agriculture and industry.<sup>33</sup>

Notably, this assessment was shared by Mao. In a seminal speech given that same year the Chairman, while insisting on the essential correctness of the preceding pattern of development, acknowledged that subsequently, accumulation would require reconsideration of the relationships between the economic departments: "Our current predicament is that we must appropriately adjust the investment ratios between heavy and light industry and agriculture and increase the development of agriculture and light industry." However, Mao reiterated the principle of prioritizing heavy industry.<sup>34</sup>

The consensus of Party and state leaders concerning sectoral adjustment however came to serve as an entry point for a more comprehensive discussion regarding the mechanisms of coordination and distribution of control (Brødsgaard 1983). Bo Yibo, chair of the State Economic Commission was convinced that economic success was strongly dependent on full exploitation of the 'socialist advantage' of centralized planning.

No matter whether it concerns the deployment of construction or the allocation of investment, or the confirmation and planning of production indicators, whether it involves the adjustment and allocation of raw material and products, all of these must proceed from a holistic perspective, so as to guarantee the focal points and consider the general; our nation's limited labor, material and fiscal resources must be rationally utilized where the need is most pressing, their effect most prompt, and their use the greatest. To do this, we must most certainly consolidate command and unify planning.<sup>35</sup>

Within the State Planning Commission, by contrast, a concern that centralized planning was unfit to effectively deal with the diverse industrial conditions and demands of the localities, and therefore advocated decentralization of control to sub-national levels government (Donnithorne 1964). Chen Yun went yet one step further, arguing for a role

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<sup>33</sup> Zhou 1956, *guanyu fazhan guomin jingji de di er ge wu nian jihua de jianyi de baogao* [Report on suggestions concerning the second plan for the development of the national economy].

<sup>34</sup> Mao 1956, *lun shi da guanxi* [On the ten major relationships].

<sup>35</sup> Bo, February 24, 1959 *People's Daily* [*renmin ribao*].

for both state planning and market allocation. According to Chen, within light industry and agriculture, material allocation, stipulated production quota and undifferentiated prices had limited diversity in material supplies, reduced the output of secondary products (i.e. auxiliary sources of revenue) and introduced quality problems. Consequently, Chen proposed the partial reinstatement of market relations in light industry:

As for basic commodities related to the national economy and peoples' subsistence, such as cotton, cloth, coal and sugar, we must continue to implement overall national procurement so as to ensure supply and a stable market. For the highly diverse commodities for daily use, we must gradually retract overall procurement and revert to a method of selective buying...for common products for selective purchase, the commercial departments have priority; and products not subject to selective purchase or those that remain can be sold by the manufacturing units themselves or by entrusted commercial departments<sup>36</sup>

Moreover, Chen extended his suggestion on allowing production and exchange outside the plan to the agricultural sector (Chen, 1956). This deviation from the Marxist-Leninist precepts of economic organization proved unacceptable to Mao. In a critique to the State Capital Construction Commission's proposed adjustments to economic coordination, Mao insisted that: "basic construction ought to strengthen the leadership of the Party and mobilize the masses".<sup>37</sup> Mao's statement reflected his strong emphasis on the development of the 'socialist consciousness' at the expense of the technical requirements of production.<sup>38</sup> Subsequently, the ideological rift between proponents of a strategy

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<sup>36</sup> Chen 1956, *shehui zhuyi gaizao jiben wanchengyihou de xin wenti* [New problems in the wake of the essential completion of the socialist transformation ].

<sup>37</sup> Mao 1958, *dui jianwei dangzu guanyu dangqian jiben jianshe gongzuo ji ge wenti de baogao de piyu* [Critique addressed to the Party organ of the Basic Construction Commission regarding the report of several problems within the work of basic construction].

<sup>38</sup> Marxist-Leninist economic theory holds that attainment of the socialist ideal critically depends on four conditions: completion of the socialization of capital and the reproduction of productive forces; and the pervasion of socialist consciousness and understanding of material and technical conditions. Whereas the understanding of material conditions and the internalization of the technology of material reproduction develops by an incremental process of learning and instruction, the transformation of social relations is a

chiefly informed by the technological qualities of economic production and coordination those supporting political mass mobilization came to delineate a division between the economic bureaucracy, headed by leaders such as Chen Yun, Bo Yibo and Zhou Enlai (who would become the driving force behind the economic reforms of 1978) and the conservative Party-faction headed by chairman Mao (Lieberthal 1997). The discord amongst China's leadership prompted Mao to overturn his support for a more balanced trajectory of development. Under the banner of anti-revisionism, the chairman ushered China's economy into the Great Leap Forward (*da yuejin*).<sup>39</sup> During the Great Leap, the relationship between agriculture and industry was greatly altered so as to prioritize the latter (see table 3).

	<b>Grain</b>	<b>Steel</b>
September 1956	500 m. tonne	10-12 m. tonne
August 1958	1.5 bn. tonne	80 m. tonne
June 1961*	310-320 m. tonne	10 m. tonne
Realized in 1962	160 m. tonne	6.7 m. tonne

\* Quota for 1963

*Table 3: Planning the Great Leap Forward; production quota for grain and steel output for the year 1962*

Sources: Zhou 1956, *guanyu fazhan guomin jingji de di er ge wu nian jihua de jianyi de baogao* [Suggestions concerning the second five-year plan for the development of the national economy]; Party Organ of the State Planning Commission 1958, *guanyu di er ge wu nian jihua de yijian* [Opinions on the second five-year plan]; Party Organ of the State Planning Commission 1961, *guanyu di er ge wu nian jihua hou liang nian buchong jihua de baogao* [Report on the supplementary plan for the two years subsequent to the second five-year plan]

The uprooting of economic organization proved catastrophic,<sup>40</sup> yet voices calling for economic development through balanced restructuring and expansion failed to make a

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revolutionary process (Schran 1962).

<sup>39</sup> 1958-1961.

<sup>40</sup> The primary cause of the widespread famine precipitated by the Great Leap Forward was the major increase in agricultural output expropriated by government (Bernstein 1984; Li & Yang 2014). The agglomeration of agricultural production into giant communes was believed to bring about a commensurate upturn in output, yet failed to do so as collectivization attenuated peasants' incentives and extensive welfare arrangements induced wasteful consumption.

lasting impression. Adjustments introduced to balance investment ratios between agriculture and heavy industry were by and large reversed during the third five-year plan period (1966-1970).<sup>41</sup> Moreover, political antagonizing against ‘revisionist’ tendencies posed stringent constraints on the scope for expansion of light industry. More than that, Mao’s economics ensured that on the whole, the rate of investment allocated to the construction and development of industry far surpassed those implied by the original thesis of Fel’dman and Preobrazhensky.

### *The conceptual legacy of the socialist paradigm of industrialization*

The paradigm for economic development which characterized the period from 1949 until the reforms which commenced in the 1970s acquiesced with the Marxist-Leninist model. The centrally administered transfer of agricultural surplus to industry was to ensure the accelerated insertion of the Chinese economy into the global frontier and provided the general outlines for the nature and social organization of production. However, beyond this broad imperative, conceptions amongst China’s political-economic elite regarding the appropriate methods and trajectory of economic development were marked more by a set of consistent debates than by consensus.

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<sup>41</sup> Within the period directly following the Great Leap, central government’s concern was to “vigorously develop agriculture so as to essentially solve the people’s problems with nutrition and clothing[...].In accordance with these basic tasks, the method of planning has changed considerably, that is to say, that planning will comply also with the precept that agriculture constitutes the basis.” SPC 1964, *di san ge wu nian jihua de chubu shexiang* [Preliminary thoughts on the third five-year plan].

However, deteriorating international relations resulted in a shift of emphasis to the construction of an inland industrial basis (the so-called “Third Front”), which was to preclude the disruption of the national economy in the case of a foreign incursion. “Expediting the construction of the Third Front is a major strategic decision of tremendous historical significance made by the Chairman in 1964. We must heed the instructions of the Chairman and swiftly construct the Third Front, and gather the nation’s labor, material, finances so as to gradually build up the defence industry, natural resource, materials, fuel, power, machine and chemical industries and the transportation and logistics system, and let the Third Front become a large-scale strategic rearguard. This relates to the overall deployment of the third five-year plan.” (SPC 1965, *guanyu di san ge wu nian jihua anpai qingkuang de huibao tina* [Outline of the report on the preparation of the third five-year plan] ). Ironically, the deterioration of Sino-Soviet relations was precipitated in part by the disagreement between Mao and Khrushchev regarding the appropriate means by which economic development was to be brought about.



The first of these concerned the respective roles of the technical and social aspects of economic production. While Soviet leadership embraced Taylorian concepts of work organization and Fordist standardized manufacturing techniques, deeming it a natural complement to, and logical extension of central planning (Hughes 2004). No such overtures to the prowess of American industrial organization were made by Mao and his confidants. While leadership within the economic bureaucracy was concerned with the 'technical aspects' of economic development, the CCP, with Mao at the helm emphasized the development of socialist consciousness amongst the working masses, combining a system of incessant and ubiquitous propaganda with periodic mass movements such as the Great Leap Forward (Shambaugh 2007).

Nested within this larger debate was a set of issues related to the appropriate distribution of resources and productive activity within the Chinese economy, as well as its concomitant coordinating mechanisms. Throughout the communist era, leaders of the State Economic Commission and State Capital Construction Commission repeatedly argued for a more moderate ratio of investment in industry, allowing agriculture and light industry to develop on a more even footing and preventing excessive accumulation of capital within Department I from creating shortages in Department II. Moreover, disagreement existed on the appropriate roles of allocation by market and plan. As attested to by Chen's statement, some of China's economic leadership was convinced that the engrossing quality of the economic plan placed undue constraints on the development of Department II and thus exacerbated imbalances introduced by the price-scissors mechanism. Allowing for the development of a contained market for consumables was believed to mitigate many of the quality and supply problems. Secondly, throughout the communist era, there existed an ongoing discussion regarding the appropriate balance of influence between central and sub-central government, as well as between that of the state and the Party. While some were ardent proponents of the virtues of central planning, others espoused concerns regarding responsiveness to varying local conditions. The discussion regarding the appropriate distribution of bureaucratic control led to periodic bouts of decentralization, followed by countervailing centripetal dynamics (Lieberthal & Oksenberg 1988; Lyons 1990).

As a result of the contention between ideological and technocratic influences within Party and bureaucracy, the strategy for economic development under communism exhibited marked volatility. Compounding this instability was the insistence on an excessively high rate of inter-sectoral transfer. While the template for ‘socialist industrialization’ clearly marked a finite stage within the broader trajectory towards communism, the neglect of agriculture precipitated structural macro-economic imbalance. When ideological concerns attenuated following Mao’s death and the subsequent ousting of the ‘Gang of Four’<sup>42</sup> in 1976, the urgent need to tend to the functional shortcomings of the Maoist-Leninist concept of control ensured the aforementioned issues regarding the appropriate relations between economic sectors, center, locality and enterprise, planning and market came to define to a large extent the political-economic discourse of the subsequent era.

### **The strategy for economic development in the reform period: “crossing the river by feeling the stones”**

#### *1978-1993 Reform and opening up*

The death of Mao and removal of the radical ‘gang of four’ in 1976 put a decisive end to the Cultural Revolution and allowed leadership to once more take economic development as its main priority. Mao’s persistent emphasis on the expedited development of industry had resulted in acute shortages in agriculture, not only rendering the ‘price-scissors’ an utterly infeasible instrument for further industrial development but also constraining supply of basic commodities. Problems were compounded by the neglect of light industry. With Mao’s influence waning, economic policy came to “regard agriculture as the foundation and industry as the guide... and to prepare the plan for the national economy in agreement with the order of agriculture, light industry and heavy industry”.<sup>43</sup> Mao’s

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<sup>42</sup> The Gang of Four (*si ren bang*), a clique comprised of Jiang Qing, Zhang Chunqiao, Yao Wenyuan and Wang Hongwen rose to prominence during the Cultural Revolution.

<sup>43</sup> Zhou 1975, *zai zhonghua renmin gongheguo di si ji quanguo renmin daibiao dahui di yi ci huiyishang de baogao* [Report delivered at the first meeting of the fourth plenum of the National People’s Congress].

Note: Zhou Enlai had already expounded the necessity of developing agriculture in order to develop industry as early as 1949. Likewise, his ideas about decentralization of government authority and the coexistence of

immediate successor, Hua Guofeng however maintained the precept of coordination by plan and the strategy of accelerated accumulation.<sup>44</sup> It was not until Hua was superseded by Deng Xiaoping that the state began to chart the course for a novel trajectory of development. Unfettered by the ideological constraints faced by Zhou and his peers, Deng expounded the strategy of ‘internal reform and (*duinei gaige, duiwai kaifang*) at the third interim meeting of the eleventh National People’s Congress in December 1978. In line with Chun Yen’s propositions, the agricultural sector became the focal point of initial reforms.

The nation issues purchase quota, appoints responsibilities and acquisition volumes for complementary rural output. For surplus, a portion is purchased at increased price, a portion is bought at lowered prices, and a portion is not procured and can be sold by the farmers themselves.<sup>45</sup>

The attenuation of administrative control over the agricultural sector did not only promote agricultural production, but also drove the expansion of light industry, which absorbed excess rural labor. Because of this rapid growth, the sectoral imbalance which had impeded development in the period preceding reforms quickly diminished. As reforms progressed, the contract responsibility system (*jiating lianchan chengbao zerenzhi*), which allowed farmers to retain and sell for a profit any output above state-contracted quota, was extended to the public industrial sector. In tandem with marketization, greater fiscal autonomy was granted to local government. Fiscal decentralization provided a further incentive to market development as taxes levied on enterprise became a main source of revenue for local authorities.

Although it is questionable to what extent the reforms comprised a truly coherent

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public and private ownership predated the reforms by some two decades (Hu 2008).

<sup>44</sup> Hua famously declared his support for Mao’s policies in an article in the People’s Daily (February 1977), stating: “Whatever Chairman Mao’s policies, we must persist in upholding them; whatever Chairman Mao’s instructions we must faithfully heed them from start to finish”

<sup>45</sup> State Council 1982, *zhonghua renmin gongheguo guomin jingji he shehui fazhan de liu ge wu nian jihua (tina)* [Summary of the sixth five-year plan for economic and social development], Chapter 9.

conception of control,<sup>46</sup> at least two of its key aspects, decentralization and marketization, had already been forcefully advocated by central figures within the economic bureaucracy in the communist period. Thus, while Deng Xiaoping's strategy of 'reform and opening up' (*gaige kaifang*) has often been touted as a visionary break from the 'socialist' mold, its main tenets were neither new nor in contradiction to extant indigenous interpretations of China's economic system.

### *1993-2003: Stabilization and consolidation*

The diminishing relevance of central material allocation and production quota impelled a discussion amongst China's economic leadership regarding the appropriate relationship between market allocation and planning. The need to articulate the role of the market and non-public economy within the Chinese economic system gained additional urgency due to popular pressure for political liberalization. This debate pitted Deng, who unambiguously supported the continuation of economic reforms against more conservative leaders such as Li Peng,<sup>47</sup> who insisted on the need for strong central economic control. The resultant compromise was the promulgation of the 'socialist market economy' (*shehui zhuyi shichang jingji*) in 1992.

The economic system of market socialism that is to be established is one wherein, under the macro-control of the socialist state, the market fulfills its basic function in the allocation of resources, where economic activity accords with the demands of the law of value<sup>48</sup> and changes in supply-demand relationships...At the same time the inherent

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<sup>46</sup> In a speech given during his influential Southern tour (*nanxun*) of 1992, Deng himself admitted that he had not fully contemplated the roles of capitalist organization and operation, and that its limits could only be appreciated by way of experimentation. Deng 1992, *zai wuchang, shen Zhou, zhuhai, shanghai deng de tanhua yaodian* [Main points of the Wuchang, Shenzhen, Zhuhai and Shanghai speeches].

<sup>47</sup> However, as evidenced by the decision to violently quell the Tiananmen protests of 1989, Deng did not tolerate the notion of political reforms.

<sup>48</sup> Discussions surrounding the Marxian concept of 'law of value' (Chinese: *jia zhi fa li*) would occupy the political economic establishment throughout the communist era (see Brødsgaard 1983). According to Marx, capitalism distorts the relationship between labor and value by way of interjection of the wage-labor nexus on the supply side and commodification (operating under the principles of exchange value rather than labor value)

weaknesses and inertia of the market must be recognized, and the state's macro-economic control must be bolstered and improved.<sup>49</sup>

Expounding the subsequent foci of efforts to develop the socialist market economy, Jiang Zemin (then General Secretary of the Central committee of the CCP) emphasized four issues:

- 1) Increasing fiscal and operational autonomy of state-owned enterprise (large SOEs in particular) so as to let them take on the responsibility of maintaining the value of state-owned assets. Improving the structure of public economy through reorganization and market competition.
- 2) Accelerating market coordination of resources, capital and labor and eradicating administrative and regional divisions.
- 3) Redistributing revenues and expenses amongst state and enterprise and center and locality through the introduction of a standardized taxation system and reforming wage and social benefit systems
- 4) Ensuring government focuses on overall planning, economic restructuring and supervision, and separating government and enterprise.<sup>50</sup>

Although at the time, many regarded policy under Jiang to be an extension of Deng's market reforms, emphasis on public sector restructuring and the separation of economic administration and production were a direct reaction to the volatility which had characterized the economic development during the first period of reforms.

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on the demand side. While socialist organization was to forestall the onset of such a discrepancy, others argued that central administration on basis of central plan could not adequately account for heterogeneity (in quality) amongst commodities and actual demand schedules. The concept of the socialist market economy prioritized resolution of the latter problem.

<sup>49</sup> Jiang 1992, *jia kuai gaige kaifang he xiandaihua jianshe bufa, duoqu you zhongguo tese shehui zhuyi de gengda shengli* [Accelerate the pace of reform, opening up and modernization, and strive to achieve an even greater victory for the cause of socialism with Chinese characteristics].

<sup>50</sup> Jiang 1992.

The overall balance of the economy is faced with certain problems. Ensuring a basic balance between the overall needs of and provisions for society, preventing excessive allocation of national revenue and inflation are major issues. Gleaned from a historical perspective, when economic development proceeds by leaps and bounds, this brings about a superficial pursuit for rapid growth; the scale of investment becomes excessive and consumption funds inflated, which brings on macro-economic imbalance and major distortions, which are incorrigible afterwards.<sup>51</sup>

In conjunction with efforts to curb the overall scale of industrial investments, macro-economic control was to focus on the structural aspects of development by delineating sectoral foci of economic development. The policy of ‘retaining the large and releasing the small’ allowed the state to consolidate its control over, and responsibility for enterprise, focusing on large firms in profitable industry. Simultaneously, the state had commenced with the selection of a select group of ‘backbone enterprises’ (*gugan qiye*) which were to ensure China’s international economic competitiveness.<sup>52</sup> These enterprises, concentrated in pillar industries (*zhizhu chanye*) providing producer goods and industrial infrastructure, operated directly under the purview of the center.<sup>53</sup>

Public capital must be prioritized within overall societal capital; and the state-owned economy must control the national economic lifelines, and exert a leading function in economic development.<sup>54</sup>

When reforms commenced in 1978, the proposals of Chen Yun and other economic

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<sup>51</sup> Li 1991, *guanyu guomin jingji he shehui fazhan shi nian guihua he di ba ge wu nian jihua de gangyao de baogao* [Report on the outlines for the ten-year program for national social and economic development and the eight five-year plan], Chapter 3.

<sup>52</sup> Li 1991, Chapter 3.

<sup>53</sup> State Council 1996, *zhonghua renmin gongheguo guomin jingji he shehui fazhan “jiu wu” jihua he 2010 nian yuanyang mubiao gangyao* [Outline of the long-term objectives for 2010 and the ninth five-year plan for national social and economic development], Chapter 3.

<sup>54</sup> Jiang 1997, *jiang zemin zai zhongguo gongchandang shiwu da shang de baogao* [Jiang Zemin’s address to the fifteenth conference of the CCP].

progressives had been initiated without definitive endpoints. With the transition of leadership from Deng to Jiang, the conceptual delineations between plan and market, state and enterprise became clearer. Faced with an impoverished rural economy and virtually non-existent light industry and service sector, Deng's main concern had been to provide incentives to increase agricultural production and invest in local economies. By contrast, Jiang's policies had been motivated by a desire to break the patterns of overinvestment and overcapacity by limiting the influence of local and industrial bureaucracy over public and collective enterprise (Li & Ma 2004); devolving many of the former responsibilities of the public sector –notably the provision of public services and the employment guarantee- unto the market (Ngok 2008); and the privatization or bankruptcy of poorly performing public enterprise (Liew 2005). Market forces were to play an ever greater role in the allocation of labor and capital and coordination between supply and demand. Increasing reliance on market allocation was however not tantamount to the dilution of state influence. Reserving for itself the prerogative of macro-economic adjustment, the central state intensified its fiscal and monetary control (Ma 2000). However, within the socialist market economy, the state's mandate extended beyond cyclical adjustments to include the structural organization of industry. Under Jiang, a novel economic paradigm emerged in which a select group of centrally controlled business conglomerates were to at once become the fulcrum of the domestic economy and the vanguard of economic modernization and international competitiveness.

### *2003-present: Towards sustainability and sovereignty*

In spite of the success of macro-economic reforms in curbing inflation and reorganization of public industry, a plethora of ongoing problems, left unattended under the Jiang administration, had gained in urgency. After twenty-five-years of rapid growth the inherent limitations of capital-intensive development had become increasingly salient. Labor had remained largely of the unskilled variety. Urban-rural imbalances continued to exacerbate and were compounded by social aggravations resultant from the abolishment of the employment guarantee and retrenchment of the public sector.

Amidst rapid development during the 10<sup>th</sup> FYP period, certain prominent issues appeared: the relationship between investment and consumption was unbalanced, part of industry blindly expanded, production capacity was excessive, transformation of the mode of economic development slowed down, energy resources are strained, environmental pollution has exacerbated, the regional development gap and the income gap between certain groups in society has continued to increase, the development of public services is still lagging behind, and the elements inciting social instability are manifold.<sup>55</sup>

Hu Jintao, who succeeded Jiang as China's paramount leader in 2003, responded to the above challenges by promulgating the 'scientific development concept' (*kexue fazhanguan*).<sup>56</sup> With regards to the mode of development, the concept presented two significant departures from the extant trajectory. The notion of 'taking people as the basis' (*yi ren wei ben*) implied an emphasis on the qualitative as well as quantitative dimensions of economic growth. More egalitarian development would not only alleviate mounting social tension but also facilitate the transition towards a pattern of growth driven by domestic consumption. Secondly, the scientific development concept underlined that further development ought to be contingent on the creation of a capacity for 'indigenous innovation' (*zizhu chuangxin*) and strong high-technology industry (Fewsmith 2004). The

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<sup>55</sup> State Council 2006, *zhonghua gongheguo guomin jingji he shehui fazhan de shiyi wunian jihua gangyao* [Outline of the eleventh five-year plan for social and economic development]

<sup>56</sup> "First we must correctly and comprehensively grasp the profound significance of basic demands of the scientific development concept. To persist in 'taking people as the basis', thus is to take the comprehensive development of man as the objective, and to plan and promote development on basis of the fundamental needs of the people and continuously fulfil the peoples' need for material and cultural growth, to conscientiously guarantee the peoples' economic, political and cultural rights and to ensure the results of development benefit all. Comprehensive development is to promote economic, political and cultural development with economic development at the core, so as to realize economic development and overall social progress. Adjusted development means to plan the development of cities and countryside, regions, economy and society, people and nature, domestic development and international openness; to advance the productive forces and relations, to balance the construction of the economic foundations and upper layers, and promote the balanced development of the economy, politics and culture. Sustainable development means to promote the harmony of man and nature, and realize a balance between economic development and population, resources and ecology[.]" (Hu 2004, *zai zhongyang renkou ziyuan huanjing gongzuo huiyi shang de jianghua* [Address given at the central working meeting for population, resources and environment] )



gradual move towards knowledge and technology-intensive economic activity would adjust investments in favor of labor, ultimately resulting in higher wages. From a strategic perspective, domestic innovation was believed to increase efficiency of resource-intensive industry and reduce reliance on foreign technology and resource-markets, thus sustaining the perennial goal of sovereignty.<sup>57</sup> Accordingly, the following objectives were stipulated under the eleventh five-year plan:<sup>58</sup>

- 1) Retain stable and relatively rapid economic growth and balance investment and consumption.
- 2) Transit from resource-intensive and environmentally harmful to ecologically sustainable development.
- 3) Enhance the indigenous capacity for innovation and render domestic science and technology the primary driver of economic growth.
- 4) Balance rural and urban development and regional development.
- 5) Establish a harmonious society and ensure development progresses under conditions of social stability.
- 6) Perfect property relations and the pricing system and the state's capacity for macro-economic governance.<sup>59</sup>

Seeking to adjust the dynamics of growth as well as the distribution of its benefits, policy under Hu gained a more interventionist character. Large-scale government investment and fiscal stimuli were introduced to promote the development of the service section and indigenous development of 'leading industries' (*zhidao chanye*) in which technological advances would effectuate large downstream externalities (Gu et al. 2009).<sup>60</sup>

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<sup>57</sup> State Council 2006, *guojia zhongchangqi kexue he jishu fazhan guihua gangyao (2006-2020 nian)* [Outline of the national medium and long-term plan for the development of science and technology 2006-2020], Chapter 1.

<sup>58</sup> 2006-2010.

<sup>59</sup> CC 2005, *zhonggong zhongyang guanyu zhiding guomin jingji he shehui fazhan di shiyi ge wu nian guihua de jianyi* [Opinions concerning the drafting of the eleventh five-year plan for the national economic and social development], Chapter 2.

<sup>60</sup> The 2006-2010 five-year plan explicitly refers to four industries: Information and communication technology, biotechnology, aeronautics and aviation and new materials.

Government investment in infrastructure became a key feature of regional development policy. To bolster the directive capacity of the center, the organs responsible for national economic planning (The State Commission for Economic Reform and the State Planning Commission) were merged into the National Development and Reform Commission in 2003. In a subsequent round of bureaucratic reforms, the number of industrial ministries was reduced so as to bolster NDRC's control over the industrial allocation of capital (Yeo 2009).<sup>61</sup>

Intensification of state influence in capital allocation under Hu reflects an interpretation of economic development more concerned with the issue of long-term sustainability. Thus, through a combination of fiscal reallocation and emphasis on development of human and intellectual-capital intensive industries, government has sought to mitigate socio-economic inequality, which undermines stability and obstructs the transition towards a mode of growth predicated on domestic demand.<sup>62</sup> Likewise it has sought to redirect investment from additions to the stock of fixed capital within traditional industry towards the development of a set of strategic emerging industries and domestic technology. Although large conglomerates still occupy a pivotal role within the overall project of development, the prior emphasis on creating economies of scale is complemented by insistence on developing an ecosystem of related small and medium-sized science and technology-based enterprise able of producing breakthroughs in crucial general purpose technologies.<sup>63</sup>

### **Touching the stones: Productivity, stability and sustainability**

Undeniably, Chinese conceptualizations of the project of economic development have undergone comprehensive changes since reforms actualized the vision of Chen Yun and his associates, and it is questionable to what extent they, or even Deng would recognize the present template. However, these changes cannot be simply dismissed as reflexive

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<sup>61</sup>Reforms were however heavily contested by the industrial ministries, so that the original program of comprehensive restructuring had to be abandoned (Brødsgaard 2010).

<sup>62</sup> Due to diminishing marginal utility, highly skewed income distributions are expected to result in lower aggregate consumption than more egalitarian distribution.

<sup>63</sup> State Council 2006, Chapter 27.

short-term adjustments, but demonstrate a coherent and progressive logic. In order for a particular paradigm to sustain itself, it must be widely perceived as both ontologically apposite and legitimate (see Hinings and Tolbert 2008; Meyer and Rowan 1977).

The post-socialist developments within the economic concept of control have been impelled by three interrelated problems. As a most fundamental prerequisite, economic paradigms must identify and articulate a set of conditions that motivate and direct systemic productivity. This was the overriding concern in the first stage of reform. By way of the introduction of a market component within Department II (agriculture, light industry) and eventually, Department I, Deng provided both the incentive for more efficient production and the allocative autonomy to redeploy redundant agricultural labor. By decreasing centralized expropriation and diversification of agricultural production towards cash crops, sectoral imbalances were attenuated. Having addressed the essential problem of productivity, the paradigm tended to the issue of short- and medium-term stability.

Thus, changes in fiscal relations and economic restructuring under Jiang sought to placate conjunctural tendencies towards the overexpansion of industry (which in turn, impels underinvestment within the overall economy), allowing the cycle of investment and production to continue in stable manner. Finally, short-term stability must be complemented with long-term viability. This requires articulation of conditions which promote the continuous reorganization of capital into processes which create value over and above extant methods of production, ensuring sustainable economic growth (see figure 2).

Under Hu, changes within the strategy for economic development sought to promote a departure from an overwhelmingly extensive pattern of accumulation (i.e. growth driven by novel additions of capital towards extant modes of production) towards an intensive one, wherein technological progress would allow for a more egalitarian distribution of economic gains, and investment would be driven predominantly by domestic demand. The common thread within the three stages has been an incessant emphasis on the primacy of industrial investment and the expansion of production. Despite concerns regarding the appropriate staging and allocation of industrial investment,

the overriding importance of industry has relegated concerns regarding the efficient functioning of capital markets to secondary stature. Herein as well, the Chinese template differs fundamentally from the Western concept of liberal capitalism.

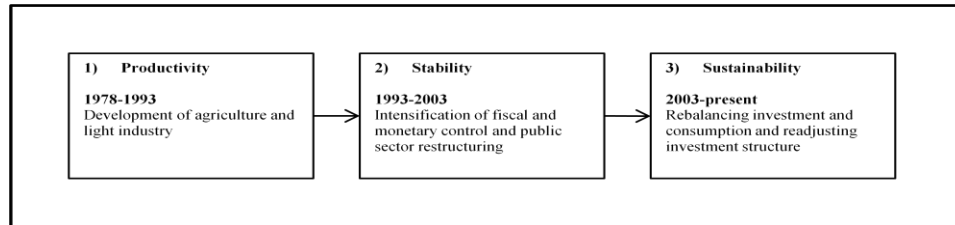


Figure 4: Development of China's post-socialist economic paradigm

### Constituents and control over capital: aligning functional and normative aspects

Along with the conceptual progression from the basic requirement of productivity towards the promotion of stability and ultimately sustainability, the respective rights and responsibilities assigned to various economic constituents have been articulated with greater clarity. Although firmly entrenched within the echelons of the Party-state, the process of paradigmatic formation, adaptation and contestation has not been insensitive or inconsequential to the interests of different constituencies. Deng's reforms have been widely perceived as spelling the irrevocable attenuation of the economic control of the state, and many regarded policy under Jiang to be a continuation of a progressive programme of economic liberalization (Chu 2010). Such interpretations are at odds with the political-economic discourse of the Party-state itself, which has insisted that crucial industries remain firmly embedded within the public economy.<sup>64</sup> While efforts to engage

<sup>64</sup> With reference to the restructuring of the public sector by 'retaining the large and releasing the small', Jiang stated that "the leading function of the public economy is reflected in its capacity for control...If public ownership continues to be the main system of property relations and the state controls the national economic lifelines, and the capacity for control and competitiveness of the state-owned economy are strengthened, under these conditions, a marginal reduction of the overall proportion of the state-owned sector [within the overall economy] will not influence the essence of China's socialism." (Jiang 1997, *zai zhongguo gongchandang di shiwu ci quanguo daibiao dahuishang de baogao*, [Report of Jiang Zemin's address to the fifteenth meeting of the National People's Congress] ). This statement was reiterated some decade later by Li Rongrong, Chair of the State-owned Assets Supervision and Administration Commission: "[In] armaments, power generation and distribution, oil and petrochemicals, telecommunications, coal, aviation and shipping industries [...] the State

in the separation of enterprise and government (*zhengqi fenkai*) were considered representative of a process of convergence towards global capitalism (Pearson 2007), such apparent ‘normalization’ disagrees with the expansive and expanding Chinese definition of macro-economic control.<sup>65</sup> The countervailing tendency towards the intensification of state control and re-centralization has led to a widespread perception that “the state advances and the private sector retreats” (*guo jin min tui*).

Moreover, rather than contradicting the centrally espoused logic of reform, changes in the sphere of control of the Party-state have been framed as impelled by the requirements of economic development. In the first phase of reforms, the onus of increasing productivity fell on local government and a nascent non-public sector. The remit of the central state was defined mostly in negative terms, and characterized by devolution and mitigation of bureaucratic constraints. In the subsequent period, the influence of the center waxed even as the overall size of the public sector decreased. Under Jiang, the state attributed itself a pivotal role in maintaining fiscal balance and promoting growth and national competitiveness through the creation of scale-efficient state-owned conglomerates. In recent times, the mandate of the state has yet expanded as it has taken on a more Keynesian guise, and industrial investments are guided by the goals of macro-economic stability and in the long run, the realization of a virtuous cycle of domestic consumption and technology-driven growth. Although the role assigned to the central state sets China’s concept of control apart from both liberal and coordinated varieties of capitalism, it differs in equal measure from the pre-reform concept of socialism. Within the Chinese ideal-type of the ‘socialist market economy’, the market is assigned the primary responsibility of resource allocation while the state reserves for itself the prerogative of

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must have “absolute control” ” (*China Daily* 2006).

<sup>65</sup> “In accordance with the principle of separating government and enterprise, we must transform the function of government. Government’s functions in economic management must truly change to the promulgation and implementation of policies of macro-level adjustment and control, managing the construction of basic infrastructure and creating a benevolent environment for economic development, and functions which ought not to be implemented by government must gradually be transferred to enterprise, the market and social intermediary organizations.” State Council 1996, *zhonghua renmin gongheguo guomin jingji he shehui fazhan “jiu wu” jihua he 2010 nian yuanjing mubiao gangyao* [Outline of the ninth five-year plan for the economic and social development of the P.R.C. and the long-term objectives for 2010], Chapter 7.

macro-control.<sup>66</sup> The latter's definition is expansive and envelops both fiscal and monetary control as well as ownership of key industries in Department I and the capacity to allocate resources to perceived priority areas within the overall project of economic and social development. Thus, notwithstanding the transformative impact of economic reforms, the centrality of the Party-state apparatus within the Chinese economy has remained unquestioned.

The main political implication of changes to the concept of control has been a re-evaluation of the hierarchy of the various economic constituents (i.e. local government and public and private enterprise). The broad remit of sub-central government during the initial period of reforms was retracted when the perceived need for fiscal discipline prompted the recentralization of the banking system and dilution of the ties between ministries and SOEs. During this same period, the emphasis within central discourse on the efficiency and competitiveness of public enterprise, part of an ostensible internalization of western precepts of corporate governance, legitimized the policy of 'releasing the small' and the dismantling of the iron rice bowl. In consequence, the entitlements and autonomy of local government and much of public industry has been severely curtailed. The state's attitude towards the development of the private component of the economy has been predominantly non-interventionist, although the resolve to effectuate an upturn in domestic consumption by (amongst others) promoting the development of the service sector and engaging in a more egalitarian redistribution of capital through expansion of the social welfare program under the twelfth five-year plan may be indicative of greater engagement. Although the focal loci of industrial investment have shifted (from the local state-enterprise to a central government- enterprise nexus) it ought to be noted that the concept of control has continued to advance the interests of the industrialist class (as opposed to that of say creditors or shareholders).

## **Conclusion**

This chapter expounded the evolution of the Chinese 'concept of control'. Just as the

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<sup>66</sup> State Council 2006, *guomin jingji he shehui fazhan di shiyi ge wu nian guihua gangyao* [Outline of the eleventh five-year plan for National Economic and Social Development], Chapter 2.

emergence of the liberal economies of the United States and United Kingdom was inextricably related to (yet not teleologically determined by) the neo-liberalism of the Reagan and Thatcher administrations and the development of German industry was embedded within the Bismarckian welfare programme, the evolution of China's economic institutions has to be understood with reference to its overarching economic paradigm. Describing the development from a Leninist program of agricultural-industrial transfers intended to promote the expedited construction of an industrial economy to the current socialist market economy, it was argued that transformations within the concept of control, rather than being reflexive, have been impelled by the interrelated and progressive problems of ensuring productivity, medium-term stability and long-term sustainability. Notwithstanding the irrefutable changes in understanding of the demands of economic development, the commensurate organization of production, and the entitlements and responsibilities of constituents, the political-economic elite, led by the central Party-state apparatus has sought to ensure its continued centrality within the economic system as well as the intimate connection between administrative and industrial actors. Thus the introduction of market production and exchange and the devolution of fiscal and functional authority to the provinces could be more appropriately interpreted within the context of a long-standing discussion regarding the efficacy and appropriate scope of influence of different instruments of coordination within a Leninist-Marxist mode of economic administration than within the dichotomous discourse of socialism-capitalism. Similarly, such an interpretation implies that the underlying conceptual drivers of centrally instigated institutional change were to do with effective economic administration and the perpetuation of the extensive economic mandate of the Party-state, rather one of fundamental socio-political transformation.

This ought to discredit any characterizations of the Chinese system as neo-liberal, be it 'state-neoliberalism' (Chu 2010) or otherwise. After all, the neo-liberal concept of control which developed in the Anglo-Saxon economies sought to advance the interests of the money-capitalists (e.g. creditors and investors) (Van der Pijl 2012). Yet within the Chinese concept of control, the overriding concern has been to perpetuate industrial investment and maintain high rates of economic growth on which the state has staked

much of its legitimacy (Jefferson 2010) rather than to ensure the highest possible rates of return to capital.

However, even if consideration of the Chinese concept of control allows us to confine definitions of the economic system to some type of state industrialism, many questions remain. First, as to how can changes in the allocation and accumulation of capital account for the tremendous increase of economic activity within the post-communist era, and did these changes indeed follow the precepts propagated by the elite? After all, the argument here is neither that the assumptions and logic of the Chinese concept of control are infallible, nor that its tenets are internalized and implemented by economic constituents without exception. Therefore, within the next chapter, emphasis will be on the Chinese mode of accumulation, which recounts the actual development of capital distribution over actors and processes. Secondly, how have the various constituents been compelled to act in accordance with the prescriptions of the socialist market economy?<sup>67</sup> This question will be addressed in the fourth chapter which deals with the economic institutional architecture. A final and fundamental question regards to whether the envisioned strategy to ensure the sustainability of China's economic development programme is feasible. Thus, in chapter five, the emphasis is on the institutional factors which influence the likelihood that China can adopt a technology-intensive and more egalitarian mode of development.

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<sup>67</sup> 'The compromises underlying the feasibility of [the] various strategies [i.e. concepts of control] are reached by concrete compensations for the special interests involved through the profit-distribution process[.]' (Van der Pijl 2012, 7,8).



## **CHAPTER 3**

### **ACCUMULATION UNDER COMMUNISM AND MARKET SOCIALISM: FROM INDUSTRIALIST CONCENTRATION TO DIFFUSION AND BACK AGAIN**

#### **Introduction**

The previous chapter considered the evolution of China's concept of control, from one firmly rooted in the Marxist-Leninist economic paradigm to the indigenous vision of a Chinese socialist market economy. As elite conceptualizations of the project of economic development changed in response to the severe shortcomings of the communist strategy of industrialization and the subsequent challenges of ensuring stability and sustainability, regulatory and government reallocation effectuated a comprehensive redistribution of capital over sectors and constituents. This chapter will expound changes in the patterns of capital distribution since the establishment of the P.R.C. In line with the questions raised in the previous segment, this analysis will consider how the reorganization of capital impelled the tremendous upturn in economic activity and output following the end of the plan economy. A second point of interest relates to transformations within patterns of distribution of capital over the various economic constituents. The latter has both functional and normative implications for the elite concept of control. After all, the distribution of capital will consolidate the dominance of one among the various groups of constituents within the economic system (e.g. industrialists, investors, workers, central and local administrators etc.). Since their capacities and interests differ, so will the paradigms and modes of production they are able to and willing to sustain.

The remainder of this chapter is organized as follows. The subsequent section provides a brief overview of the pre-reform patterns of capital allocation. This section confirms that the prioritization of industry and excessive rate of transfer of agricultural output severely impeded economic growth. The section thereafter focuses on developments in the post-communist era. It is argued that Deng's policy effectively removed regulatory constraints on the development of agriculture and light industry,

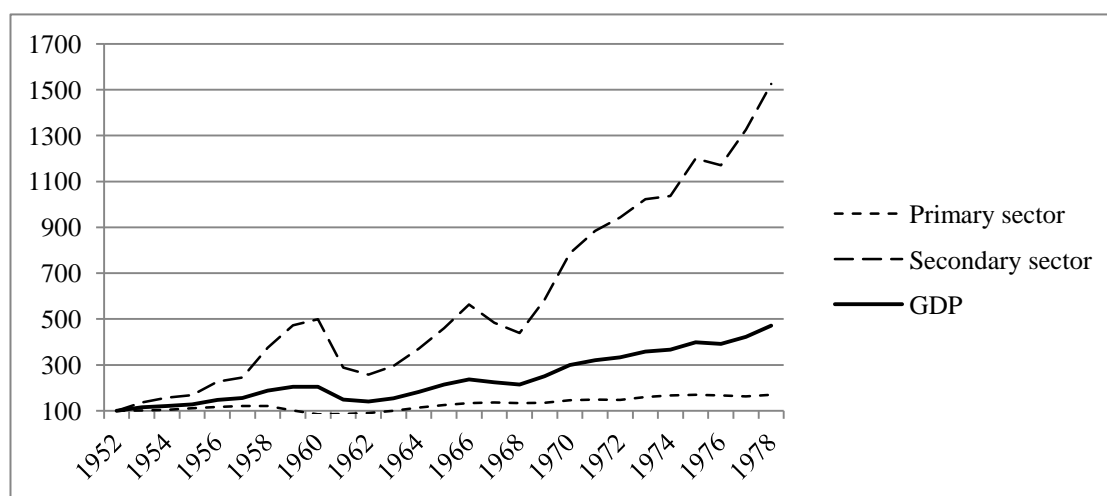
allowing for alleviation of sectoral imbalances through the development of a market system. This period was followed by a countervailing trend towards the reconsolidation of central control over capital allocation, and comprehensive restructuring of state-owned enterprise. Concentration of investment into a public economy relieved of the burden of a plethora of non-performing SOEs, along with a burgeoning private sector ensured that the pattern of growth, characterized by high investment in fixed capital, to continue unabated. Notwithstanding the continuation of an essentially industrialist mode of accumulation, regulatory changes under Jiang prompted a comprehensive redistribution of capital. The bureaucratic recentralization of fiscal and regulatory authority has prompted a commensurate increase of the prowess of central state-owned enterprise. Emphasis on expansion of production and consolidation of capital within the echelons of public industry in lieu of a more balanced trajectory of growth has resulted in the exacerbation of entrenched socio-economic disparities. Recent intensification of centrally administered, direct fiscal transfers has as of yet failed to substantially moderate patterns of accumulation. This discrepancy between the promulgated intent to transit to a consumption-driven mode of development through the invigoration of (primarily non-public) labor and knowledge-intensive sectors and actual patterns of capital allocation calls into question the likelihood of fulfilling the current administration's vision of a sustainable mode of accumulation within the system of a socialist market economy.

### **Accumulation in the communist era (1949-1978): Accelerated industrialization and its outcomes**

As related in the preceding chapter, the principles of the mode of production within the communist era originated from within the theories of Fel'dman and Preobrazhensky. Thus, Department II, of which agriculture constituted the major part, was to furnish the capital required to engage in the construction and expansion of an industrial basis. In turn, industry would manufacture producer goods which would allow for an upturn of agricultural productivity beyond the initial gains resultant from the collectivization of the means of production. Despite admonitions of key figures within the economic administration, Mao insisted on a divergence from the initial trajectory of development in

favor of a great increase of the ratio of transfer of surplus from agriculture towards industry.

Despite Herculean effort and great expense, attempts to match the accomplishments of the modern industrialized economies within a generation by way of the ‘productive advantage’ of socialist economic organization fell decisively short of the mark. While throughout the era of the plan economy, China maintained a high ratio of fixed gross capital formation to gross domestic product,<sup>68</sup> the average growth rate of the economy during the period 1952-1978 was 6.7%. While certainly robust, economic development was nowhere near quick enough to realize the objective of matching the productivity of the industrialized capitalist economies within a generation. Not only did the mode of accumulation under communism fail to engender the envisioned quantitative upturn, but the strategy of concentrating capital within the industrial sector, had caused the growth of agriculture to lag considerably behind (see figure 3).



Note: 1952 = 100

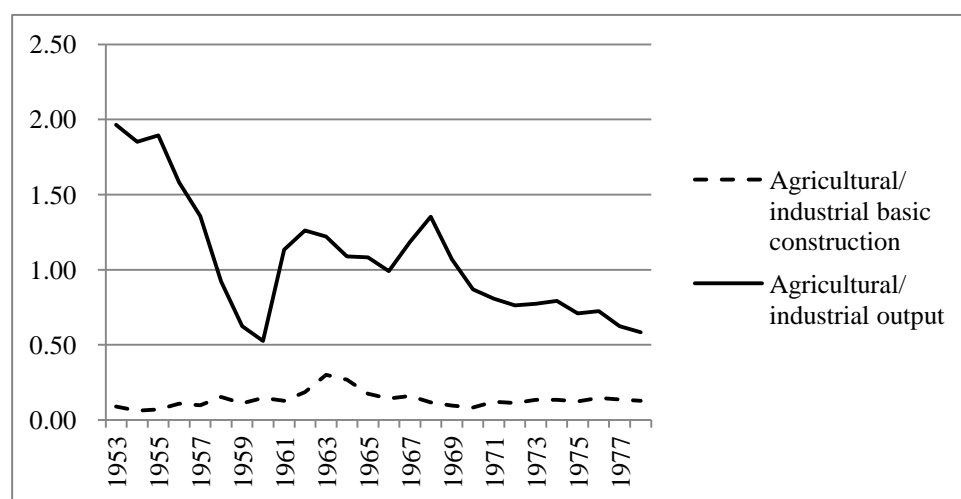
Figure 5: Growth indices of output of primary and secondary industry, 1952-1978

Source: China Statistical Press, 2005, table 6.

Investment ratios between the first and second economic departments (agriculture and industry respectively) throughout the communist era exhibited a much stronger bias

<sup>68</sup> Ranging from 0.25 in the first five-year plan period (1953-1957) to 0.34 during the period of the fourth five-year plan (1971-1975), *SSBC-Hitotsubashi University Historical National Accounts of the P.R.C.* 1997.

towards the development of industry than proposed in the original Fel'dman-Preobrazhensky paradigm. High investment in industry had been supported by the appropriation of agricultural revenues (by way of depressed prices for produce, the so-called price-scissors mechanism). However, sustainability of the strategy of the accelerated development of capital towards the industrial sector was contingent on increases in the efficiency of agricultural production. Such improvements failed to materialize. Because of government's preoccupation with industrial development, central capital allocation had predominantly targeted heavy industry and the production of producer goods for the agricultural sector had been neglected. By contrast, government investment in the development of basic conditions for agricultural production (irrigation, electrification etc) remained marginal (see figure 4).



Note: Industrial construction expenditure is total basic construction expenditure minus agricultural expenditure

*Figure 6: Ratio of agricultural to industrial basic construction expenditure and sectoral output, 1953-1978*

Source: China Statistical Press, 2005, tables 6, 18

Rather, the state had continued to rely on reorganization (i.e. the establishment of large-scale farming collectives) and autonomous investment by the rural community. Additionally, although the reorganization of plots into large-scale collectives resulted in labor-saving economies of scale, they had but a marginal effect on overall productivity

because rural labor participation had from the outset been comparatively low, and there were few alternative uses for idle rural workers.<sup>69</sup> While China's labor force grew by some 191 million in the period 1952-1978, industry only absorbed about 37 per cent of this addition (Naughton 2007, p.81). On the one hand, there was an inherent limit to the extent to which capital-intensive industry could absorb the rural labor surplus. On the other, the covenant between the Party-state and the industrial worker was predicated on the latter's subjugation to the Party-state apparatus in exchange for a comparatively high wage and entitlement to a wide array of welfare benefits. Rapid expansion of the industrial workforce would have depressed wages and attenuated the capacity for monitoring and control of the bureaucratic apparatus. Thus, the state relied on the household registration system to enforce a stringent constraint on the mobility of rural inhabitants.

The limited capacity of industry to absorb excess agricultural labor was reciprocated by the lack of rural purchasing power, which further prevented the diffusion of industrial products to the agricultural sector. What growth the sector experienced did not result in a commensurate increase of rural affluence; whereas total agricultural output had grown roughly five times between 1952 and 1977 (the year preceding agricultural reform) per capita consumption expenditure had only doubled.<sup>70</sup> Moreover, while production was subject to quota and appropriated by the state at depressed prices, peasants had arguably but little incentive to autonomously increase production.<sup>71</sup> Due to the lack of investment in agricultural modernization and limits to the rationalization of the structure of rural labor, production of grain per peasant remained virtually stagnant throughout the plan era, reaching 0.90 cubic meters in 1952 and 0.93 in 1977<sup>72</sup>.

In spite of the failure to vitalize agriculture, industry expanded rapidly, growing from some 18 to just under 45 per cent of GDP from 1952 to 1978. Econometric analysis confirms the overwhelmingly extensive character of accumulation during this period,

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<sup>69</sup> The average rate of rural labor participation between 1952 and 1978 was 38.8%, and displayed only marginal variation (China Statistical Press 1998).

<sup>70</sup> (China Statistical Press 2005).

<sup>71</sup> Essentially, the problem was one of rent-seeking, see (Murphy et al. 1993).

<sup>72</sup> Calculated from (China Statistical Press 2005, tables 4, 39)

with growth almost in its entirety being accounted for by additions to fixed capital in novel areas of industry (see table 4). The predominantly extensive character of accumulation under communism is further suggested by the volatile pattern of growth of the industrial sector since “[a]s long as capitalism transforms the labor process by the creation of collective means of production, but without reshaping the mode of consumption, accumulation still progresses only in fits and starts” (Brenner & Glick 1991, p.52).<sup>73</sup>

			Shares of output growth (%)		
Period	Output growth	TFP growth	Capital	Labor (educated)*	TFP
1952-1957	6.5	4.7	12.7	14.9	72.4
1957-1965	3.9	-1.0	93.1	49.5	-42.6
1965-1978	4.9	-0.2	67.7	36.7	-4.4
<b>1952-1978</b>	<b>4.4</b>	<b>0.5</b>	<b>56.3</b>	<b>32.7</b>	<b>11.0</b>

\* Workers who enjoyed education at primary level or above

Table 4: Estimated growth of GDP and its composition, 1952-1978

Source: Brandt & Rawski, 2008, p. 839

All in all, after nearly three decades of continuous struggle, the Chinese state had failed to achieve the national economic prowess envisioned at the incipience of communist rule. First, an excessive bias in central coordination towards heavy industry had resulted in neglect of agriculture. Problems within the pattern of production were mirrored by the lack of rural purchasing power, an outcome of the rents levied on agricultural surplus and the persistently unequal income and social welfare conditions within agriculture and industry.<sup>74</sup> Although the extraordinary feats of economic growth in other communist economies which astounded Western observers (Krugman 1994) had not come about in China, socialist economic development had nevertheless yielded the industrial foundation for the subsequent strategy of ‘reform and opening up’ (*gaige kaifang*).

<sup>73</sup> This is because first, sufficient rents have to be appropriated from Department II to fund expansion of Department I, and Department II, given its lack of expendable capital, cannot assimilate the additional output of Department I.

<sup>74</sup> Which will be expounded in the next chapter.

## **Accumulation under market socialism**

### *Extensive accumulation through sectoral readjustment (1978-1993)*

As related in the discussion of the Chinese concept of control, leading economic administrators such as Chen Yun and Zhou Enlai had long advocated a comprehensive revision of the mechanisms and guidelines of capital allocation, arguing for a trajectory of more balanced sectoral development and the introduction of a market component within Department II. With the demise of Mao and removal of other Maoist hardliners, Deng was finally able to implement the much anticipated reforms. Agriculture became to focal point of early adjustments. The initial focus on agriculture had essentially two reasons. First was the lack of increases of rural productivity.<sup>75</sup> Secondly, emphasis on heavy industry had rendered bureaucratic interests in the agricultural sector marginal, and therefore agricultural reforms met with little resistance (Shirk 1993). Three major changes were introduced. First, farming collectives were disbanded. Secondly, prices for government procurement were increased by an average 22.1 per cent in 1979 (Lin 1992). Finally, farmers were allowed to sell a proportion of produced crops on the market. The household responsibility system (*jiating lianchan chengbao zerenzhi*), introduced on a trial basis in 1979, allowed farmers to retain and sell for a profit any output above state-contracted quota. As a result, the household responsibility system had become ubiquitous by the early 1980s (Qian 1999). Subsequent to these regulatory changes, agricultural output rapidly increased. Moreover, the introduction of a market for produce prompted farmers to shift production towards cash crops and livestock which fetched higher prices (see table 5).

Introduction of the household responsibility system also allowed peasants to engage in non-agricultural production, providing a means to alleviate the problem of idle rural labor. By way of the 1979 Decision on Certain Issues regarding Accelerated Agricultural Development,<sup>76</sup> central government explicitly endorsed and promoted the development

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<sup>75</sup> Under central planning, the ratio of per household rural production to consumption had consistently dropped, from its initial high of 2.88 under the first five year plan to 2.48 after the period of adjustment (e.g. 1966-1977). (Calculated from CENET 2005, tables 4, 6, and 11.

<sup>76</sup> CC 1979, *guanyu jia kuai nongye fazhan ruogan wenti de jueding*.

of so-called Township and Village Enterprises (TVE, *xiangzhen qiye*).<sup>77</sup> These TVEs, concentrated within labor-intensive light industry, quickly emerged as a crucial factor of economic development in the first decades of reform.

Subsector	1952-1978	1978-1984
Crops	2.5	5.9
<i>Grain</i>	2.4	4.8
<i>Cotton</i>	2.0	17.7
Animal husbandry	4.0	10.0
Fishery	19.9	12.7
Forestry	9.4	14.9
Agriculture (total)	2.9	7.7

Table 5: Average annual growth rates of agriculture, 1952-1984

Source: Lin 1992, p.35

Although central government condoned and encouraged the development of TVEs, it did not provide the main impetus to their development. Rather, the expansion of TVEs was driven by peasants and local government. Localities had been given authority to tax TVE sales and retain fiscal revenue beyond a negotiated proportion remitted to the center. As a result, local government gained a strong interest in promoting the development of TVEs (Chang & Wang 1994; Kung & Lin 2007). Fiscal and operational decentralization was crucial to reform because it provided stronger incentives for local government to promote the development of regional economies (Young 2000). Under the central plan, provincial governments had been invested with control over local enterprise but enterprise revenues had to be remitted to central government. Throughout the pre-reform era, local administrators had strong incentives to (nominally) meet production quota. However, managers had but little interest in ensuring that production was efficient, since costs (or gains) would ultimately accrue to the center. Seeking to improve the productivity of state-owned enterprise, the center introduced the state enterprise law of 1988, which transferred the operational mandate from local government to enterprise management.

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<sup>77</sup> Within the early stages of reform, TVEs adopted a collective ownership structure, wherein local government would own a majority share (Sun 2002).



Now nominally free to attract capital and offer its goods and services outside centrally stipulated quota (Chen 2008), SOEs had a clear incentive to promote the expansion of production. Nevertheless, in order to compensate local government for its loss of influence over enterprise, the center decided to decentralize fiscal control (Shirk 1990a). This allowed local government to retain the larger share of fiscal revenues extracted from public industry and created yet greater impetus for expansion of industrial production.

Under the planning system, the Chinese economy had been enfeebled by years of centrally enforced capital transfers and restrictions, distorting the balance between economic sectors and the ratio between investment and consumption. During the period of ‘reform and opening up’, many of these constraints and restrictions were removed. The introduction of a market component and corporatization, first within agriculture and subsequently in selected areas of industry prompted an organic process of amelioration of sectoral imbalances. At the outset, increased productivity owed much to the proliferation of agriculture as attested by its growing share of GDP. However, it was the transition from agriculture towards higher value-added production, promoted by the introduction of the collective township and village enterprises, which gave the greatest impetus to growth in the early period of reform.

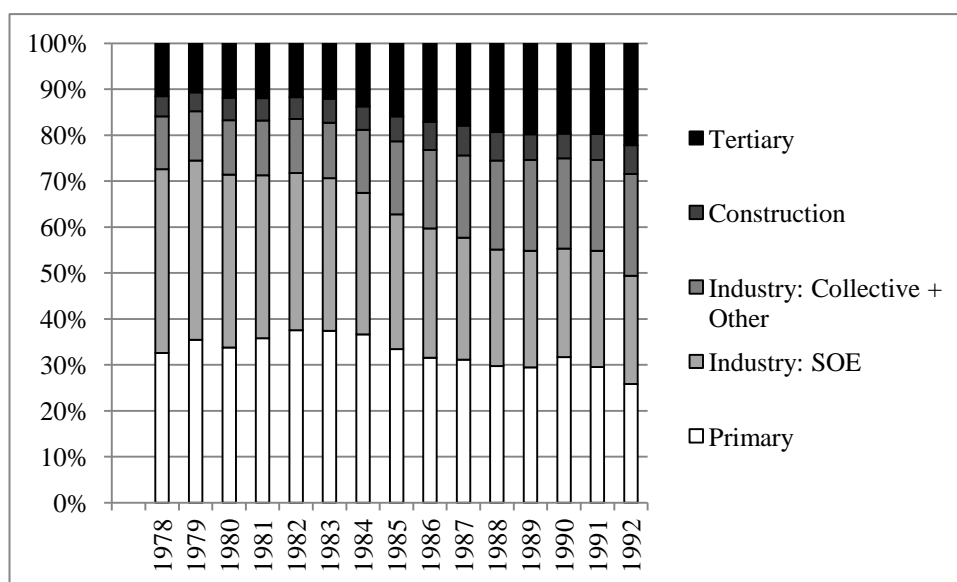


Figure 7: Shares of GDP by sector and ownership status, 1978-1993

Source: Calculated from (China Statistical Press 2005), tables 6, 41

The rural economy was also bolstered by the pervasive establishment of collective enterprises, which allowed for the absorption of excess rural labor and expanded the heretofore severely restricted supply of industrial consumer goods. Finally, rapid market growth impelled the development of services such as retail, trade, transportation and communication (OECD 2006, see figure 5).

The increase of products and services sold through the market in turn promoted the rapid increase of wages, and expendable income. Between 1978 and 1993, per capita rural consumption spending rose, from 183 to 855 yuan.<sup>78</sup> In the same period, urban income increased by a similar magnitude, from 405 to 3027 yuan. Thus, although gradual marketization benefited both rural and urban citizens, it also exacerbated the disparity between them (see figure 6). Jointly, the implicit transfers of capital caused by the abrogation of regulatory constraints and introduction of a market mechanism pushed capital into new forays of productive activity. Lack of supply in many consumer markets prompted incessant investment in production capacity (Wedeman 2003). Increased production of consumption goods in turn promoted demand within heavy industry (Pei 2005).

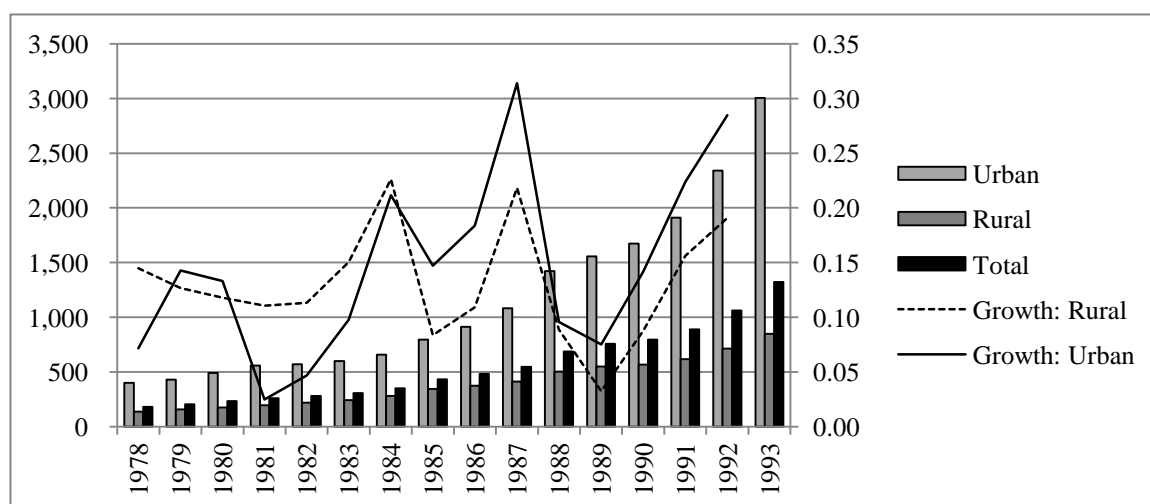


Figure 8: Rural and urban growth of per capita consumption expenditure, absolute and YoY growth, 1978-1993

Note: Absolute growth in price-adjusted yuan. left axis; year-on-year, right axis

Source: Calculated from (China Statistical Press 2005, tables 11 and 28)

<sup>78</sup> (China Statistical Press 2005, table 11).

Functional implications aside, shifts in the distribution of capital also had political consequences. As a result of fiscal decentralization, local governments' financial prowess greatly increased. This enhanced financial stature implied that, as reforms progressed, local government became a chief influence in the coordination of capital. The influence of direct central allocation waned in tandem with the proliferation of the market and the progress of decentralization so that by the mid-1990s, the practice of central material allocation had all but disappeared (Naughton 1996).

### *Stabilization and the reemergence of the central state (1994-2002)*

Between 1978 and 1995, China's economy had grown at an average 9.7%, and per capita GNP had risen from 379 to 4754 yuan (NBS 1996; 2010). The burgeoning market also contributed greatly to the fiscal prowess of the state. Between 1978 and 1995, revenue from taxes rose from 51.9 to 603.8 billion yuan (NBS 1996). Rapid increase of revenue in turn, fuelled local investment in industry. However, corporatization and marketization within the state-owned sector had failed to replicate the splendid successes of the market economy. Fiscal decentralization had prompted local government to engage in endemic overinvestment, contributing to mounting inflation (Wu 2005; Shirk 1993, see figure 7).<sup>79</sup> Moreover, due to vested bureaucratic interests, investments continued to favor industry, resulting in overcapacity in many sectors (Auty 1992).<sup>80</sup> While decentralization thus introduced perverse incentives for local governments, the ability of the center to deal with these issues through monetary and fiscal policy had weakened due to its diminished share of revenues.

With the passing of power from the first generation of reformers to the new leadership, market-reforms were accompanied by a stringent focus on macro-economic stabilization and institutionalization of administrative relations. Deng's policies had sought to address the constrained development of agriculture and light industry brought about by the practice of central planning.

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<sup>79</sup> The inflationary crisis, and pervasive discontent regarding bureaucratic corruption were among the chief reasons for the civil unrest of 1989, precipitating into the Tian'anmen incident.

<sup>80</sup> This is reflected in the generally positive terms of trade of agriculture vis-à-vis industry, suggesting an overabundance of industrial output (see figure).

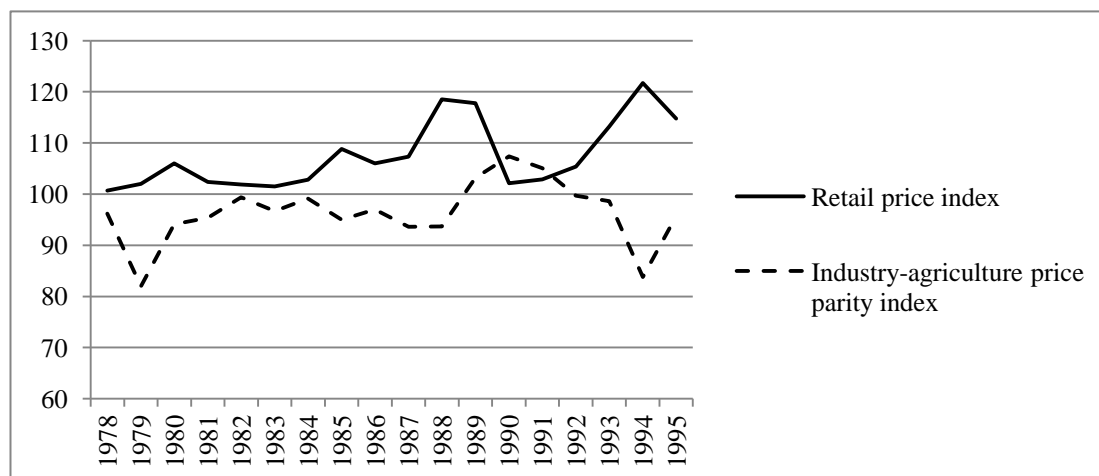


Figure 9: Inflation and sectoral parity, 1978-1995

Source: NBS, 1996

Policies under Jiang Zemin were of a similar reactionary nature, being much concerned with the structural imbalances brought on by unchecked market growth and the discretionary influence of local government. Thus, rather than seeking to fundamentally alter the pattern of capital-driven economic development, institutional changes were geared towards consolidation and adjustment. Nevertheless, regulatory interventions had profound implications for the distribution of capital over constituents and sectors.

Commencing in 1994, central government introduced various macro-level policies which sought to discipline public industry by curbing local government's capacity for discretionary industrial investment while attenuating soft-budget constraints.<sup>81</sup> The tax reforms of 1994, which supplanted negotiation-based sharing arrangements between provincial and central government which had existed under Deng with a unified tax scheme, were the first major initiative to curb discretionary investment of local government (Loo & Chow 2006; Ma 2000). Concurrent efforts were made to curtail the availability of credit by consolidating fiscal authority within the People's Bank of China, which gained central bank status. Subsidiaries operating at the local level, which had been susceptible to the influence of local government, were closed (Wong & Lu 2002).

<sup>81</sup> CC 1994, *guanyu wanshan shehui zhuyi shichang jingji tizhi ruogan wenti de jue ding* [Decision on Certain Issues regarding the Completion of a Socialist Market Economy].

Following this recentralization of the banking sector, the state introduced a decisively more conservative monetary policy (see table 6).

	Money (M <sub>1</sub> )	Currency in Circulation (M <sub>0</sub> )
1991	24.21	20.17
1992	35.89	36.45
1993	n/a	n/a
1994	26.17	24.28
1995	16.78	8.19
1996	18.88	11.63
1997	16.54	15.63
1998	11.85	10.09

Table 6: Growth rate of money supply, 1991-1998

Source: NBS, 2012, table 19-4

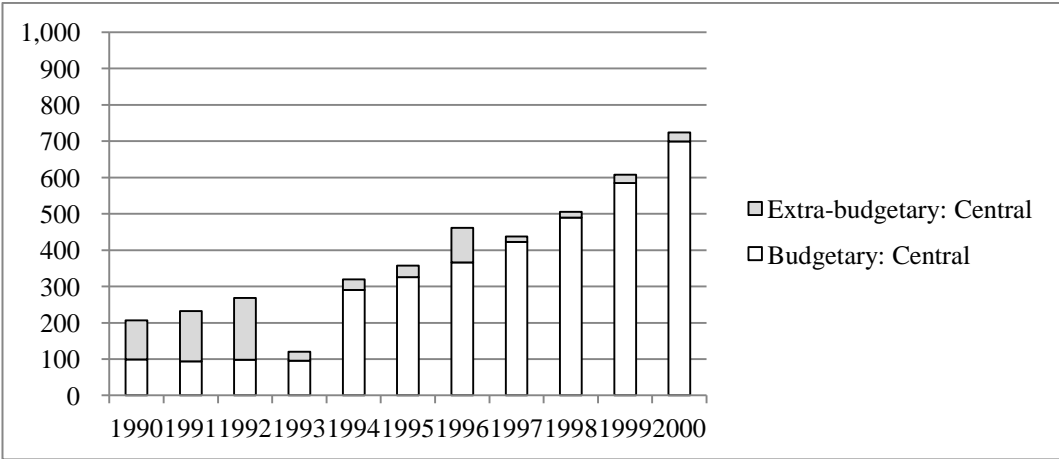
Simultaneously, bankruptcy legislation and labor force reductions put an end to the unconditional state support given for public enterprise.<sup>82</sup> Under the slogan of ‘retaining the large and releasing the small’ (*zhua da fang xiao*), central government disbanded or privatized the largest share of state-owned enterprises, leaving the state in control of only the largest corporations (Naughton 2007). These measures proved successful in curbing the runaway inflation which had accompanied economic development under Deng. Within the period between 1995 (the year following the introduction of tax reforms) and 2000, inflation decreased by an average 3.4%, lowering the retail price index from 114.8 to 98.5 (NBS 2004). Reforms also had profound effects on the structure of the economy. Public sector retrenchment added significantly to the expansion of the market component of the Chinese economy, so that from 2002, non-public industry accounted for the greater share of industrial output.<sup>83</sup>

<sup>82</sup> State Council 1997, *guowuyuan pizhuan guojia jingmaowei guanyu 1997 nian guoyou qiye gaige yu fazhan gongzuo yijian de tongzhi* [Notification on State Council’s Endorsement of the 1997 Opinions of the State Economic and Trade Commission on the Reform and Development of Public Enterprise].

<sup>83</sup> Calculated from (China Statistical Press 2005, table 41). Note that after 1996, the introduction of the shareholding form within state-owned industry renders differentiation between state and market-based enterprise problematic, and thus actual state-ownership is understated. On the other hand, from 1998 onwards,

However, contraction of the scale of state-owned industry did not imply its decline. Although the number of SOEs was reduced to less than half between 1995 and 2000, overall output of state-owned industry continued to rise steadily. At the same time, expenses associated with loss-making enterprise were reduced by a great margin, leaving the state in command of a more consolidated and more robust public sector. Fiscal and monetary policies were successful in mitigating local tendencies towards overinvestment and improving the efficiency of the public economy by abolishing loss-making enterprise and excess labor. As in the initial period of reform, these structural adjustments were not without political consequence. First, because monetary and fiscal stabilization had been effectuated through the consolidation of control of the financial sector within the central state, the decentralization of budgetary revenues was reversed. However, because this decrease in local government revenues was not accompanied by a commensurate redistribution of expenses, local governments increasingly relied on extra-budgetary sources of income.

Second, rapid expansion of the market economy and the diversification of legal ownership structures had resulted in the emergence of a growing constituency of private entrepreneurs.




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statistics include only non-SOEs with annual revenues of over 5 million yuan., which results in a downward bias in the estimate of total non-public enterprise.

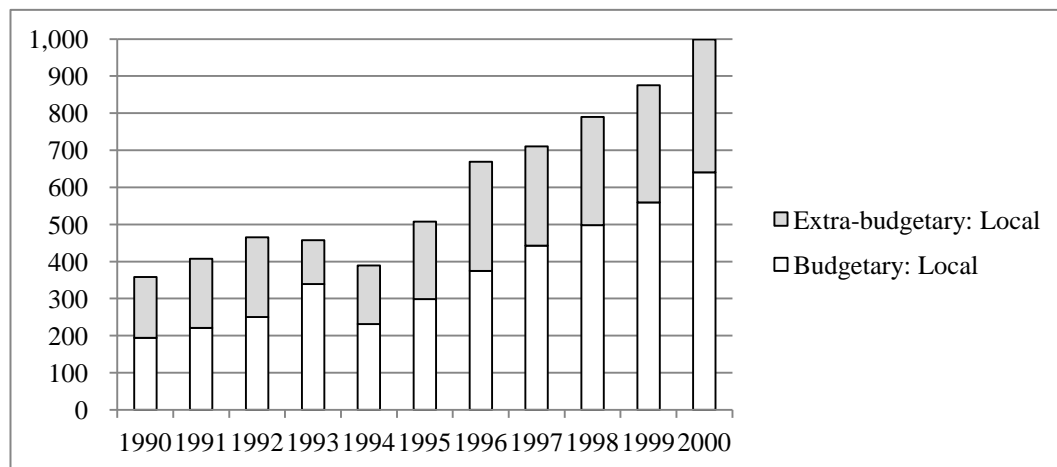


Figure 10: Central and local government revenue, 1990-2000 (billion yuan.)

Source: Calculated from (CENET, 2005, tables 23, 24)

### From centrifugal to centripetal capital (2003-present)

In spite of the success of macro-economic reforms and reorganization of public industry, a plethora of ongoing problems, left unattended under the Jiang administration, had gained in urgency. The detrimental consequences of resource-dependent growth had become increasingly salient. Productivity gains had been realized predominantly through addition of capital, while labor remained largely of the unskilled variety. Moreover, abrogation of the employment guarantee had led to the layoff of some forty per cent of workers in public industry. In addition to the growing divide between public and private sector, urban-rural imbalances continued to exacerbate. Although Deng's agricultural reforms had greatly contributed to the wellbeing of the rural population, investment in the reform era had been concentrated within industry, and the household registration system had continued to stymie rural-urban migration.

Moreover, in an ironic reiteration of the past, the market mechanism had promoted novel forms of expropriation of rural capital. While Jiang's fiscal reforms had aided in the consolidation of budgetary revenues, it had also eliminated a main source of income. To compensate, local governments proceeded with the large scale transfer of farm-land to industry and the property sector. Although peasants had been given the right to long-term use of plots, they had no legal recourse to address appropriation and sale of farm-land (Peck & Zhang 2013). All in all, the pattern of economic growth pursued under Jiang had

not only constrained the growth of wages, and thus the potential to transfer to a consumption-driven model of development, but also aggravated social tensions. Secondly, emphasis on the expansion of industrial capacity resulted in high consumption of energy and raw material. Heavy reliance on coal energy<sup>85</sup> and accumulating industrial waste induced significant strain on the environment. Concerns over social and environmental externalities coincided with apprehensions about the tenability of economic sovereignty given China's increasing reliance on foreign factor markets and technology.

In tandem with the reconsolidation of control within the central Party-state apparatus, direct appropriations re-emerged as a key instrument of capital allocation. Under Hu, programmes –typically administered by local government– directed at the resolution of perceived bottlenecks in economic development have combined lump-sum allocations with a host of subsidies and other indirect fiscal stimuli. Development of rural and peripheral economies and promotion of human and intellectual capital have been key foci of these policies. Accordingly, policies such as the ‘western development programme’ (*xibu da kaifa*), have been appended with a range of incentives targeting the rural economy.<sup>86</sup> From 2003 to 2010, investment in agricultural development grew from 4.6 to 9.1% of total state expenditures (NBS 2004, 2011). Moreover, government rapidly increased outlays for science, technology and education and introduced a host of industrial policies extending favorable conditions to domestic enterprise operating within technology-intensive industries (McGregor 2011).

Counteracting the abovementioned redistribution of capital was the incessant growth of the centrally-controlled public economy. Bolstered by its resolve to retain control over the overall structure of the economy, central government designated several upstream sectors as ‘pillar industries’ during the fourteenth Party congress and again in the tenth five-year plan (Liu 2005). These subsequently became the focus of government's efforts of reorganize public industry. The state effectuated the consolidation of central SOEs through a series of mandatory mergers and acquisitions, resulting in the formation of a

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<sup>85</sup> In 2004, coal-based energy accounted for 74.5 per cent of total energy production (NBS, 2005).

<sup>86</sup> Note that many of these programs were instigated under Jiang, rather than under Hu. The western development program for example, commenced in 1996.



select group of large business conglomerates. The amalgamation of public assets was complemented with ownership diversification by way of stock-listing, resulting in a rapid influx of capital. As a result, the overall stature of these central SOEs (*zhongyang qiye*) rapidly increased, so that by 2008, they accounted for more than 40 per cent of state-owned assets (SASAC Yearbook, 2009).

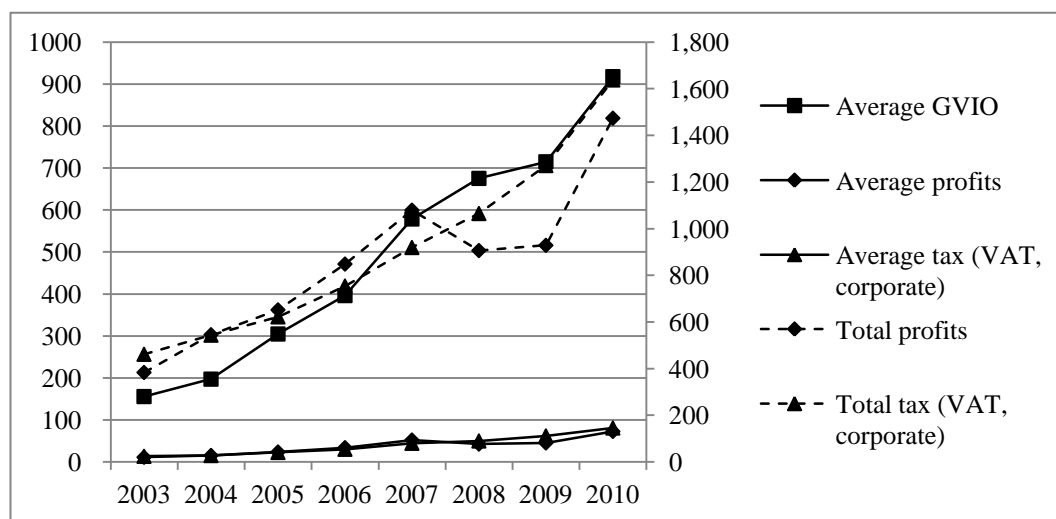


Figure 11: Output, profit and taxes of state-owned and state-controlled enterprises, 2003-2010

Source: NBS 2011, 14-8

Under Hu, China's economy continued to experience steady growth, with GDP increasing by an average 10.9 per cent between 2003 and 2012 (NBS 2012). However, progress along the qualitative dimensions of economic development was less obvious. Lump sum allocations for the alleviation of sectoral and regional disparity have not been able to moderate socio-economic inequalities which emerged as a consequence of decades of industry-oriented, investment-driven growth. The prioritization of industry, impelling the neglect of agricultural development throughout most of the post-communist era, has also been largely responsible for the structural disparity of the coastal and inland region. Focusing on those areas where 'reform and opening up' were to reap the most immediate benefits, early efforts at marketization, corporatization and integration with the global economy were concentrated in the relatively affluent and developed coastal provinces. Subsequent investment and development increased the productivity of coastal

industry vis-à-vis that of the inland regions, in turn reinforcing the tendency for investment to flow to the coastal provinces (Fujita & Hu 2001). The rapid deterioration of the ratio of rural to urban incomes, which only moderately improved under the Hu-Wen administration demonstrates a patent misalignment between the humanist discourse of *yi ren wei ben* and actual patterns of development (figure 10).

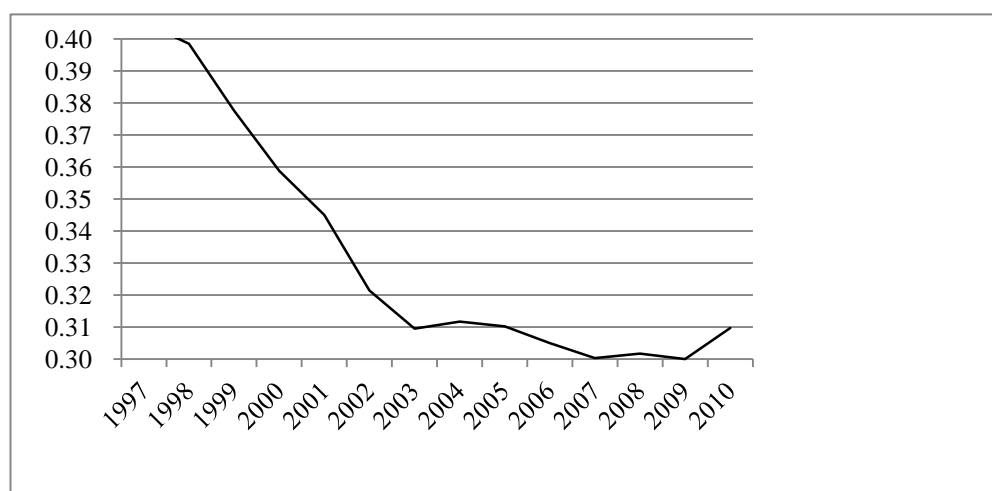


Figure 12: Rural income as share of urban income, 1998-2011

Source: Calculated from NBS, 2012, table 10-2

After three decades of reform, China's trajectory of economic development departed significantly from the communist-era model. No longer does capital extracted from agriculture form the main source of investment for industry. Relationships between bureaucracy and enterprise have been refashioned so that now the market component comprises the larger part of the economy. Within the public economy as well, the practice of material planning which once constituted the fulcrum of state-enterprise coordination has disappeared in tandem with corporatization. Contrasting these profound changes are certain persistent characteristics of the distribution of capital. The subsequent section which considers the overall mode of accumulation in the post-command-era economy demonstrates that, notwithstanding profound institutional change, development is still driven by high investment in fixed capital, and the persistent prioritization of the public component of the economy. Yet, these engrained features of Chinese economic development threaten long-term sustainability and undermine social stability.

## The mode of accumulation within the socialist market economy

### *Structural features of accumulation*

Under socialism, the distinguishing pattern of accumulation was one of expropriation of capital from the rural economy into heavy industry. Removal of these coercive regulations in the first stages of reform introduced both incentives and opportunities for the diversification and expansion of production in both agriculture and light industry, and accounts in large part for the rapid upturn of economic activity in post-communist China. Although the forced transfer of agricultural surplus into industry has ceased to be the core of China's economic strategy, investment in the reform era consistently prioritized the development of industry over that of agriculture. Thus, while output of the primary sector grew by 4.37 times between 1978 and 2011, industry expanded by more than 35 times in the same period (see figure 11).

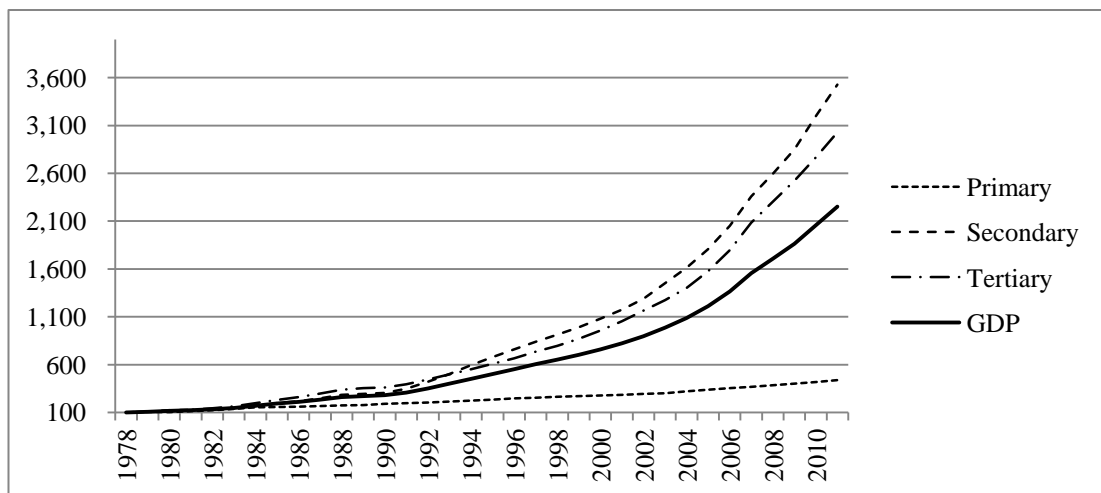


Figure 13: GDP and component growth, 1979-2011, (1978=100)

Source: NBS 2012, table 2-1

Moreover, while the price-scissors mechanism has been abandoned, and in recent years incremental steps have been taken to alleviate other institutional constraints (such as the household registration system), expropriation had persisted in other guises, such as the acquisition and sale of farm-land by local government. As a result (with the exception of the initial stage of liberalization), growth within agriculture has continued to trail significantly behind that of the secondary and tertiary sectors.

Similarities with the pre-reform pattern of accumulation do not only exist within the sectoral distribution of capital, but also in the relationship between investment and consumption. As can be gleaned from figure 12, household consumption expenditure rose rapidly in tandem with the market-driven expansion of the economy during the first two decades. However, during the tenure of Jiang (1993-2003) growth of household consumption expenditure slowed down markedly.

Although in the wake of Hu's promulgation of *yi ren wei ben* (to take the people as the basis), the divergence in growth rates of consumption expenditure and productive capital decreased, government's reaction to the global financial crisis offset this development.<sup>87</sup> All in all, the reform-era economy has relied on high investment and high additions to the fixed capital stock in even greater degree than its communist counterpart. Moreover, the expansion of fixed capital has consistently outpaced growth of both GDP and wages, suggesting the persistence of a predominantly extensive mode of accumulation.

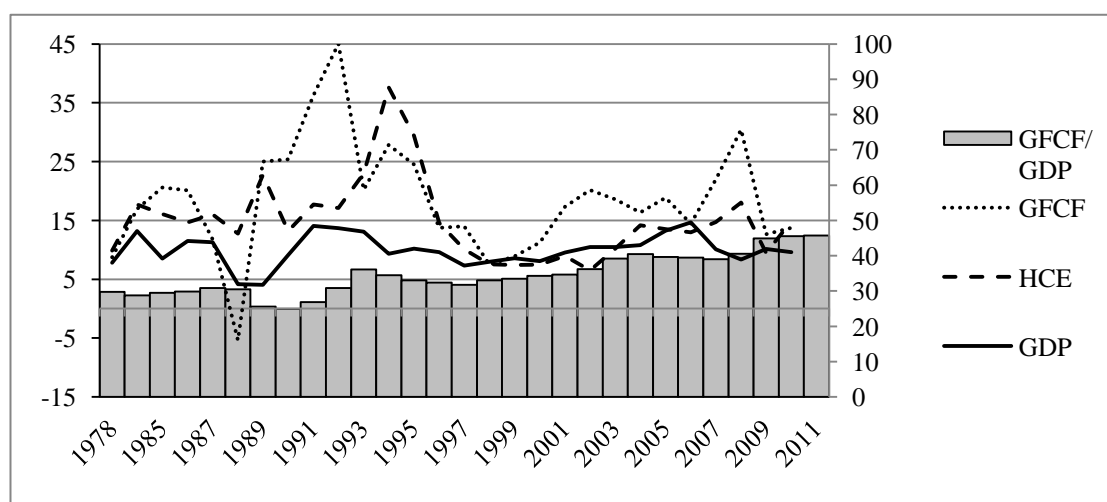


Figure 14: Growth of real GDP, household consumption expenditure and gross fixed capital, 1978-2011

Source: Calculated from NBS, 2012, tables 2-17, 2-18

<sup>87</sup> In reaction to the 2008 financial crisis, the National Development and Reform Commission (NDRC) implemented a comprehensive stimulus plan (totaling roughly 4 trillion yuan). The major part of these funds (1.5 trillion and 1 trillion yuan, respectively) were invested in national infrastructure and various large technological projects stipulated in the Medium and Long-term Plan for Scientific and Technological Development (Anonymous 2009b). Keynesian investment (predominantly in state-controlled industries) adding to the growth of fixed capital thus was prioritized over fiscal measures which could have stimulated consumption through increases of expendable income.

### *Capital concentration and distributive consequences*

While the broad characteristics of accumulation during and after the command economy display certain salient similarities, the reform-era distribution of capital has been more divergent. For one, processes of marketization, corporatization and de-recentralization introduced novel constituents while moderating relationships of authority between extant ones. Amongst these changes, the emergence of a private sector has been of greatest consequence. The establishment of an economy outside the confines of the public sector provided tremendous scope and drive for the utilization of latent capital. Indeed, the market now comprises the greater part of the Chinese economy, a fact central to transitionist arguments.

Yet the significance of the development of the market component is subject to qualifications. First, the introduction of new sources of financing has not challenged the primacy of industrial capital. In fact, Chinese reliance on loans and FDI as sources of investment in fixed assets has consistently decreased. Thus, the emergence of investors and creditors (domestic and foreign) did not result in a comprehensive shift in the hierarchy of economic constituents (see table 7).

	<b>State Budget</b>	<b>Domestic Loans</b>	<b>Foreign Investment</b>	<b>Enterprise, others*</b>
1981	28.1	12.7	3.8	55.4
1985	16.0	20.1	3.6	60.3
1990	8.7	19.6	6.3	65.4
1995	3.0	20.5	11.2	65.3
2000	6.4	20.3	5.1	68.2
2005	4.4	17.3	4.2	74.1
2010	4.7	15.2	1.6	78.5

\*Includes investment from retained revenues and funds obtained from sources other than financial institutions

*Table 7: Sources of investment in fixed assets by percentage of total, 1981-2010*

Source: NBS, 2012

Second, the reduction of the share of overall production of the public economy has been countervailed by the increasing concentration of capital. Due to local government's

proclivity to invest in the local public economy during the initial period of reform, the productive capacity of local SOEs grew at a much faster rate than that owned by collective and private enterprise. To wit, in the period 1978-1996, the number of state-owned and market-based enterprises rose by an annual average of 1.02 and 2.78 % respectively, while gross output of the two sectors grew by a yearly average of 23.1 and 18.0 per cent.<sup>88</sup> Restructuring in the mid-1990s transferred much of the state's non-productive assets to the private sector. Yet the volume of assets under purview of remaining SOEs - particularly those in strategic upstream industry controlled by central government- rapidly increased. In the same period, the size of private enterprise grew at a much more moderate rate.<sup>89</sup> Thus, patterns of accumulation within the private and public segments sector have been largely contrasting, with rapid but diffuse growth<sup>90</sup> prevailing in the private economy and more moderate expansion coinciding with increasing concentration in the (centrally controlled) public sector. Since these enterprises have been the focus of government's corporate development strategy (Nolan 2001; Keister 1998) and are increasingly clustered in major upstream industries, their diminished share of gross industrial output is a poor reflection of their actual significance within the economic system (see tables 8 and 9). Notwithstanding the pervasive influence of the state, the processes of marketization and corporatization, along with the tremendous accumulation of assets within central SOEs have given rise to a potent managerial constituency within the public sector (Walder 2011).

The devolution of operational authority to corporate leadership has created new potential for the development of agency problems and emphasized the need to adjust coordinating mechanisms to ensure alignment of state-managerial interests (Brødsgaard 2012).

Concentration of industrial assets is representative of a more general trend towards the recentralization of capital in the public sector. However, this transfer of revenues wasn't accompanied by a commensurate redistribution of expenses.<sup>91</sup> Thus, although

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<sup>88</sup> Calculated from (China Statistical Press 2005).

<sup>89</sup> Below data refers to domestic private enterprise only.

<sup>90</sup> I.e. growth by means of the establishment of new enterprise.

<sup>91</sup> In 1993, the central-local distribution of fiscal revenues was 0.22 and 0.78, while the distribution of expenses

State-owned/ controlled as % of total industry								
	Enterprises	Employees	Assets	Liabilities	Equity	Fixed assets	GVIO	Industrial profits
1998	39.22	60.49	68.84	44.15	67.84	79.46	49.63	36.01
2003	17.47	37.62	55.99	56.26	55.38	64.00	37.54	46.01
2011	5.24	19.77	41.68	43.88	38.73	48.91	26.18	26.81

State-owned/ controlled average (monetary values in million yuan.)								
		Employees	Assets	Liabilities	Equity	Fixed capital	GVIO	Industrial profits
1998		579	115.72	47.31	41.34	55.14	51.93	0.81
2003		631	275.73	163.33	111.67	127.38	155.80	11.19
2011		1063	1651.85	1010.38	640.59	656.13	1296.25	96.51

Private (above scale) as % of total industry								
	Enterprises	Employees	Assets	Liabilities	Equity	Fixed capital	GVIO	Industrial profits
1998	6.46	2.60	1.37	1.31	1.46	1.21	3.07	4.62
2003	34.45	17.88	8.60	8.82	8.31	6.88	14.75	10.31
2011	55.47	32.25	18.90	15.03	20.38	17.55	29.89	29.57

Private (above scale) average (monetary values in million yuan.)								
		Employees	Assets	Liabilities	Equity	Fixed capital	GVIO	Industrial profits
1998		151	13.94	8.53	5.41	5.11	19.53	0.63
2003		152	21.48	12.99	8.50	6.95	31.03	1.27
2011		164	70.73	32.66	31.82	22.23	139.71	10.05

*Table 8: Concentration of capital and distribution over state-owned and private enterprise, 1998-2011*

Source: Calculated from NBS, 2012, tables 14-6, 14-10; 2004, tables 14-5, 14-9

	Total SOEs	Central SOEs	Central /Total SOEs
Number	113,731	148	0.13%
Employees (1, 000)	36,723	11,368	30.96%
Assets (billion yuan)	13,182.87	5,557.4	42.16%

*Table 9: Distribution of capital within the public economy, 2008*

Source: SASAC Yearbook, 2009

local government emerged as the main coordinating actor within the initial period of reform, subsequent development saw a countervailing tendency bolstering the

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was 0.28 and 0.72 respectively. By 2011 these ratios had changed to 0.49 to 0.51 and 0.15 to 0.85 (NBS, 2012).

hierarchical relationship between central and local government. A consequence of fiscal redistribution has been local government's increasing reliance on the collection of extra-budgetary revenues (Mertha 2005), of which the aforementioned appropriation and sale of land is an example. Thus, the fiscal reconsolidation of the central state has proceeded in part by the devolvement of costs unto local government, which in turn has partly passed these on to society.

Finally, prioritization of industry has had profound implications for the distribution of capital over the urban and rural economy. While the rural economy was invigorated by the abolishment of systemic resource transfers, until recently, no deliberate efforts were made to significantly adjust the systemic bias of capital allocation towards industry. Moreover, due to interregional differences in productivity, capital has continued to flow predominantly to the developed coastal regions. The dual divergence between eastern and inland regions and cities and countryside has caused socio-economic disparities to exacerbate during the reform era.

## **Conclusion**

In the communist era, industrial development was driven by the expropriation of agricultural surplus value. Constraints on rural purchasing power and the overwhelmingly extensive quality of accumulation within industry resulted in a lack of transfer of productivity-enhancing capital from department I to department II and precluded realization of the strategy of accelerated industrial development. In the initial period of reform, extensive and diffuse growth of the market sector consistently outpaced more consolidated accumulation within the public sector, allowing for attenuation of the imbalances between the economic departments. With the passing of power from Deng to Jiang, tendencies towards liberalization and decentralization were reversed, even as the administration proceeded with reforms reminiscent of western economic liberalization. In an ironic reiteration of pre-reform patterns of capital distribution, capitalist institutional reforms have led once again to the expansion and invigoration of the commanding heights of the state-controlled economy.

Thus, capital accumulation in the post-communist era has not unequivocally adhered



to a single pattern. Roughly, accumulation within the non-state component of the economy has been diffuse, with additions to capital stock being relatively dependent on the influx of new enterprises. By contrast, the public economy has developed predominantly by expansion of capital under control of extant firms, and the select group of centrally controlled national champions in particular. Regardless of these differences, the overall mode of accumulation has remained predominantly extensive, with rates of gross fixed capital even far surpassing those under communism. The emphasis on the continuous expansion of productive capacity is reflected in the continued dominance of the industrialist class within the coordination of capital. Although the significance of central planning was diminished with the development of debt and equity markets, the financial sector appears to have bolstered rather than challenged the extant socio-economic hierarchy.

Nevertheless, corporatization and marketization resulted in the emergence of novel constituents, whom the state has had to contend with. The influence of Chinese entrepreneurs grew in tandem with the development of the market economy. Within the public sector, devolution of operational control resulted in the formation of a managerial class. This alteration of distribution of capital necessitated changes to the institutional architecture which coordinated the interrelations between state and market and central state and sub-central public actors. However, the discrepancy between current discourse – to the effect of promoting more egalitarian growth – and the actual distribution of capital points also to the path-dependent constraints imposed by institutions that have entrenched the imperative for continuous expansion of productive capacity. The subsequent chapter examines how the institutions which regulate finance, labor and competition have continued to accommodate the state-industrialist nexus in the face of the changing distribution of capital, as well as why institutionalized inter-constituent relationships may impede the transition towards a more egalitarian mode of development.

Finally, the persistence of an extensive mode of accumulation calls into question the general sustainability of current economic development. Consistently high margins of addition to industrial capital imply a risk of production in excess of consumption or a systemic problem of idle capacity. China's 'opening up' and emphasis on exports has

been instrumental in staving off the destabilizing influences of over-accumulation (Boyer 2012). Recently, the global financial crisis suppressed foreign demand, while the state's financial stimuli, targeted mainly at the expansion of fixed capital, have ironically compounded the problem of over-accumulation exacerbating the risk of stagflation. The limits of the Chinese pattern of extensive accumulation are also obvious from increasing socio-economic divergence, prompted by the uneven development of city and countryside and the predominance of capital investment over the expansion of expandable income. The systemic crisis the Chinese economy is facing now is thus one which is fundamentally different from that impeding growth in the communist era. The latter was brought on by the structural imbalance of agriculture and industry. Although growth of the agricultural sector has continued to trail behind that of service and industry, China's current economic predicament arises out of the inherent limitations of an extensive mode of growth. The manifest economic and social imbalances prompted by China's accumulation regime stress the imminent need for a capacity to consistently increase relative surplus value by way of the introduction of productivity-enhancing technologies. Absent increases in labor productivity, transition towards a more egalitarian, domestic consumption-based model of development appears infeasible. Chapter five asks whether the current institutional architecture can provide the requisite impetus and coordination to transition towards a predominantly intensive mode of accumulation.

## CHAPTER 4

### REGULATION UNDER COMMUNISM AND MARKET SOCIALISM: SUSTAINING THE STATE-INDUSTRIALIST NEXUS

#### Introduction

Notwithstanding profound changes within the distribution of capital over productive processes and constituents since the transition from the communist central planning system to the current constellation of market socialism, patterns of capital accumulation have displayed certain salient continuities. As related in the previous chapter, one of these commonalities is the heavy reliance of economic growth on the expansion of industrial capital. Additionally, although the public economy has inarguably become less encompassing, the state has continued to play a role of central (and in recent years, increasing) importance. Jointly, the predominance of industrial capital and consolidation of control over key industrial sectors by the central Party-state apparatus –a dominant form of capital and main coordinating mechanism- give rise to China's state-industrial nexus. To venture beyond this general characterization of the main dynamic of the Chinese economic system, this chapter considers the *mode of regulation*, that is, the aggregate of institutional arrangements which determine the systematic relationships between productive capital and labor and finance and capital, as well as the ways in which enterprises interact over the course of production. Analysis is concerned with how China's mode of regulation sustained the communist and post-communist state-industrialist nexus. An additional question of interest is how this relationship between state and industry was affected by the transition towards market socialism.

This chapter commences with an overview of the institutional framework which took shape under communism. Transfer of agricultural surplus to industry hinged on a centrally administered system of capital allocation. However, the distributive process necessitated establishment of a great number of regional and functional bureaux. Informational and coordinative constraints subsequently resulted in sub-central bureaucracy's emergence as separate constituents within the system of economic planning.

Notwithstanding the pervasive nature of the state, the center's coordinative capacity was thus curtailed by considerable bureaucratic fragmentation, which ought to be considered when making longitudinal comparisons of the magnitude of economic control. The systemic bias towards heavy industry was reinforced by the development of an indigenous system of industrial relations. The household registration system segregated the rural and urban workforce. The state cultivated its relationship with the industrial workforce through the institution of the *danwei*, or work unit, which effectively eroded the autonomy of industrial labor. Administrative staff was managed by way of the *nomenklatura* system of personnel control. Jointly, these institutions, constituting the crux of the communist mode of regulation, ensured the dependency of labor and management on the Chinese Communist Party. In reviewing the institutions which took shape under communism, this section not only provides an anchor point for discussion of subsequent institutional changes, but it likewise yields important insights into the nature of the Leninist system of bureaucratic administration which continues to constitute the primary means by which the central state coordinates with China's main economic constituents.

With the introduction of reforms in 1978, the monopolistic mode of regulation, which had promoted the concentration of capital into heavy industry, was supplanted by a more extensive one. Nevertheless, state monopolization of upstream industry and credit and equity markets introduced novel mechanisms of expropriation, resulting in a countervailing trend of consolidation. As capital flowed towards public industry, much of the costs of loss-making enterprise –of which the 'iron rice-bowl' system of urban social welfare, which constituted the crux of the state-industrial worker nexus, comprised no small part- were devolved unto the private sector. In its stead, the state sought to solidify its ties with the emergent managerial class. Through its Leninist bureaucratic apparatus, the center perpetuated relationships of hierarchical dependency with leaders of public industry and regional government, while simultaneously seeking to co-opt private-sector entrepreneurs. The aligning principle between these constituents and the center is the joint interest in the continuous development of industrial production. As such, in spite of alteration of primary constituents and the mechanisms coordinating their interaction, the state-industrialist nexus has abided.

## **The communist mode of regulation**

As regulation theory would predict, reorganization of relationships of production in communist China was accompanied by a commensurate reordering of the mode of regulation. Although predominantly monopolistic in character, the communist industrial paradigm and the distinctly political context of economic activity lent an idiosyncratic character to regulation.

### *Coordination of capital and inter-enterprise relationships*

#### **Fiscal and material planning**

Upon the establishment of the People's Republic, the CCP rapidly commenced the project of economic nationalization. Initially, the scope of public ownership was limited to heavy industry, while private enterprises were allowed to continue operation within consumer goods and commerce.<sup>92</sup> However, in tandem with the development of the economic administration, the scope of state control expanded, and by 1956, virtually all industry had been subsumed either within state-owned enterprise or collectives. Ultimate control over the allocation of capital rested with three central organs: the State Planning Commission, State Economic Commission and the Basic Construction Commission.<sup>93</sup> Although the distribution of responsibilities over the various administrative organs varied periodically, the relationship between the three was broadly as follows. The State Planning Commission was responsible for setting out the long- and medium-term course of economic development. To this effect, it drafted various national plans (such as the five-year plans) in which it stipulated overall outlays for each of the economic departments, promulgated production quota and set out major objectives for the

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<sup>92</sup> Chinese People's Political Consultative Conference 1949, *gongtong gangling* [Common program].

<sup>93</sup> CC 1958, *guanyu chengli zhongyang jiben jianshe weiyuanhui, jihua weiyuanhui, jingji weiyuanhui de jueding* [Decision regarding the establishment of the Basic Construction, State Planning, and State Economic Commissions]. Throughout the history of the P.R.C. bureaucratic organization has been subject to a great number of reforms. As such the SEC and SPC have at times been merged into a single entity or operated separately, while the BCC was disbanded or re-established at various intervals. The latest incarnation of the SEC and SPC is the National Development and Reform Commission (NDRC), established in 2003. For an extensive overview of bureaucratic reforms see for example Brødsgaard, 2002; Burns, 1993.

development of the industrial and public infrastructure. The State Economic Commission was responsible for short term macro-economic adjustments. It produced detailed annual budgets for the industrial and regional bureaucratic organs and set yearly production targets. Finally, the Basic Construction Commission was mandated with management of investment in fixed industrial assets (*jiben jianshe*), so as to increase productive capacity. Its concrete tasks consisted of the articulation and prioritization (*pai dui*) of objectives for plant construction and expansion and industrial infrastructure (Dong 2007b).

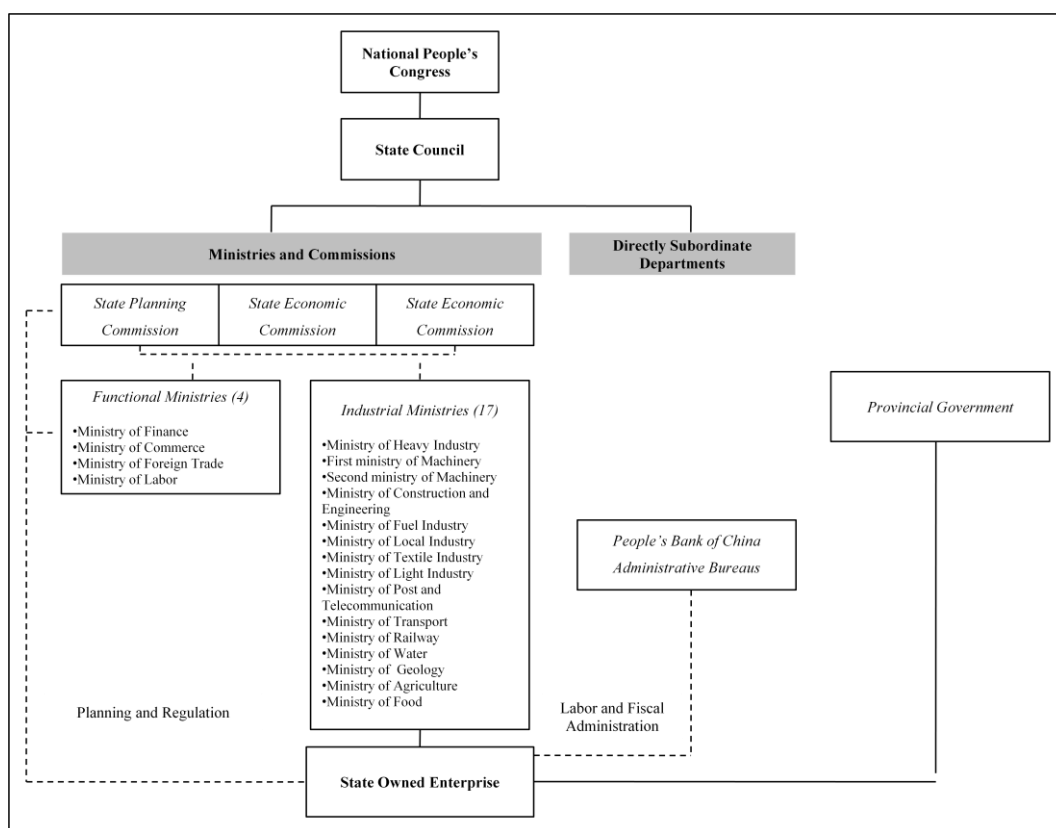


Figure 15: Organization of economic administration under the central plan

Source: Adapted from [www.czbb.changzhigov.cn](http://www.czbb.changzhigov.cn)

Although the formal structure of China's communist economic bureaucracy provides an impression of a highly centralized and hierarchical system of allocation (see figure 13), there were actually considerable limits to the extent of control central organs could exert over the process of economic development. The formulation and implementation of the national plans was a highly complex process, fraught with extensive informational and

managerial constraints. Thus, upon establishment of the planning system, a great number of functional and regional organs emerged to support the central state. The State Planning Commission would initiate the planning process by promulgating a series of ‘control figures’ (*kongzhi shuzi*), broad targets and quota for production and economic growth. After approval from the National People’s Congress, functional ministries would draft tentative economic plans for the economic departments under their purview.<sup>94</sup> These then produced detailed schemas for allocation of capital to the manufacturing plants under their purview. Central planning thus depended heavily on information and assertions provided by these subordinate elements. Moreover, leading cadres within industrial bureaux were often promoted to positions of eminence within the government and Party, which resulted in a permeation of industrial interests into the highest echelons of political hierarchy (Brødsgaard 2002).

Second, throughout the communist era, there existed an ongoing discussion regarding the appropriate balance of influence between central and sub-central government, as well as between that of the state and the Party. Leaders directly responsible for economic administration were in favor of strong central control. However, Chairman Mao had great reservations about the proliferation of central bureaucracy.<sup>95</sup> Political arguments were appended by a concern regarding sensitivity to varying local conditions (Lieberthal & Oksenberg 1988; Lyons 1990). This resulted in the rather unique administrative system of *tiaokuai* (lit. ‘lines and blocks’). Under this arrangement, which persists until present day, bureaucratic organizations either fall within the functional (*tiao*) or regional (*kuai*) category. The former are to ensure that central policies are devolved to, and implemented by lower levels of the administration, while the latter allows for adjustments, if warranted by local conditions.

Political and economic forces coalesced to ensure that, throughout most of the command era, the propensity towards decentralization prevailed.<sup>96</sup> Administrative

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<sup>94</sup> Financial and Economic Committee of the State Council 1952, *guanyu guomin jingji jihua bianzhi zanxing banfa* [Temporary measures for the drafting of the national economic plan].

<sup>95</sup> This rift between proponents of balanced growth and mass mobilization coincided largely with the division between bureaucracy and Party (Lieberthal 1997).

<sup>96</sup> Schurmann (1968) notes that decentralization reinforced Party control because local governments would be

reforms were introduced in 1957, which brought less crucial elements of the economy such as light industry under the direct auspices of local government. Enterprises in heavy industry remained for the most part under central control, but material allocation to those enterprises became a local affair (Donnithorne 1964). Capital under direct control of the center subsequently greatly decreased due to popular mobilization during the Great Leap Forward and Cultural Revolution, and the strategy of regional autarky pursued under the Third Front. However, as Lardy (1975) points out, the center still exerted considerable influence over allocation, as demonstrated by the construction of an industrial basis in inland regions (since richer provinces would have surely opposed inter-regional fiscal transfers if so able).

Although the center continued to stipulate the broad direction of national economic development,<sup>97</sup> central government's capacity to specify conditions upon which capital would be made available to enterprise or critically survey productive conditions was limited. Information asymmetry implied that central government could only rely on crude production quota in deliberating the allocation of capital and could exert but little direct control over productive agents. The communist institutions for the allocation of capital thus had their peculiarities; although capital was made available *a priori* on basis of future projections,<sup>98</sup> it lacked the capacity for monitoring and control characteristic of bureaucratic systems. In the face of the center's limited capacity to directly coordinate allocation of capital and its outcomes, it relied to great degree on the intricate systems of personnel administration.

Central control over capital was complemented by the *bianzhi* system (lit. 'the establishment'), which encompassed both administrative bureaux (*jiguan*) and enterprise (*qiye*).<sup>99</sup> The system stipulated the remit and proportionate remuneration for each position within the economic bureaucracy, as well as the total number of personnel occupied within each position (Brødsgaard 2002; Mertha 2005). Together with the

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beholden to Party committees at the regional level.

<sup>97</sup> According to Harding (1981) proposals to give provinces greater autonomy in economic planning were vehemently –and successfully – opposed by the center.

<sup>98</sup> As is characteristic of monopolistic regimes.

<sup>99</sup> Responsibility for the administration of the *bianzhi* system lay alternatively with the Party or the state.



planning mechanism, the *bianzhi* system thus allowed the center to delineate the proportions of both capital and labor appropriated by industry and its supporting bureaucracy (see Przeworski & Limongi 1993). Clearly, central decisions regarding the industrial *bianzhi* relied in no small part on information delivered by sub-central bureaucratic organs, which encouraged opportunism on the part of the latter (Groves et al. 1994). Nevertheless, the system's relevance in curbing the expansionary tendencies within the economic administration can be inferred from the sharp increase in industrial labor during the Great Leap Forward, when the *bianzhi* system was temporarily suspended in favor of a strategy of mass mobilization (Dong 2007a).

### **Constituent interaction**

The *bianzhi* system was equally important in determining intra-bureaucratic negotiations of the division of authority and responsibility. Through *bianzhi* reform, the state could adjust the relative influence of constituents within the bureaucracy by increasing or decreasing their position within the hierarchy and the number of staff allotted to them. Throughout the pre-reform era, the center engaged in significant periodic bureaucratic reforms and down-scaling, habitually abolishing, merging or (re)establishing various departments in accordance with prevailing opinions on the appropriate distribution of influence. For example, following the decision to decentralize fiscal and operational responsibilities for economic development in 1958, the Basic Construction Commission was abolished, and its responsibilities divided amongst the State Planning Commission, State Economic Commission and Ministry for Construction.<sup>100</sup> Under conditions of public ownership and administration by plan, productive actors had in principle no control over either prices or output, and as such, competition in the capitalist sense was irrelevant to pre-reform China. Due to the regional and functional compartmentalization of industry, enterprise neither engaged in direct competition nor collaboration. Rather, competition took on an indirect form, where bureaucratic constituents vied for the favor of the center. The central state, in turn was permeable to the demands of sub-central

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<sup>100</sup> Standing Committee of the National People's Congress 1958, *guanyu tiqing tiaozheng guowuyuan suo shu zuzhi jigou de yi'an* [Proposal regarding the adjustment of the organs under the State Council].

constituents because it of necessity relied on them for economic information<sup>101</sup> and execution of its plans.

### *The coordination of labor*

Unlike Soviet communism, which was predicated on the support of the proletariat, the peasant class provided the basis for China's communist revolution as well as the economic foundation for socialist development. Although agricultural production was rapidly subsumed within the plan economy, the state's initial engagement with the agricultural sector was by and large limited to the abrogation of exploitative arrangements, through the purge of landlords and rent-seeking bureaucrats<sup>102</sup> and the socialization of farm-land. Restructuring of rural social relationships and universal work entitlement was to put an end to exploitation and poverty. Having removed these constraints the state considered it sufficient to depend on a strategy of self-reliance (*zili gengsheng*) within the countryside (Chang 2003).<sup>103</sup> This changed as the strategy of industrialization intensified, and the state came to consider collectivization a necessary measure to ensure an upturn in agricultural output. Hesitation on part of the peasants who, after having wrought control from the landlords, now had to turn over their plots to the collective induced the state to introduce the 'five guarantees' (*wu bao*), which ensured provision for basic needs for destitute families. The fate of these guarantees was intimately associated with that of the rural communes. As the communes grew, so did the scale and scope of guarantees until, during the heyday of the collective in 1958, they came to account for approximately half of peasant incomes (Dixon 1982). This particular agricultural production-welfare nexus was however short-lived. After the catastrophic ending of the Great Leap Forward, the lavish welfare arrangements within the communes were scaled back and associated

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<sup>101</sup> The asymmetric distribution of information relating to (localized) economic activity, in favor of regional actors, results in the onset of possible rent-seeking of agents (i.e. local and functional bureaucracy) vis-à-vis principals (e.g. the center), see (Berle & Means 1965).

<sup>102</sup> On the social organization of pre-communist agricultural China, see Liu 2007.

<sup>103</sup> Additionally, regulationist theory asserts that the existence of pre-capitalist forms of communal and familial subsistence provision depresses wages and therefore is a crucial determinant of the potential for extraction of absolute surplus value (Brenner & Glick 1991).

expenses were largely devolved to the production teams (Dixon 1982)<sup>104</sup>

In contrast to the state's fickle engagement with China's peasants, the urban, industrial workforce was a continual focus of institutional arrangements under communism. As harbingers of the socialist industrial economy, urban laborers were rewarded both with higher incomes and greater access to welfare goods.<sup>105</sup> The bifurcation between agriculture and industry was institutionalized through the household registration system (*hujizhi*).<sup>106</sup> From the mid-1950s onwards, government utilized an extensive administrative apparatus to monitor and control all domestic movement of labor. This registration system allowed government to restrict movement from countryside to city, so as to realize the desired distribution of labor between agriculture and industry. Curbing the inflow of urban migrants was required to ensure appropriate incentives for cooptation of the industrial workforce (Cheng & Selden 1994). Moreover, by transfixing industrial labor, the registration system provided a prerequisite for the project of socio-political transformation, which sought to supplant traditional social relations (of family, region etc.) with ties to the factory or commune (Walder 1988). Within industry, the lot of the laborer became inextricably associated with that of the production unit, or *danwei*. Regulation introduced in the first half of the 1950s rendered the *danwei* responsible for providing lifetime employment and social welfare for all factory workers.<sup>108,109</sup> However, the influence of *danwei*-organization extended far beyond the work-relation as the production unit also constituted the locus of domestic and communal life, and as such encompassed virtually all aspects of social interaction (Yeh, 1997).

Notwithstanding the centrality of the production unit, the relationship of chief importance was not that between labor and management, but rather that between

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<sup>104</sup> Agricultural production was organized in communes, comprised of brigades, which in turn were made up of production teams, the smallest organizational unit.

<sup>105</sup> To this, Chang (2003) adds that urban labor constituted a potential political threat, requiring a strategy of large-scale cooptation.

<sup>106</sup> The household registration is alternatively known as the "*hukou*" system.

<sup>108</sup> A system colloquially referred to as the 'iron rice bowl' (*tie wan fan*).

<sup>109</sup> State Council 1951, *laodong baoxian tiaolie* [Regulations on Labor Security]; State Council 1954, *guoying qiye nebu laodong guize gangyao* [Outline of the Internal Labor Regulations for Public Enterprise].

employee and the Party-state. In 1955, national reforms standardized wages according to specified occupational grades. From then on both the distribution of wages and the number of specified positions for each unit were determined not by the production unit, but rather through the *bianzhi* system (Howe 1973). Initially, wage differentials were promoted as a production incentive, but these were largely reversed later due to the progressive politicization of economic life (especially during the period of the Cultural Revolution). This politicization had dual implications for industrial relations. At the level of enterprise, it meant a substitution of a system of communal discipline for monetary rewards (such as the infamous struggle meetings, *ibid*). This did however not mean that material incentives or occupational differentiation were abandoned altogether. Rather, this became the purview of the Party, which bestowed privileges on workers who upheld the virtues of communism in exemplary manner (Walder 1988). Naturally, the Party's system of personnel control encompassed not only China's industrial workers, but also those bureaucrats responsible for regional and industrial administration. The *nomenklatura* system, established in the mid-1950s had its origins in the Soviet system of cadre administration and comprised a register of key positions within the bureaucratic hierarchy (Burns 1987).<sup>110</sup> Through the *nomenklatura* the Party's Central Organization Department and a plethora of Party Committees controlled the appointment, promotion and removal of central, provincial and ministerial leadership as well as the directorate within the major universities and research institutes (Manion 1985). The *nomenklatura* not only constituted the sole organizing principle for all crucial positions within the bureaucratic hierarchy, but also provided strong incentives for bureaucrats to conform to Party directives. After all, decisions regarding cadre promotion were made on basis of appraisals of the ideological virtue and professional attainment of candidates, while promotion into the echelons of the Party-state bureaucracy bestowed upon individuals (without any outside options) the benefits of power (Burns 1989). The system thus functioned as a rank-order tournament (Lazear & Rosen 1981), impelling bureaucrats to frenetically strive to meet production quota.<sup>111</sup>

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<sup>110</sup> Cadres are Party members within public office.

<sup>111</sup> Kung and Sen (2011) note that incentives for professional attainment significantly contributed to

Within regulationist accounts, the employee relationship is treated as a time and context specific expression of a general compromise between workers' right to the value of their labor and their demand for certainty of provision. In communist China, this compromise was characterized by an institutional bifurcation between productive activity in agriculture and industry. Although the state stipulated the organization of agricultural activity and lay claim to its output, it did not offer the peasants commensurate security. With the exception of a brief period during the Great Leap Forward, the wage-labor nexus (that is, the institutionalized distribution of realized surplus value) disadvantaged the rural population (not least by the artificial depression of rural income), in order to promote the expedited development of industry and the allegiance of the urban workforce. Overall, organization of labor expressed a peculiar paradox. Agricultural production was characterized by an extensive employment relationship but subject to the centralization of surplus value, while within industry, the wage-labor relation was decisively intensive, yet only partially predicated on the extraction of surplus value. Life-time employment and guaranteed social benefits were appended with social organization of the work relationship which encouraged strong identification of the worker with enterprise. However, the relationship between appropriation of surplus value and guaranteed provision of welfare was interrupted by the extensive political apparatus which sought to ensure the fidelity of personnel to the Party and the precepts of communism.

### *Characterizing the communist mode of regulation*

*Prima facie* the communist institutions which coordinated labor, capital and inter-actor relations which jointly circumscribe the mode of regulation broadly resembled a monopolistic mode of regulation. Lifetime employment and comprehensive welfare benefits were extended to workers in industrial manufacturing units. Capital was allocated on basis of centrally promulgated production targets. Competition was eschewed as it was believed to result in the wasteful duplication of productive efforts. Yet, regulation in communist China had its idiosyncrasies.

First, interactions between the central Party-state, local government and

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administrators' extraction of grain output to meet central quota during the Great Leap Forward.

manufacturing unit were guided by an admixture of economic and political objectives. Decisions to decentralize fiscal and operational autonomy to provincial administration, or at times, to the grassroots level had in part been motivated by Mao's concerns that the development of a strong central bureaucracy would threaten the dominance of the Party. Such reservations were compounded by the inherent constraints of central planning to render the reality of bureaucratic economic administration less than totalitarian. Rather, the institutional ties which came to predominate the communist mode of regulation were those that tied the various constituents to the Party. The industrial *danwei*, intended to satiate workers' economic and social needs, was an outcome of the need to co-opt the proletariat within a system of socio-political relations over which the Party presided. The desire to ensure dependency on the CCP was likewise reflected in the practice of *nomenklatura*, by which the Party was able to directly control the fate of cadres occupying prominent positions within all areas of economic (as well as political and social) life. As a result of the relentless focus on industrial expansion, realization of production quota became the major imperative, resulting in a state-industrialist nexus, premised on a covenant between the Party, sub-central bureaucracy and industrial workers.

Due to this industrialist orientation (and in contradiction to the communist egalitarian ideal) regulation had unapologetically prioritized the urban economy. Although the countryside had been burdened with the provision of funds requisite for the project of socialist industrialization, the state by and large neglected its commitment to investment in agricultural production and peasant welfare. In so doing, Chinese communist regulation not only contravened with the principles of Fel'dman and Preobrazhensky, but also undermined the economic system's social cohesiveness.

## **The mode of regulation in the reform-era Chinese economy**

Two decades of development under the central plan had given rise to palpable social and political antagonisms. A focus on ideology and class politics had increasingly supplanted economic objectives, but had been unable to insulate the Party from mounting popular dissatisfaction. Therefore, the changes under the mode of regulation which were instigated under Deng were as much a prerequisite to the remarkable transformation of the Chinese economy as a means of placating the disenchanted peasants and invigorating inefficient industrial relations. The incentivizing and coordinating mechanisms which came to replace the system of material planning and mandatory production quota provided the institutional conditions for China's remarkable economic transformation. Simultaneously, institutional change effectuated a comprehensive reconfiguration of the state-industrialist nexus.

### *Fiscal allocation*

#### **Coordination of capital**

Although the dismantlement of the 'iron rice bowl' system perhaps constituted the most salient aspect of the departure from the socialist plan economy, the influence of the transformation of the fiscal system has been equally profound. In the three decades of reform the principles and mechanisms for the allocation of capital changed fundamentally. Moreover, the substitution of a finance-based regime for the socialist practice of planned production and material allocation resulted in a realignment of fiscal authority between the center, local government and enterprise.

The shift away from the principles of central planning occurred naturally through the rapid growth of the market. Although the national credit plan (*xindai jihua*) continued to ensure that capital was directed to the objectives stipulated in central government's five-year plan, routine investment in enterprise fell outside the purview of the central bureaucracy.<sup>112</sup> Due to the introduction of the household and contract responsibility systems, agriculture and industry had focused increasingly on production for the market, rendering central production quota and material allocation of ever lesser importance

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<sup>112</sup> According to Ma (2000), the credit plan was officially abolished in 1997.

(Naughton 1996). As a consequence, reinvestment of funds autonomously raised by enterprise rapidly became the major driver of industrial expansion.

Concurrently, China's banks took on a role of increasing importance. During the plan economy, the People's Bank of China had been the sole financial institution. Responsible for administration of deposits and remittances, its main function was to allocate funds on basis of central policy (Nanto & Sinha 2002). Changes to China's banking system had commenced in the late 1970s. The Agricultural Bank of China was established in 1979 to furnish capital for township and village enterprises as well as invest in agricultural infrastructural projects. The China Construction Bank managed capital for the development of national infrastructural development and large enterprise, while the Bank of China was chiefly responsible for international finance. These three were appended by the Industrial and Commercial Bank of China in 1984, which functioned as the urban counterpart of the ABC and took over the commercial activities of the PBC, when it was given central bank status that same year (ibid). Because of the proliferation of economic activity outside the plan and the concomitant expansion of the banking system, loans rapidly came to replace centrally budgeted allocation as the primary source of external investment.

The transition from material planning to fiscal allocation did not just imply the substitution of one coordinative mechanism to another, but had major redistributive consequences. First of these was a reorganization of the sources of capital. The introduction of the household responsibility system had portended the end of the price-scissors mechanism, thus allowing for the reinvigoration of an impoverished rural economy. Simultaneously, it created a requirement for another source of capital capable of funding the ongoing expansion of China's industry. With personal incomes growing as a result of the upturn in market activity, private deposits rapidly developed to account for the major portion of credit controlled by China's financial institutes in the initial stages of reform. Notwithstanding the diminished importance of central direct fiscal allocation, government continued to exert stringent control over interest rates. With the exception of intervals during which rapid growth was accompanied by low inflation, interest rates for personal deposits have been artificially depressed to provide cheap capital to state-owned



enterprise (Shih 2011).<sup>113</sup> Thus, by way of the transition towards bank-based finance, depressed returns on savings have come to replace the system of artificially low prices for agricultural produce which subsidized industrial development within the plan economy.

In tandem with the expansion of commercial credit, China developed its securities market. The Shanghai Securities Exchange commenced operation in late 1990. A second exchange was opened in Shenzhen the following year. Both exchanges were established with the objective of expanding and diversifying sources of corporate investment, as well as to promote greater operational discipline within the public sector. Some ten years after the inception of the Chinese stock markets, total capitalization had reached 4.1 trillion yuan, or roughly 40 per cent of GDP (Li & Ma, 2004). The vast majority of traded shares were issued by state-owned or controlled enterprises. In 2002,<sup>114</sup> the state held a controlling stake (averaging 49 per cent) in 1043 out of a total of 1230 enterprises.<sup>115</sup> As in the credit market, the state has continued to exert significant influence. The China Securities Regulatory Commission and the bureaucratic planning agencies jointly specify the quantity of stock to be newly issued and its total value. Provincial offices nominate candidates for listing, on basis of recommendations of industrial bureaux (Ma 2000). Control over the overall size and features of the stock market is complemented with a strong degree of direct state ownership, as a high proportion of non-transferable shares within state-controlled shareholding companies has ensured that government's position as ultimate owner has remained by and large unchallenged (Zhang 2004).

Notwithstanding the rapid development of equity finance, its role has been to append, rather than to replace bank-based finance, which continued to provide the vast majority of externally raised funds. The adoption of capitalist fiscal institutions was accompanied by a gradual but fundamental redistribution of financial influence. The initial period of reform was characterized by a comprehensive shift of fiscal authority from the center to the localities and enterprise. In accordance with the fiscal responsibility systems, local government would remit a negotiated portion of revenues to the center.

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<sup>113</sup> By varying estimates, state-owned enterprise accounts for anywhere between 70 to 95 per cent of national bank lending (Witt 2010; Steinfeld 2002).

<sup>114</sup> The last year for which comprehensive data on ownership was available.

<sup>115</sup> Calculated from: Database of Chinese listed firm's ownership structures (NUS, 2006).

With regional contributions to economic growth the predominant concern, better performing provinces were able to negotiate better terms, and could thus retain a larger share of revenue (Shirk 1990). More favorable fiscal conditions in turn drew investment to the more affluent provinces, creating a cyclical dynamic which resulted in a progressive decline of the ratio of central to provincial revenues. Because banks, despite their increased importance within the coordination of capital flows, had continued to function essentially as administrative bureaus, they had but little means to stipulate the conditions upon which credit would be made available. Rather, decentralization had allowed provincial government to utilize its increased stature to engage in discretionary borrowing from bank subsidiaries (Zinser 1991). Local government used its financial clout to support and expand local state-owned industry. Because ultimate financial responsibility for the public economy continued to rest with central government and interest rates had been kept extremely low to fuel the rapid expansion of industrial output, credit was extended with but marginal regard to enterprise performance (Montes-Negret 1995). This arrangement was altered significantly due to reforms introduced from the mid-1990s onwards. The financial system which developed under Jiang, and was expanded subsequently under Hu was characterized by the progressive centralization and consolidation of control over capital. Reform of the fiscal system commenced with the replacement of the host of annually negotiable remittances to central government which had existed under the responsibility system with a system of standardized national taxes. Under the new tax assignment system, central government revenue was bolstered through customs duties, consumption tax and income tax on centrally owned SOEs. Furthermore, the center was entitled to 75 per cent of revenues from VAT. While collection of central taxes had initially relied on efforts of local government, from 1994 onwards, central taxes were collected by national tax bureaus (Ma 2000). As a result of the reforms, central revenues from taxes rapidly increased, resulting in a reversal of the distribution of state revenues between the center and localities.

### **Corporate governance**

The transition from lump sum allocation to bank finance was accompanied by the

development of different monitoring and control mechanisms. The People's Bank of China was elevated to status of central bank, and subsidiaries operating at the local level were closed (Ma 2000). Operating directly under State Council, the PBC was mandated with the supervision of the operation and organization of other financial institutions (including banks and investment funds), as well as promulgating and executing monetary and exchange policy. China's Commercial Banking Law in 1995 decreed that commercial lending ought to be separated from non-banking investments activities.<sup>116</sup> Moreover, commercial and policy lending were separated. Accordingly, the PBC has continued to supervise policy lending, which is executed through the State Development Bank, Import-Export Bank and Agricultural Bank. Commercial lending has become the purview of the Bank of China and the four specialized banks<sup>117</sup> (Li & Ma, 2004). These changes jointly served to consolidate control over lending within the banks, mitigating the influence of local government. However, in stark contrast to capitalist bank-centered financial systems elsewhere (e.g. Dore, Lazonick, & O'Sullivan, 1999; Hall & Soskice, 2001), strong ties with central government seem to have precluded the formation of strong links with enterprise, and as such China's banks do not habitually engage in close scrutinizing of corporate strategy. Due to the absence of this fiduciary quality, banks function predominantly as extensions of the central state, allocating funds to enterprise in accordance with government priorities (Tian & Estrin 2007). Rather, the task of enterprise governance within the public economy has increasingly fallen on a select group of state-controlled asset management companies, most important of which the State-owned Assets Supervision and Administration Commission (SASAC). To facilitate the reorganization of the public economy which commenced in 1997, four asset management companies (AMCs) were established, each under the auspices of one of China's four commercial banks.<sup>118</sup>

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<sup>116</sup> While commercial banks' investment activities were allowed to continue for some time, a 1997 circular mandated that all banks close their shareholding accounts.

<sup>117</sup> the Agricultural Bank of China, Construction Bank of China, Bank of China and the Industrial and Commercial bank of China.

<sup>118</sup> These are Huarong (Industrial and Commercial Bank of China), Dongfang (Bank of China), Xinda (Construction bank of China) and Changcheng (Agricultural Bank of China).

The principal function of these AMC's was to repackage SOE debt into equity, thereby reducing the strain of non-performing loans (Heilmann 2008).<sup>119</sup> The furious pace at which such restructuring unfolded suggested that the primary concern was with consolidating the state's financial position, rather than improving the performance of loss-making enterprise. By the end of 2002, a total of 587 enterprises had undergone debt-equity swaps, involving assets worth yuan 334.48 billion.<sup>120</sup> Subsequently, focus was on harnessing the center's control over the largest and most profitable elements of public industry. The State-owned Assets Supervision and Administration Commission (*guowuyuan guoyou zichan jiandu guanli weiyuanhui*, SASAC) was established in 2003 as a special entity directly under State Council and given ownership of a select group of 'central enterprises' (*zhongyang qiye*), large business conglomerates<sup>121</sup> within industries of strategic importance. It was mandated with approval of corporate investment, supervision and initiation of acquisitions and mergers and management of executive appointment within these enterprises (Pearson 2007; Naughton 2008). In 2005, these central enterprises posted profits of yuan 627.7 billion, equivalent to 97.4 per cent of total profits achieved within the economy (Mattlin 2009).

Changes in the governance of public enterprise have however been more instrumental in allowing the center to wrest control over the commanding heights of the economy from the industrial ministries than fundamentally altering the authority between SOE and central government. SASAC has made headway in the reorganization of various backbone industries, gradually reducing the number of central enterprises from an initial 200 or so to a current 113 by way of a series of mandated mergers and acquisitions.<sup>122</sup> The expansion of central control has not however been paired with greater fiscal claims of central SOEs. Under the tax reforms of 1994, China's large SOEs were exempted from

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<sup>119</sup> Through a debt-equity swap, investors take on enterprise's liabilities in return for an ownership stake. Theoretically, well-informed investors will only be willing to take on such liabilities if they possess the requisite expertise, while the transfer of operational authority to principals ought to alleviate potential agency problems, thus resulting in improved corporate performance.

<sup>120</sup> Research Institute of Finance and Banking of the People's Bank of China, 2003.

<sup>121</sup> At present, there are 115 such central enterprises, <http://www.sasac.gov.cn/n1180/n1226/n2425/index.html>, Accessed April 17, 2013.

<sup>122</sup> <http://www.sasac.gov.cn/n1180/n1226/n2425/index.html>.

remitting profits to government. Although, after vehement contestation, State Council passed regulations in 2007 requiring central SOEs to pay tax on profits, the effective rate was limited to 5 per cent in most cases (Brødsgaard 2012). As a result, the tremendous growth in profits achieved by these SOEs in recent years has not resulted in a comparable increase in central revenues. In spite of this lack of dividends, central government still profits from the growth of the national champions through taxation, which accounts for approximately one fifth of total central revenues (see table 10).

	<b>Corporate income tax</b>	<b>Total revenue</b>	<b>Revenue from corporate income/ total</b>
2005	320.4	1605.18	0.20
2006	435.85	1957.61	0.22
2007	564.97	2277.49	0.25
2008	739.11	3268.06	0.23
2009	761.91	3591.57	0.21
2010	779.52	4248.85	0.18
2011	1002.34	5132.73	0.20

*Table 10: Central government revenue and revenue from corporate tax, 2005-2011*

Source: Compiled from NBS 2006-2012, table 8-5

Introduction of capitalist financial institutions has had profound effects on the mechanisms of capital allocation and the distribution of influence over capital. The transition from negotiated remittances to a nationally standardized taxation has greatly simplified the coordination between central and local government, and bolstered the former's financial position vis-à-vis the latter. Recentralization of fiscal control was greatly aided by the reform of the banking system. Likewise, the emergence of shareholder ownership has been a instrumental precursor in the project of sectoral organization of strategic industry. Moreover, the expansion of capital markets, through the development of banking and the stock exchange provided the state with additional means to transfer private sector capital into state-controlled industry.

Nevertheless, the emergence of credit and equity finance has had but marginal influence on the system of corporate governance. By far the largest portion of corporate

assets remains composed of industrial capital. Debt and equity financing has appended the industrialist focus on corporate expansion, rather than replaced it with a profit-orientation. The capacity for financial institutions to serve as a proxy for principals has also been constrained by the predominance of state-relations. Since China's domestic banks continue to perform an indispensable role in central capital allocation and are firmly embedded within the bureaucratic system, they lack the requisite autonomy and incentives to engage in more independent monitoring of enterprise performance. Finally, the spread of western practices of corporate governance is impeded by the pivotal role of the bureaucratic systems of supervision and control which developed under communism.

### *The coordination of labor*

China's post-reform mechanisms of labor coordination show both salient continuities and profound changes. In spite of the dissolution of the price-scissors and the scope for diversification provided by the introduction of the TVE, rural-urban inequality has not only persisted, but consistently widened. In part, the disparity can be accounted for by greater labor productivity of urban industry. However, the naturally inegalitarian tendency of industrial development has been compounded by the institutional divide between the rural and urban economy. In 2005, the Ministry of Public Security announced its intent to eliminate the household responsibility system.<sup>123</sup> Subsequently, 13 provinces, autonomous regions and municipalities abrogated the taxonomical distinction between rural and urban status (Xinhua 2005). Nevertheless, free flow of labor from the countryside to the city has continued to be impeded. Large cities, fearing the destabilizing socio-economic consequences of the abrogation of *hujia* arrangements, have been loath to engage in reforms. Furthermore, in affluent regions conditions for eligibility of the transformation from rural to urban status have remained prohibitively high for the vast

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<sup>123</sup> This resolve was reiterated by the central committee of the CCP in late 2008. The 'decision on certain major issues regarding the promotion of rural reforms' of 2008 (*tuijin nongcun gaige fazhan ruogan zhongda wenti de jueding*) called for the "unification of rural and urban societal management, advancement of reform of the household registration system, broadening of the conditions for settlement in small and medium sized cities, and the orderly transformation of rural to urban registration status of persons with who have stable employment and residence in towns and city", Chapter 3.

majority of rural residents (Kam & Buckingham 2008). Even in instances where rural-urban registration has been abolished, reforms have not extended to taxation, employment and welfare policies (administered by different bureaux), which continue to perpetuate rural and urban divergences (Hu 2009). In addition to the inequalitarian influences of capitalist industrialization and the *hukou* system, new inequalities have arisen due to their interaction. Prospects of greater opportunities have motivated massive unsanctioned rural migration to the cities. By government's own estimates, China's 'floating population' (*liudong renkou*) now totals some 211 million, or roughly 16.5% of the overall population (State Commission for Population Control 2009). These migrant workers are categorically denied access to public welfare provisions and have no recourse to legal protection, and are therefore exposed to the unadulterated Dickensian aspect of China's economic modernization.

Although the practice of linking welfare to registration status has implied the continuation of inequality between rural and urban inhabitants, changes in labor institutions have also attenuated the traditional covenant between industrial workers and the state. Liberal policies introduced throughout the reform-era (and in the 1990s in particular) had gradually dismantled the *danwei* system, in which public enterprise served as the main provider of social welfare services (Gu, 2001). The 1994 Labor Law heralded the end of the 'iron rice-bowl system', which had rendered the *danwei* responsible for lifetime provision of welfare services to its workers. The lifetime employment guarantee had been nominally abrogated with the introduction of the enterprise contract responsibility system in 1986 (Wong 2001). However, changes in the volume of the public workforce were limited up until 1997, when the policy of releasing the small resulted in the closure of the majority of small and medium-sized SOEs. Introduction of national unemployment insurance in 1999 and a national security fund the subsequent year sought to bring the provision of social welfare in line with the new reality of commoditized labor, while the minimum life security system was introduced in 1998 to deal with the novel phenomenon of urban poverty (Liu & Wu 2006). Although these policies have effectuated the expansion of urban welfare to the private sector, the levels of support provided by the programs are have been marginal compared to those furnished by

the *danwei* system they have come to replace.

Changes in the scope and scale of welfare provisions seem to accord with liberalist principles. The introduction of national programs has nominally eliminated the welfare-nexus between the industrial worker and public enterprise. However, a sole focus on the changing boundaries of the welfare system ignores the comprehensive redistribution of associated expenses amongst central and local government and individuals. Prior to reforms, central government shouldered ultimate fiscal responsibilities for the welfare services provided by the *danwei*. Due to corporatization of state-owned enterprise and fiscal decentralizations in 1980s, central governments share of these expenditures drastically dropped.<sup>124</sup> Despite the national status of the welfare programs introduced in the 1990s, local government has remained primarily responsible for financing of welfare.<sup>125</sup> Because of efforts to recentralize state revenues<sup>126</sup>, local government in turn devolved many of the expenses unto individuals. Not only did this imply high stipulated contribution rates for enterprise and individuals to pension and social insurance schemes, but also the progressive privatization of other major welfare services such as housing, education and healthcare (Wong 2001; Hannum & Wang 2006). While restructuring and corporatization within the public sector greatly alleviated costs associated with social welfare and contributed to the profitability of state-owned enterprise, this displacement has only been partially offset by recent forays into developing a national social security system. Moreover, due to fiscal reforms, responsibilities have been distributed unequally over local and central government. Abrogation of the ‘iron rice bowl’ and the *danwei* system also implied the end of the traditional social contract between the industrial workforce and the Party-state. Reforms have led to widespread discontent amongst disenfranchisement laborers, who feel the state reneged on its responsibilities (Hurst & O’Brien 2002).

Leaving normative judgments aside, it is undisputable that the communist-era

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<sup>124</sup> Under the 1985 rearrangements of central-local fiscal relations, outlays for welfare were devolved to local government.

<sup>125</sup> In 2011, the proportions of budgeted outlays for ‘social safety and employment efforts’ for central and local government were 4.5 and 95.5 per cent respectively.

<sup>126</sup> Which will be dealt with subsequently.



state-labor nexus has withered due to the regulatory changes of the 1990s. While pre-reform institutions cultivated workers' dependency on the Party-state, emphasis on the allegiance of the industrial workforce has been substituted for a preoccupation with growth and efficiency. In tow, the Party-state has sought to redefine and bolster its alliances with China's traditional 'managerial class', comprised of heads of local government and state-owned enterprise, while reaching out to its new constituents. As a consequence of the development of the market component of the Chinese economy, a private entrepreneurial class took shape. Although Deng's reforms had supported entrepreneurship as a driving force of economic modernization China's political establishment, still largely composed of the old revolutionary guard, remained on the whole strongly adverse to notion of embracing a capitalist class. Antipathy intensified in the wake of the Tiananmen debacle, and that same year private entrepreneurs were officially banned from CCP membership (Dickson, 2007). Antagonism between the political elite and China's emerging capitalists abated under Jiang. Due to comprehensive reform of the public economy a great portion of state-owned enterprises were converted to private status.<sup>127</sup> In tow with this shift, many cadres who had formerly been employed as SOE managers became private entrepreneurs.<sup>128</sup> Naturally, Party membership amongst the owners of newly privatized enterprise was high, resulting in a permeation of private interests within the Party.<sup>129</sup> Further impetus to the reconciliation of the traditional political and new economic elite was given directly by Jiang himself, and in 2002, an amendment to the CCP's Constitution lifted the moratorium for entrepreneurs on CCP admission.<sup>130</sup>

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<sup>127</sup> According to the 2002 Report on the national survey of private enterprise [2002 *nian zhongguo saying qiye diaocha baogao*], privatized SOEs accounted for approximately 25.7 % of the total number of enterprises within the private sector in 2002.

<sup>128</sup> A phenomenon referred to as *xia hai* [plunging into the sea].

<sup>129</sup> The abovementioned survey estimated 50.7% of leadership of privatized SOEs to hold Party membership.

<sup>130</sup> Jiang's 'three represents' (*san ge daibiao*), while often regarded as a void ideological construct, has in fact been accredited with providing the impetus to the inclusion of the entrepreneurial class (Lewis et al. 2003). Contemporary changes to regulation abound. Article 1 of the first chapter of the constitution stated that "Chinese laborers, peasants, soldiers, intellectuals and advanced constituents belonging to other social classes, who acknowledge the leadership and constitution of the Party and who want to join a Party organization and actively contribute to it, implement the Party's resolve and pay their contributions in a timely fashion can apply

For entrepreneurs operating in China's private economy, the utility of Party membership has been primarily to gain access to scarce resources.<sup>131</sup> Because the private economy has been largely excluded from participation in China's state-capital markets, entrepreneurs have had to rely overwhelmingly on self-raised funds or illicit banks (Tsai 2009). A major advantage of active support of the CCP consists of the opportunity to enjoy access to funds at significantly lower interest rates from China's state-controlled banks (Zhou 2009).

The Party on the other hand, has a clear interest in co-opting private entrepreneurs, who have been instrumental in fulfilling the Party's mandate of continued economic growth. Moreover, the development of an economically autonomous class would constitute a challenge to the socialist system (Dickson, 2000). The operational logic of the Party has been to gradually augment the institutional foundations of the private sector (Dickson, 2007; Tsai, 2007), while simultaneously building clientelistic ties with the entrepreneurial vanguard. After years of contention between the Party's conservative and progressive factions, a Property Law was finally promulgated in 2004.<sup>132</sup> Yet, further controversy delayed adoption of the law for another three years. Private property regulation has been enforced with varying degrees of vigor, depending on the regional status of private-sector and local government relationships. Overall, the introduction of formal market institutions has somewhat attenuated the importance of political capital in ensuring contract enforcement (Yano et al. 2013). Nevertheless, political connections continue to bestow preferential access to financial and legislative resources (Li et al. 2008). While the Party's patronage system has thus shifted from its pre-reform focus on

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for membership of the CCP". In a speech made at the 16<sup>th</sup> Party congress the previous year, Jiang had included entrepreneurs amongst the advanced constituents as 'builders of a socialist society'. The decision was subsequently reiterated and articulated in the 'Decision to convene the 17<sup>th</sup> National People's Congress', which stated that "each province, municipality and city must attract an appropriate number of representatives of new economic and social organizations".

<sup>131</sup> A survey held amongst private entrepreneurs in eight Chinese counties in 2005 found that for 51.3 per cent of co-opted entrepreneurs economic benefits had been the main motivation for joining the Party (Dickson, 2007).

<sup>132</sup> Tsai (2007) notes that entrepreneurs were markedly absent from the political drive for the consolidation of private property regulation, positing that extensive informal institutions (such as *guanxi*, networks predicated on social relationships) already provided the prerequisites for reliable exchange.

industrial laborers to capitalist managers, and the criterion of political zeal has been substituted for economic prowess, the link between socio-economic privilege and regime support has persisted.

The influence of economic reforms on the state-enterprise nexus was not limited to the private sector. The corporatization of state-owned enterprise resulted in a greater degree of operational and fiscal autonomy. Moreover, reliance of government on SOE revenues had bolstered the political clout of large and profitable SOEs, much like decentralization had improved the bargaining position of local government vis-à-vis the center. In the face of diluting bureaucratic ties between the state and public enterprise, management by *nomenklatura* has been of seminal importance in perpetuating central control. Personnel management within public industry focused on the select group of ‘central enterprises’ (*zhongyang qiye*). Although SASAC nominally acts as principal, appointment of executive management of the 53 largest central SOEs is administered not by SASAC, but by the Organization Department of the CCP on basis of the *nomenklatura* (see table 11). These executives are regularly transferred to top positions in the government and Party and vice-versa, further enhancing the reciprocity between the political and economic spheres. To wit, in 2007, thirteen executives of state-owned enterprises within so-called strategic and pillar industries were members of the central committee of the CCP, and as such have direct influence in national policy formulation.

*Nomenklatura* control likewise constituted a seminal link between central and local government. Despite fiscal recentralization and the consolidation of public assets within central enterprises, economic administration has of necessity continued to rely extensively on the *kuai* component of regional bureaucracy (Xu 2011). Under conditions of high complexity and limited capacity to directly monitor actual behavior, the pursuit of (regional) economic growth provided a parsimonious means of aligning central and local interests. For the CCP, continued economic development has long been a pivotal premise for political legitimacy (Chen, 2002; Liew, 2005), while for local government, regional growth enhances its fiscal prowess. This has led the central Party-state to promote regional GDP-growth as the primary heuristic in assessing the professional attainment of local leaders, whose chances of promotion are tied directly to increases in gross regional

Industry	Type of industry	No. executives on nomenklatura	No. CC members (2007) <sup>†</sup>
Power generation	Strategic	7	2
Aeronautics	Strategic	3	3*
Steel	Pillar	5	3
Electronics/ Equipment	Pillar	4	
Machinery	Pillar	4	
Services (other) <sup>‡</sup>	Other	5	1
Shipbuilding	Strategic	3	1
Automobiles	Pillar	3	
Petrochemical Industry	Strategic	3	2
Telecommunications	Strategic	3	1
Food	Other	2	
Services (financial)	Other	5	1
Mining (coal)	Strategic	1	
Military	Strategic	1	1
Chemical	Pillar	1	
Engineering/ Construction	Pillar	1	
<i>Total</i>	<i>13</i>	<i>53</i>	<i>13</i>

*Strategic industries* are industries in which the state considers absolute control and the increase of state assets imperative.

*Pillar industries* are industries considered vital to the economy in which the state must maintain a controlling stake

<sup>†</sup> Of which two served as full and eleven served as alternate members of the Central Committee

<sup>‡</sup> Other services include: logistics, aviation, retail, travel

\* Two members were executives at the same enterprise, China Aerospace Science and Technology

*Table 11: Party-enterprise ties within the public sector, 2012*

Source: Adapted from Brødsgaard 2012; Chan 2009; Mattlin 2009; China Daily 2006

product ( Li & Zhou, 2005; Meyer, 2011). Not only does this system promote vehement competition amongst local leaders (Xu 2011), but it is also instrumental to sustenance of the industrialist orientation. Investment in fixed capital, commands an immediate upturn in regional growth, which is important because the tenure of provincial governors is short (generally three to four years).<sup>133</sup> In addition, because business tax, the single largest contributor to local revenues,<sup>134</sup> is levied over the total volume of production, local government has a strong incentive to promote investment in fixed assets.

<sup>133</sup> (Choi 2012).

<sup>134</sup> In 2011, business tax constituted 32.9 per cent of total local tax revenues and 25.7 per cent of total revenues (NBS, 2012).

### *Competition*

A final comprehensive change in the mode of regulation regards the transformation of the coordinating mechanisms and mechanisms governing interaction between China's economic actors. As reforms progressed, the tripartite strategy of decentralization, marketization and corporatization gradually came to replace operational planning. In 1992, the status of the market economy was greatly elevated when Jiang Zemin proclaimed the establishment of a 'Socialist Market Economy' the main task of economic reform.<sup>135</sup> The distributive and organizational effects of competition did not only assert themselves through the expansion of a market economy, but also through deliberate efforts of the state to introduce incentives for efficacious use of resources within the public economy and bureaucracy. As a result, different economic actors have been exposed to different competitive dynamics, the scope of which broadly coincides with the boundaries of private, local and central public industry.

### **Private industry**

Rapid market expansion paired with the slow development of formal institutions has profoundly influenced inter-actor relations within the private economy. Retarded introduction and ambiguous enforcement of private property rights and exclusion from participation in official markets for financial capital have motivated a strong reliance on intricate relational networks, or *guanxi* (Redding 1995; Lovett et al. 1999).<sup>136</sup> First, *guanxi* have been instrumental in funneling foreign capital into China's private economy. When Deng's reforms reinstated China's gradual engagement with the international economy, Chinese diaspora (based predominantly in the independent territories of Hong Kong, Macau and Taiwan) were quick to capitalize on the burgeoning economic activity. Personal ties within the mainland allowed outside investors of Chinese origin to circumvent FDI regulation (strongly biased towards investment in state-controlled industry) and rapidly expand their presence in China's Special Economic Zones (SEZs),

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<sup>135</sup> [http://news.xinhuanet.com/ziliao/2003-01/20/content\\_697129.htm](http://news.xinhuanet.com/ziliao/2003-01/20/content_697129.htm).

<sup>136</sup> *Guanxi* has its origins in the Confucian model of social organization, wherein individual identity is predicated on one's status within the social hierarchy and one's relations to others.

which formed the beachheads of the state's early experiments in international market activity (Hsing 1998).

Foreign investment has focused predominantly on the manufacturing sector.<sup>137</sup> Reflecting the dependence of the Hong-Kong and Taiwan economies on international trade, enterprises established in China emerged predominantly in export-oriented industries (Lin & Kwan, 2011). For these enterprises transnational relational networks were instrumental in linking foreign capital and technology with the low-cost labor stock freed up by the introduction of the market system (Zhang, 2005).

Besides alleviating constraints on access to financial capital by promoting the influx of foreign investment, *guanxi* have been an indispensable in furnishing conditions for market exchange. Conventionally, property rights and contract law have been regarded as the *sine qua non* of market exchange and production (e.g. Coase, 1937; Williamson, 1985). In light of the underdeveloped stature of these formal institutions and lack of an independent judiciary, contractual protection was substituted by relationship-based trust. Through intricate systems of referral and cultivation of reciprocal relationships, private enterprises coalesce in informal conglomerates which function as internal markets for capital and information, and allowed entrepreneurs to band together to gain economies of scale (Peng & Heath 1996).<sup>138</sup>

Finally, relational ties cultivated through *guanxi* also link China's entrepreneurs to the economic bureaucracy. More so than centrally orchestrated attempts to co-opt China's emergent capitalists, reciprocal relationships between local government and private entrepreneurs have been instrumental in solidifying the incongruous nexus between the socialist bureaucracy and the private economy. For local government, various extra-budgetary fees and taxes levied on private enterprise in return for preferential treatment have constituted an increasingly important source of revenues (McNally 2007). For enterprise, investment in the development of ties with bureaucratic actors, rather than comprising a one-off transaction, comprise a sustainable advantage over competitors who

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<sup>137</sup> Up until 2008, FDI in manufacturing accounted for 60.84 % of the cumulative total. Real estate was another major recipient of FDI, absorbing 16.18 % of total foreign capital (China commerce yearbook, 2009).

<sup>138</sup> The notion that business groups may constitute a viable substitute for formal market institutions has been posited more generally by for example (Khanna & Yafeh 2007).

lack political capital (Wank 1999). Gleaned from this perspective, the ambiguous stature of formal institutions and resulting bureaucratic discretion in regulatory enforcement comprises a prerequisite for the perpetuation of the interdependent relationship between capitalists and the state, wherein political influence and economic performance are intimately associated (McNally 2012).

### **Sub-central public industry**

Under the plan economy, competition for capital between the constituents of the sub-central bureaucracy was largely subsumed within the planning mechanism. While local government had considerable autonomy in distributing budgetary funds to manufacturing units under its purview, the center retained considerable control over the magnitude of sums allocated to provinces and ministries and desired levels of output. In the initial period of reforms, intra-bureaucratic contestation over resources became characterized by ‘bargaining politics’, where ministries and provinces vied for representation of their particular interests (Shirk 1993). Devolution of fiscal authority to the provinces in the initial stages of reform had weakened central control. At the same time, the *tiaokuai* system prohibited the articulation of spheres of responsibility and authority. The indeterminateness of influence was exacerbated by the erratic quality of alternating bouts bureaucratic reform.<sup>139</sup> This led to a situation of ‘fragmented authoritarianism’ (Lieberthal & Lampton 1992), wherein state influence was paradoxically both expansive and piecemeal. Under Jiang, a series of comprehensive adjustments to intra-bureaucratic relations was introduced. In addition to fiscal recentralization, bureaucratic reorganization sought to consolidate regulatory control within the central organs while severing the links between SOEs and industrial ministries through *bianzhi* reforms, reducing the number of industrial organs, and corporatization of the operational arms of ministries (Pearson 2007b). Due to the standardization of local remittances to the center, the extensive bargaining over fiscal revenues abated. However,

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<sup>139</sup> Administrative reforms often proceeded in haphazard fashion, with reorganization progressing without due consideration of requisite human capital and competences. Furthermore, central attempts at streamlining China’s bureaucracy were often subverted by bureaucratic constituents at lower levels, whom engaged in the attraction of staff and establishment of organs outside the *bianzhi* system (Brødsgaard, 2002).

in the face of the continued emphasis on regional economic development, the center was loath to wrest control over local public enterprise from provincial government.

Jointly, increased financial prowess of local government during the first stage of reform, provincial ownership of state-owned enterprise and the imperative of economic growth resulted in intense inter-regional competition, but also motivated erection of provincial trade barriers to protect local industry, and exacerbated the cellular structure of industry which had developed due to efforts to ensure regional industrial autarky during the Third Front (Young 2000). Simultaneously, many industries witnessed a rapid expansion of existing production capacity and an influx of new manufacturers. Local bureaucracies, receiving rents through the provision of licenses and the collection of industrial levies and taxes had little incentive to curb industry entry. Because the central state bore ultimate fiscal responsibility for the local public economy, local states were rather insensitive to the detrimental effects of the influx of competitors and accruing overcapacity on the financial performance of local SOEs (Wang 1991). The combination of rapid entry and regional protectionism led many Chinese industries to suffer concurrently from structural overcapacity and a lack of enterprises operating at efficient scale (Huang, 2002: Pei, 2007). Furthermore, incentives to promote the development of local industry led to extended price-wars, particularly in such industries as aviation in which high demand and decentralization compelled local government to fervently compete for market-share (Chung 2003). Despite central attempts to maintain a state of ‘orderly competition’ (*youxu jingzheng*), industries predominantly under control of local government continued to be characterized by intense struggle for market share and protectionism.<sup>140, 141</sup> Central

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<sup>140</sup> Examples include both traditional foci of state-owned industry such as mining and steel production (Wu 2000), as well as novel ones which developed in tow with reforms, such as automobile manufacturing (Noble et al. 2005) and civil aviation (Chung 2003).

<sup>141</sup> Central government has recently sought to address the problem by way of an anti-monopoly law, which paradoxically prohibited enterprises from marketing goods at *below-market* rates (*zhonghua renmin gongheguo fan longduanfa* [Anti-monopoly law of the P.R.C.], Chapter 3, Article 17). The motivation for such a decree was derived from the concept of ‘excessive competition’ (*guodu jingzheng*), where low industrial barriers to entry and high barriers to exit induced enterprises to market goods below cost-price. The prevalence of this phenomenon reflects the extent of the abovementioned problems of overbearing control of local government over industry organization. However, Yu & Wu (2008) mention that a provision limiting the administrative influence of local government over industry entry and exit was omitted from the final version of the law.



attempts at restructuring these industries have been limited almost exclusively to small scale manufacturers, as mergers and liquidations were vehemently opposed by provincial governments whose vested interests were at stake (Noble, Ravenhill, and Doner 2005; Wu 2000). Due to the entrenched principle of *tiaokuai* organization and a tendency towards decentralization that predated Deng's reforms bureaucratic reforms were more instrumental in consolidating central control over the line ministries than regional government. In effect, central coordination of the local economy has been by and large governed by the bureaucratic system which ties the interests of provincial officials to rates of regional economic growth.

### **Central public industry**

By contrast, within 'strategic' industries, efforts to corporatize and merge enterprises traditionally under control of industrial ministries have resulted in the formation of central business groups which dominate upstream sectors. Although the central enterprises which were separated from the industrial ministries initially engaged in intensive competition, reorganization was greatly facilitated by the fact that the operational arms of ministries in strategic industry (such as petrochemicals and telecommunications) already had been consolidated to a greater degree and industry entry following the reforms had been stringently restricted.<sup>142</sup> From the mid-1990s onwards the state engaged in a series of organizational restructurings which effectively partitioned industries in functional or geographic monopolies (Pearson, 2007; Yeh & Lewis, 2004). While, following their separation from the industrial ministries, these enterprises gained considerable fiscal and operational autonomy, the central state continues to assert its influence through a host of bureaucratic organs. SASAC (which straddles the functions of owner and regulator), the National Development and Reform Commission,<sup>143</sup> and the Ministry of Finance hold ultimate authority on strategic issues of corporate investment,

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<sup>142</sup> With the coal mining being a salient outlier due to its extreme diffusion. The reason for the diffuse structure of the industry can be traced back to the incipience of reforms, when pervasive lack of fossil fuels prompted government to allow for development of a host of local-state controlled and collective mining operations (Thomson 1996).

<sup>143</sup> The latest incarnation of the Central Planning Agency.

mergers and acquisitions and set industrial price quota, curbing industry competition (OECD 2009; Naughton 2008).

While China's leadership has repeatedly insisted on the necessity of continued control over enterprises in strategic and pillar industries, it has been less articulate about the rationale for continued public ownership. Some have argued that the state is motivated chiefly by a desire to retain the most profitable elements of the Chinese economy while utilizing these in a strategic manner to nurture a set of globally competitive enterprise (Mattlin 2009; Nolan 2001; Szamosszegi & Kyle 2011). Indeed, examination of the distribution of state control suggests that the degree of state ownership is positively correlated with average rates of industry profitability.

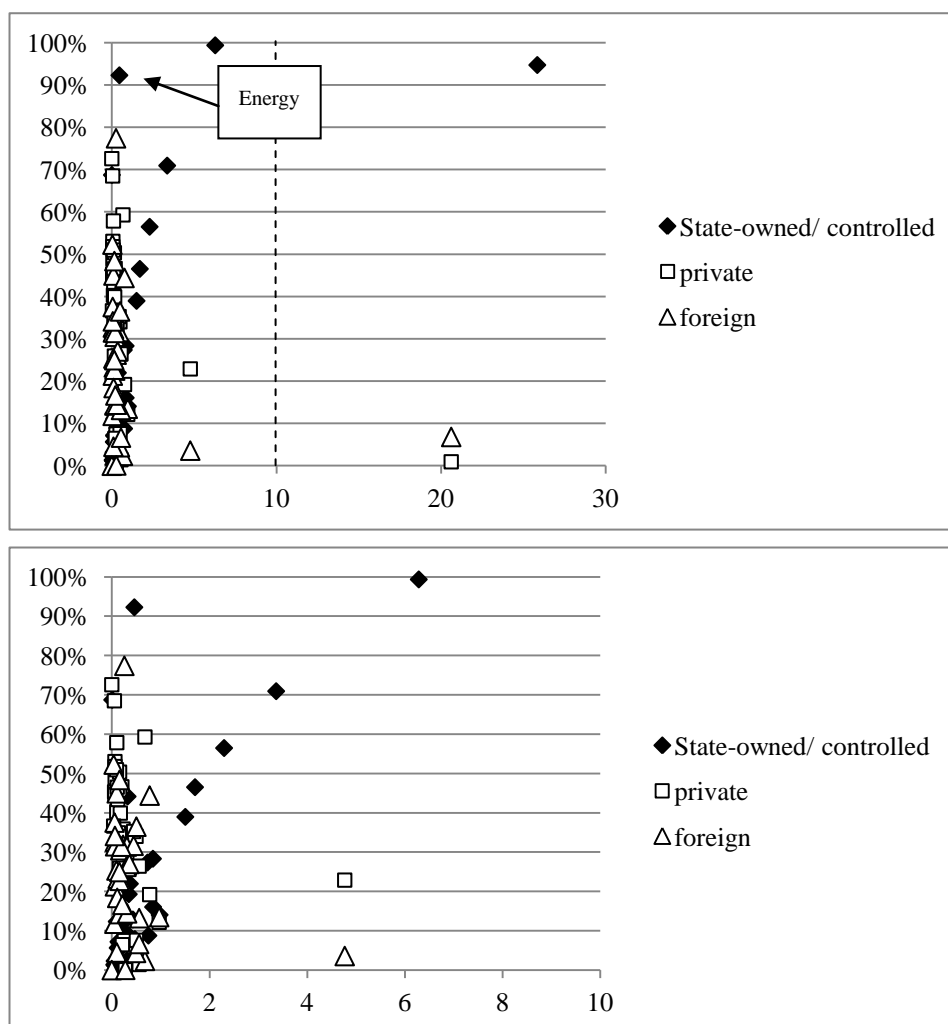


Figure 16: Enterprise ownership by industry (share of GVIO) and average firm profits (log), 2010

Source: Calculated by author from NBS 2011, tables 14-6, 14-10, 14-14

Centrally-owned conglomerates have played a pivotal role in state attempts to nurture indigenous prowess within selected fields of technology. In 2008, China's main industrial regulator, the Ministry of Industry and Information Technology mandated that China's largest mobile operator proceed with the construction of a 3G network, based on indigenous TD-SCDMA technology (EIU 2011). The decision was explicitly geared towards the development of international competitiveness of the domestic standard by nurturing economies of scale.<sup>144</sup>

More generally, China's SOEs have been instrumental in sustaining rapid economic growth by maintaining the consistently high investment rate in fixed capital. Due to the pre-reform focus on the development of heavy industry and subsequent selective trajectory of reform, public enterprises remain concentrated within asset-intensive industries. Below figure provides cumulative percentages of ownership for state-owned and privately/ foreign-owned enterprise across industry. Industries have been ranked from the lowest (recycling, waste disposal) to highest (water treatment and supply) capital intensity - that is, the proportion of capital to labor. While more than 50 per cent of private and foreign-owned enterprise is agglomerated in labor-intensive industry (i.e. the rate of labor to capital is approximately 5:1), the distribution of state-ownership is strongly skewed towards the right, reflecting the public economy's engagement in heavy industry. As stated previously, development of these enterprises has been strongly driven by reinvestment of enterprise profits, and has been appended by government stimulus in periods of economic downturn.<sup>145</sup>

The energy sector constitutes a consequential exception to the general relationship between profitability and investment (see figure 14). While SOEs account for over 90 per cent of output of the energy sector, depressed prices for energy have ensured that average profits in the energy sector have remained comparatively low. Throughout the reform era,

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<sup>144</sup> The state's latest comprehensive blueprint for the technological development of industry, the Medium and Long-Term Plan for the Development of Science and Technology [*zhongchangqi keji*] listed a total of 16 mega-projects within electronics, ICT, energy technology, agriculture, medicine, and aerospace technology, Chapter 2004.

<sup>145</sup> Central and local stimulus, extended predominantly to SOEs in the wake of the 2008 financial have particularly contributed to recent growth in fixed-asset investment (Haley & Haley 2013).

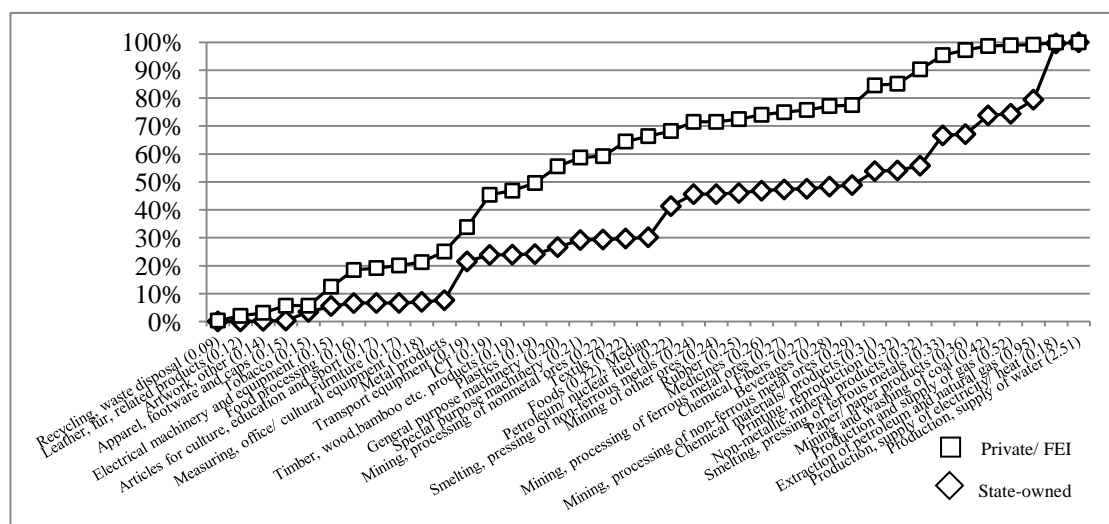


Figure 17: Distribution of public, private/ foreign ownership (cumulative) across industry (ranked by capital intensity), 2010

Source: Calculated by author from NBS 2011, tables 14-6, 14-11, 14-15

central planning agencies have maintained stringent control of energy prices. Government subsidies for end-use energy –comprised of a host of policies depressing costs of energy inputs such as coal and petroleum and various consumption-based policies- were estimated to yuan 356.73 billion, or approximately 1.42 per cent of GDP in 2007 (Lin & Jiang, 2011). These subsidies have been material in sustaining high-volume, low-cost production (Haley & Haley 2013), and consequently the state-industrialist nexus.<sup>146</sup>

The institutionalized relationships embedding China's central state-owned enterprise, which constitute the core of the public economy, have resulted not so much in a predisposition towards either collusion or outright competition within industry. Rather, the state has sought to mitigate direct competition by allotting to these enterprises a particular functional domain or market. Such coordination is instrumental not only in ensuring the profitability of the public sector, but also in promoting national macro-economic objectives and industrial policies. Broadly, the concerns of the center have been to promote the incessant growth of the economy and development of industry through investment in capital construction and the subsidization of production, and more

<sup>146</sup> Coal still constitutes the major source of energy for Chinese industry, which may account for continued above-average profitability of the petrochemical sector.

specifically, to build competences within technology-intensive industries which are considered crucial to China's global competitiveness.

*Characterizing the mode of regulation in the reform-era Chinese economy*

Although the central strategy for economic reform explicitly insisted on the preservation of state control, institutional changes within the spheres of capital allocation, industrial relations and inter-enterprise coordination have nevertheless unraveled much of the communist mode of regulation. To wit, China's financial system bears little resemblance to its communist-era system of planned allocation. Yet, the piece-meal adoption of capitalist institutions cannot be regarded as a transition towards a market-based system in any conventional sense. However, reorganization of the capital regime has been instrumental in resolving two pertinent problems of regulation. First of these was the dearth of capital which constrained industrial development. As a result of the gradual corporatization of agricultural and industrial enterprise, the locus of coordination of capital quickly shifted from government to enterprise. Self-raised funds have been appended by credit and equity capital. Stringent state control over China's banking system and selective stock-listing have allowed for household and corporate savings and investment to be funneled into state enterprise. The appropriation of funds from the private to the public component of industry echoes the logic of the Fel'dman paradigm, yet has not precipitated the same crisis. Reasons for this can be found in the lesser absolute and relative volumes of expropriation and the voluntary nature of savings. A second problem was the tenuous quality of central control. In addition to the primacy of public over private industry within the capital markets, tax reforms, the consolidation of banking and the adoption of asset management in favor of bureaucratic administration of enterprise have reversed the decentralization of fiscal authority which characterized the initial period of reforms. Due to the persistent influence of the state and the comparatively minor importance of external capital, introduction of credit and equity markets has not led to the formation of an independent class of financiers, but rather paradoxically bolstered the influence of the center. Within China's private sector, reliance on autonomously raised funds have been a necessity due to the inherent bias of capital markets towards public

enterprise. Within the public economy, SOEs have vehemently contested the transfer of capital towards government, and have as such developed a high degree of fiscal autarky.

The peculiarly constrained influence of finance-based governance is offset by the persistent centrality of political and bureaucratic systems of control. Yet, within the sphere of labor as well, reform has resulted in a profound uprooting of inter-constituent relations. Corporatization and marketization have resulted in the emergence of novel constituents, who have become the focus of the socialist system of personnel control. The central nexus between the state and economic actors which developed under Jiang has been technocratic and elitist, and has been cultivated with the objective of incorporating those constituents who play a pivotal role in sustaining economic growth. This has entailed the extension of preferential treatment to prolific entrepreneurs willing to join the ranks of the CCP, and stringent *nomenklatura* control over central SOE management. At the same time, reform of labor institutions has resulted in the abrogation of the comprehensive communist urban welfare system. Contraction of the public economy coincided with liberalization of pensions, healthcare and other social services, and has contributed to the financial reinvigoration of the state. These changes suggest a clear prioritization of efficiency over egalitarianism. Yet, the distinctively political quality of the relationship between state and the economic elite defies conventional notions of liberal economies. This political aspect is expressed in a dynamic where economic performance begets political influence and political influence, in turn grants access to economic resources.

Notwithstanding the eclectic quality of the principles coordinating competition in China, certain general observations can be made. Development of the formal institutional fabric determining patterns of competition has been skewed towards the highly concentrated, upstream sectors controlled by the central state. Through a combination of macro-economic policy, industrial policy and corporate control, the center has been able to direct the behavior of central SOEs towards the fulfillment of a variety of economic objectives. While insertion of macro-economic objectives may at times antagonize with the profit motive of enterprise, state and central enterprise have a mutual interest in the consolidation of assets within upstream industry and the perpetuation of investment in

fixed capital. By comparison, formal national institutions have been of lesser importance within the coordination of central-local economic relations. ‘GDP-ism’ constitutes the main aligning principle between central and local government. Although the corporatist nexus between provincial government and local SOEs and TVEs (Oi 1995) has been somewhat attenuated due to fiscal recentralization, the focus on regional economic growth continues to drive high investment in local industry but also impels local protectionism and intense inter-regional competition. Finally, institutional development within the private economy has been stunted, with government’s attitude towards private enterprise oscillating between tolerant and rapacious. With wanting property rights, contract law and systematic exclusion from official capital markets, amounting in effect to a competitive formal regime (see Jessop 1990), private enterprise have sought to circumvent the limits to accumulation by reliance on the indigenous social institution of *guanxi*, which transposes social associations unto relationships of production and exchange. Whether the ostensible recent trend towards the formal emancipation of the private sector will persist remains to be seen. If so, it would however erode a fundamental aspect of the covenant between China’s capitalists and the state (at both local and central levels), the tit-for-tat of economic performance and political cooperation. Although state coordination is thus (unsurprisingly) most palpable within the commanding heights of the public economy, activity within the local public and private economy continues to be moderated by central incentives which seek to ensure the twin objectives of economic growth and political allegiance.

## **Conclusion**

At first glance, the current institutional architecture bears but little resemblance to that of the communist era economy. In this period, capital was allocated by plan on basis of production quota. Whereas the broad contours of allocation were formulated at the central level, specification of targets for sectors and regions, and administration of manufacturing units relied on an extensive sub-central bureaucracy. Bureaucratization of the economy also implied a comprehensive reconfiguration of the social organization of production. The systematic transfer of capital from agriculture to industry was premised on an

institutionalized dichotomy between rural and urban labor. Beyond what value could be created through consolidation of agricultural production into collectives, the expropriation of surplus value relied on depression of agricultural incomes and marginal welfare provision. By contrast, within industry, the need to secure the compliance of industrial labor impelled the development of a lavish and comprehensive welfare system. Although these institutions firmly established the state-industrialist nexus as the core of communist regulation and acquiesced with the strategy of expedited industrial development, they gave rise to a set of severe antagonisms. First, bureaucratic administration proved tremendously complex, and information gaps and managerial constraints curbed the center's capacity for effective control. Second, explicit coercion within agricultural production precipitated widespread rural destitution and led to grassroots defection from state policies.<sup>147</sup> Within industry, the amalgamation of political and economic objectives hampered efficient promotion of productivity.

Institutional changes which unfolded over the previous three decades have mitigated many of these problems. In the initial stages of reform, the relaxation and gradual abolishment of the system of central re-appropriation of agricultural output provided the impetus to the extensive growth within agriculture and light industry. In tow, the significance of plan-based allocation of capital and production quota diminished. Although decentralization initially intensified bureaucratic bargaining over capital, these dynamics were attenuated through the introduction of a standardized national taxation system and the centralization of banking.<sup>148</sup> As a result of fiscal reforms, the financial prowess of local government much diminished while central revenues were replenished. However, due to the concurrent processes of marketization and corporatization, the greater portion of control over capital allocation has been invested in enterprise. Coordination between the state and enterprise has relied on extension and adjustment of the administrative system of personnel control which developed under socialism. The traditional state-industry covenant, based on the co-optation of laborers, has evolved to

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<sup>147</sup> In fact, the household responsibility system condoned extant practices of, rather than introduced rural market production (Cai & Treisman 2006).

<sup>148</sup> Bargaining politics have nevertheless remained important within several of the strategic industries, in which industrial bureaucracy has continued to play a seminal role (see Wu, 2007; Yeh & Lewis, 2004).



focus rather on the managerial class which owns and/ or controls capital. The shift towards enterprise leadership was accompanied by the attenuation and partial abrogation of monopolistic industrial relations . Under the guise of marketization and liberalization, a competitive labor regime has replaced the *danwei* system. Within the area of inter-actor relations, the influences of marketization and liberalization have asserted themselves with differing degrees. Within strategic industries direct competition is generally eschewed, with reforms having been more instrumental in wresting control from industrial ministries. Competition for regional growth has supplanted the bargaining-orientation of local government. In the private sector, stability in inter-actor relations has been achieved through the informal institution of *guanxi*.

Amongst the multiple bifurcations within the institutional arrangements governing capital, labor and inter-actor coordination amongst center and locality, public and private industry, the persistent emphasis on the state-industrialist relationship is the unifying constant. The shared interest in promoting the expansion of fixed capital is reinforced by the bias of fiscal allocation towards industry, local GDP-ism and the reorientation of the Party-state from the interests of labor to those of the capitalist/ managerial class. What's more, the current mode of regulation has been more efficacious than its communist predecessor. During communism, the only answer to the problems of central computation and supervision had been to decentralize the process of allocation, which however induced agency problems between local and central bureaucracy. The introduction of a market system simplified coordination by homogenizing the value of economic production, while the institutionalization of universal fiscal arrangements for local government and enterprise mitigated the complexities associated with protracted bargaining over remittances. Moreover, the adoption of asset-management and introduction of the profit motive complemented the Leninist apparatus of personnel control in aligning interests between center, locality and enterprise. The perpetuation of *nomenklatura* and other institutions which link the spheres of political and economic control are a salient exhibit that institutional changes have neither adhered to liberal templates nor proceeded in hap-hazard fashion. In the wake of reforms, these institutions have adapted to focus on the managerial and entrepreneurial class, rendering them more

parsimonious. They are likewise a potent reminder that the architects of China's economic reform never intended for development to spell the demise of the public economy, let alone endanger the perpetuation of CCP rule. Indeed, through consolidation of its control over capital, personnel and command over key industries, the central state has managed to enhance its control in comparison to the initial stage of reform, and arguably communism.

The perpetuation and consolidation of the state-industrialist nexus however bring with it pressing questions. In the face of pervasive technical and allocative inefficiencies (Qin & Song 2009), investments in fixed capital can hardly sustain recent rates of growth. These problems are compounded by the socio-economic tensions which have arisen as a result of the prioritization of the industrialist class over laborers and the primacy of state-owned over private enterprise. Whether the current economic regime can persist depends crucially on whether increases in productivity can be effectuated. The following chapters consider in detail the capacity for innovation within the Chinese system.

## **PART II**

### **SUSTAINABILITY AND TECHNOLOGICAL DEVELOPMENT**

## CHAPTER 5

### OVERCOMING THE LIMITS OF EXTENSIVE GROWTH: THE PROSPECTS FOR AN INNOVATIVE CHINA

#### Introduction

Previous chapters described a pattern of economic development predominantly predicated on the relentless expansion of industrial capital. While institutional reform provided scope for an attenuation of sectoral imbalances and successfully brokered a covenant between central and local government, public managers and private entrepreneurs, the limits of China's current mode of development have become increasingly salient. The systemic bias towards investment in fixed capital has precipitated increasing socio-economic disparity and ecological degradation. However, the threat of over-accumulation, dependency on foreign technology and the gradual dissipation of labor cost advantages have brought on concerns of China's economic competitiveness in the medium to long term. All these developments call into question the sustainability of China's current mode of growth. The promulgation of the 'scientific development concept' onwards attested to leadership's pertinent awareness of these problems. Prevailing discourse amongst the political-economic elite posits that social instability and economic stagnation can be avoided by means of a transition towards technology-intensive production. Not only ought development of higher value added industry in favor of the current bias towards traditional manufacturing decrease dependency on physical inputs, but knowledge-intensive production would impel formation of a highly skilled middle class, which promotes domestic purchasing power and alleviate economic disparity. Finally, focus on building indigenous competences within 'emerging strategic industries' would ensure continued international competitiveness.<sup>149</sup>

The stated resolve to transit to a mode of production based on the development and exploitation of novel technologies stands in stark contrast to patterns of accumulation,

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<sup>149</sup> State Council, 2010, *guanyu jiaakuai peiyu fazhan zhanluexing xinxing chanye de jue ding* [Decision regarding the expedited development of the emerging strategic industries].

which suggest an intensification rather than mitigation of fixed capital-driven growth and concomitant social and economic externalities. This chapter evaluates whether China's economy is indeed making progress towards realization of a predominantly intensive mode of accumulation. Continuous reconfiguration of productive alignments, resulting in increased efficiency or creation of goods and services of greater value depends on the nurturing of intellectual capital and secondly, 'institutional stop-gapping' in instances where the characteristics of the innovative process impede autonomous organization and motivation for actors to engage in the exchange, absorption and implementation of intellectual capital.

The national innovation systems literature (NIS, Freeman, 1987; Lundvall, 1992; Nelson, 1993) has formulated two distinct institutional models which fulfill the prerequisites for consistent innovation. The 'liberal' variety emphasizes market coordination, wherein reciprocity between the scientific and industrial domain impel a largely autonomous trajectory of technological progress (Dosi 1982; Perez 1983). In contrast to its liberal counterpart, the developmentalist model hinges on the promulgation of a select set of industries which become the focus of efforts to cultivate national economic competitiveness. Bureaucratic institutions established to support the project of socialist industrialization were poorly suited to the systematic development of intellectual capital or diffusion and implementation thereof. The institutional framework and organization of innovative activity which have taken shape during reform have sought to address the flaws of the communist-era system, which limited the scale and impact of technological development. During the last two decades of the 20<sup>th</sup> century, government has engaged in a series of initiatives that sought to restructure the centralized planning mechanism for science and technology into a more encompassing set of institutions which are responsive to the varied demands of different types of innovative activity and the processes of invention and discovery, diffusion and implementation associated with them. The current Chinese innovation system is characterized on the one hand by the commercialization and decentralization of research, and on the other by central coordination of, and government support for key areas of industry and technology on the other. Emphasis on establishing an institutional framework for innovation wherein

enterprise is the main locus of innovation and the state provides coordination and fiscal support at the level of industry suggests strong parallels to Japanese, Korean and Taiwanese antecedents. Has the concurrent development of economic administration and market-based production in China then promoted the institutional convergence towards an East Asian variety of the developmental model (Nelson 1993; Freeman 1995; Freeman 1987)?

To consider whether the resultant government-enterprise nexus reflects the dynamics of those described in other East Asian newly industrialized economies, I examine the distribution of innovative activities over these actors. Indicators of innovative input and output demonstrate a remarkable upturn in scientific and technological activity in the wake of institutional reforms. Furthermore, these data support the assertion that enterprise has become the major site of research and development, while government continues to specify substantive foci of technological endeavors. However, a closer analysis reveals anomalies in patterns of behavior which call into question the applicability of the ‘developmentalist’ predicate. This divergence can be attributed to the broader institutional architecture which supports the state-industrialist nexus. Extant systems of bureaucratic controls and market relations fail to furnish both the incentives for long-term investments, and the coordinating mechanisms which allow for the inter-constituent collaboration, necessary for persistent and pervasive innovation.

### **National innovation systems: Liberalist and developmentalist models**

National innovation systems theory has been described as theoretically eclectic or even a-theoretical (Edquist 2005). Nevertheless, the development of the NIS perspective can be traced back to distinct theoretical influences. As attested by the importance of concepts of control, theoretical perspectives are moreover not merely an analytic concern, but are of direct relevance to the manner in which national governments have shaped the architecture of their institutional framework for innovation.<sup>150</sup> Two general approaches

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<sup>150</sup> With respect to the Chinese case, innovation policy has been explicitly informed by the Japanese and Korean experiences (Liu and White 2001), which provided much of the impetus to the development of the NIS perspective (see Freeman 1987). Moreover, from the late 1990s onwards, the NIS perspective has been a consistent guideline of innovation policy. For example the, the 2001 plan for scientific and technological

can be outlined. The ‘liberal’ variety of NIS focuses on the subset of market failures identified by the new institutional economics (Williamson 1975; Williamson 1985; North & Weingast 1989) which arise specifically within the context of technological production and exchange. Such problems come in two guises, those to do with incentivization and coordination, and are a result of uncertainty of returns on investments in innovation, high positive externalities<sup>151</sup> and the information paradox which emerges during the course of transaction of intellectual capital.<sup>152</sup> Accordingly, the focus of this variety of NIS is on the provision of institutions which alleviate such opportunity and transaction costs, such as intellectual property regimes and the provision of commodities with public goods characteristics such as basic science and education. However within this variant of NIS, government generally abstains from stipulation of substantive foci or direct coordination of innovative activities, which are instead understood to be derived from the interaction of scientific and technological progress and market demand. Within this liberal variety, which predominates in the US and UK, the relationship between the scientific domain and enterprise constitutes the central dynamic of innovation (Nelson 1993).<sup>153</sup>

Another variety of NIS takes its inspiration from the political economic theory of Friedrich List (Freeman 1995), who argued that government planning plays an indispensable role in the development of national technological competence and competitiveness. In this view, the instrument of government coordination is to promote the development and adoption of efficiency and quality enhancing technology *within* industry, as well as a redistribution *across* industries from low to high value added

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development states amongst its main objectives the establishment of “a national innovation system which accords with the socialist market system and the indigenous development of science and technology”, State Council 2001, *guomin jingji he shehui fazhan di shi ge wu nian jihua keji jiaoyu fazhan zhuanxiang guihua* [Program for the development of science, technology and education of the tenth five-year plan for social and economic development], Chapter 2.

<sup>151</sup> These externalities are a result of the non-rivalrous nature of intellectual capital, i.e. its not diminishing in supply as a result of its consumptions (Greenhalgh & Rogers 2010).

<sup>152</sup> This paradox relates to the problem that, in order for a potential buyer to appropriately ascertain the value of a technology, he/she has to intimately understand its context. However, having such knowledge obviates the need for purchase.

<sup>153</sup> Although within the US, the directive influence of the military complex has been well documented (Rosenberg 1983).

processes. This is effectuated first through investment in the development of requisite competences and resources, such as skilled labor, scientific and managerial expertise and an intellectual capital stock. In contrast to its liberal counterpart, in which states ought to be in principle indifferent to whether technology is developed domestically or acquired from outside (save for the normal cost-related concerns which obtain during the generic make-or-buy decision, see Williamson, 1975) the strategic variant of NIS considers that the nurturing of indigenous innovative capacity is crucial to the development of international competitiveness and improved terms of trade and therefore even warrants deliberate short-term inefficiencies (set on by higher opportunity costs of indigenous development and/ or temporary supply-demand disequilibria) if they are counteracted by a future increase of efficiency and technological rents (see Schumpeter, 2010).<sup>154</sup> Nevertheless, the market is still considered important, because domestic and international competition disciplines enterprise performance. The strategic variety of NIS characterizes development of many East-Asian economies, in which the government-enterprise nexus has been considered decisive (Freeman 1987; Nelson 1993).

<b>Activity</b>	<b>Liberal NIS</b>	<b>Developmentalist NIS</b>
<i>Education</i>	The role of state institutions is predicated on alleviating market failures due to positive externalities of science and education	Focus is on developing an indigenous base of intellectual capital and skilled workforce
<i>Research</i>		
<i>Development</i>	To be undertaken in concerted effort between science and industry	To be undertaken in concerted effort between state and industry so as to build competences in designated industries
<i>Diffusion</i>	Dependent on allocative and incentivizing functions of the price and market mechanism	Dependent on coordination by plan and market competition
<i>Implementation</i>		

*Table 122: Distribution of innovation-related activities in the liberalist and developmentalist*

<sup>154</sup> Note however that for late developers, international markets allow for the purchase and retro-engineering of various technologies, allowing for a rapid catch-up rate. In this instance, efforts at building a domestic science and technology base are focused on advanced industry. This point will be elaborated on further in the subsequent section.



Although the activities of education, research and development, diffusion and implementation are at the central focus of both perspectives, the liberal and developmental varieties of NIS provide distinct interpretations on how these ought to be distributed amongst government, academia and industry, as well as the appropriate roles of bureaucracy and market.

### **Objectives and coordination within the Chinese innovation system**

Under communism and for some time thereafter, research, production and coordination were subsumed within the institutional framework of the command economy. In the subsequent period, general tendencies towards decentralization, corporatization and marketization, and more recently, on the development of capacity for ‘indigenous innovation’ (*zizhuchuangxin*) have resulted in an innovation system which –much like the economy proper- is characterized both by enduring features of communist organization and market forms of association. In similar vein to the previous chapters, this section considers elite perceptions of the process of innovation and its role within the overall economy, institutional changes and novel patterns of interaction, and resultant patterns of investment in, and proprietorship of intellectual capital.

#### *Innovation under communism*

### **Guiding principles of innovation under communism: Socialist industrialization and science and technology planning**

With the establishment of the People’s Republic in 1949, efforts commenced to rebuild China’s institutes for science and education, which had suffered from years of neglect during the preceding years of war. Initially, research was exclusively dedicated to a select number of objectives within national defense stipulated by the central state. Following the promulgation of the first five-year plan for economic development, which sought to

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<sup>155</sup> The first column lists the primary activities within the NIS, and the second and third columns respectively describe the liberalist and developmentalist approaches towards the organization of these activities.

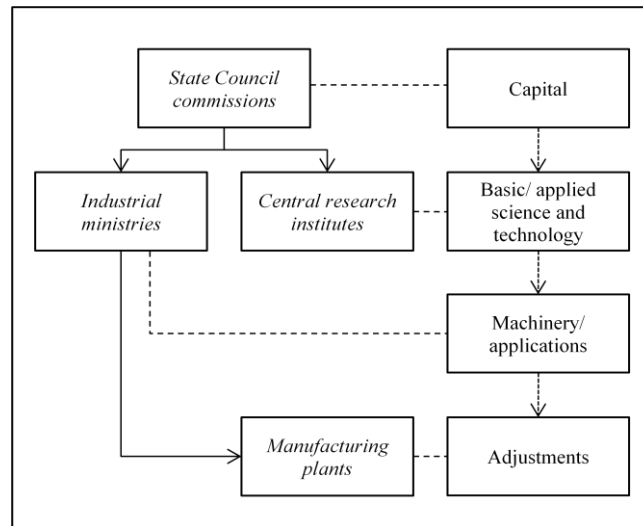
rapidly effectuate industrialization, the scope of research became more expansive. With the establishment of the State Science Planning Commission<sup>156</sup> in 1956, the science system was integrated into the planning mechanism of the command economy. That same year, the commission drafted the first of China's long term plans for science and technology. The plan stated that "*we must wholly or in part complete the technological transformation of the economic departments, so as to realize the objective of socialist industrialization*".<sup>157</sup> Through a consultative process involving influential local researchers, overseas returnees, and a large cohort of Soviet researchers, 57 'national major scientific and technological tasks' (*guojia zhongda keji zhuanxiang*) in twelve key research areas were formulated.<sup>158</sup> Furthermore, the plan specified the organization of science and technology. Selection of these objectives was based on the identification of 'pressing bottlenecks' within production such as mining and prospecting, and the construction of production plants, corresponding to a predominantly extensive pattern of expedited industrialization. Planning of science and technology during the command economy thus reflected a strong 'demand-pull' orientation (see Mowery & Rosenberg 1978). However, rather than relying on the market-mechanism, the delineation of research objectives and allocation of capital were the prerogatives of the various commissions operating under the State Council. The socialist science system would accordingly seek to resolve the bottlenecks identified by the commissions through a two-pronged strategy of absorption of results from the forefront of global science and technology and development of indigenous competence in basic research and strategic areas such as defense. Technological advances made by the research institutes would then be assimilated by industry, which would make the requisite adjustments to effectively introduce novel machinery and applications in production plants (see figure 15).

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<sup>156</sup> Merged with the State Technology Commission in 1958.

<sup>157</sup> State Science Planning Commission (SSPC) 1956, Long-term plan for the development of science and technology (1956-1967), Chapter 1.

<sup>158</sup> *gongheguo qi ge keji guihua huihang* [A retrospective of the seven science and technology plans of the P.R.C.], Retrieved from: [http://www.gov.cn/test/2006-03/21/content\\_232531.htm](http://www.gov.cn/test/2006-03/21/content_232531.htm).



Solid arrows denote hierarchical relationships, dotted lines signify designated activities, dotted arrows signify conceptual relations between activities

*Figure 186: Coordination within the innovation system: Conceptual and actual organization of innovation under communism*

Notwithstanding the paucity of domestic scientific expertise, technological absorption, central coordination and a focus on a select number of key issues within industrial development were believed to not only offset any initial disadvantage vis-à-vis industrialized western nations, but in fact allow China to approximate global industrial and technological frontiers.<sup>159</sup>

### **Organization of the innovative process: the linear perspective**

Technological research, experimental development and industrial application were organized in accordance with the principle of hierarchical administration. The State Science and Technology Commission (SSTC)<sup>160</sup> was responsible for the promulgation of medium and long term plans and overall administration.<sup>161</sup> However, while scientific

<sup>159</sup> SPC, 1956, Chapter 1.

<sup>160</sup> Formed in 1958 out of a merger of the State Science Planning Commission and the State Technology Commission.

<sup>161</sup> Military research was however administered by a separate entity, the Defense Science and Technology Commission.

policy was the remit of SSTC, it had to contend with the administrative control other bureaux exerted over the institutes and manufacturing plants which comprised the science and technology system (Gu and Lundvall 2006, see figure). The vanguard of the national research system was comprised of a cluster of central research institutes. At its core was the Chinese Academy of Sciences (CAS), which had been established in 1949. CAS set out the main directions for research to be conducted by industrial ministries and academic institutes. Research undertaken by CAS focused primarily on fundamental issues in industrial research and basic and theoretical science. Research institutes under the industrial ministries engaged in experimental development of industrial technology and the diffusion of scientific and technological advances within industry. They were also to provide feedback on practical applications of technology to CAS. The responsibilities of universities were threefold; first, the foremost academic institutes and laboratories were to conduct research independently. Additionally, universities would carry out research commissioned by the industrial ministries on a contract basis. Finally, they were responsible for vocational training and the nurturing of a scientific talent pool. While research activities were in principle confined to the above-mentioned institutes, some of the large manufacturing plants which engaged in complex production were allowed to establish facilities for the testing and modification of experimental designs.<sup>162</sup>

While much emphasis was given to the planning and allocation of scientific and technological tasks, less attention was bestowed on the diffusion of research results. In September of 1965, the SSTC issued the Temporary Measures on the Management of Intermediary Experimentation on Industrial Science and Technology, which stipulated that research institutes at all levels ought to report significant findings to the SSTC.<sup>163</sup> Concurrent efforts were made to systematize the organization and publication of major research findings, and establish dedicated units for technological evaluation and standardization.<sup>164</sup> Nevertheless, because SSTC had not been granted authority over the budgets of industrial ministries, it could not enforce the adoption of novel technology.

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<sup>162</sup> SSPC, 1956, Chapter 5.

<sup>163</sup> *dangdai zhongguo bianji weiyuanhui* 1991.

<sup>164</sup> SPC, 1963, 1963-1972 *nian kexue jishu fazhan guihua gangyao* [1963-1972 Outline of the plan for scientific and technological development].

Rather, the assumption seemed to be that results would naturally trickle down from the central research institutes at the apex of the S&T system to the industrial ministries to industry.

Activity	Socialist NIS
<i>Education</i>	Focus is on developing requisite skills to integrate advanced production technology and the resolution of a limited number of technological bottlenecks
<i>Research</i>	
<i>Development</i>	Undertaken by central research institutes, secondary role attributed to ministerial research institutes
<i>Diffusion</i>	Dependent on coordination by plan
<i>Implementation</i>	

Table 13: State-science-industry relations in the Chinese socialist NIS

### The contribution of science and technology to communist economic development

Due to the efforts of the central state, the science system rapidly expanded. In 1949, the founding year of the People's Republic, only some fifty thousand individuals were engaged in scientific research nationwide and the number of research institutions totalled a mere thirty (Kou 2010). By 1965, the number of institutes wholly dedicated to research had increased to 1714, and some 2.5 million personnel were employed in scientific or technical capacities.<sup>165</sup>

Year	High school graduates (1000)	University graduates (1000)	Educational attainment of work force (non-student population ages 16-65), percentage of total				
			No degree	Primary	Junior high	Senior high	Tertiary
1952	289	32	73.9	19.6	4.8	1.4	0.4
1965	2,325	186	56.8	30.2	9.2	3.0	0.8
1978	23,985	165	39.6	33.4	20.6	5.7	0.7

Table 134: Indicators of education during communism, 1952-1978

Source: Brandt & Rawski, 2008; (China Statistical Press 2005)

<sup>165</sup> *zhongguo kexue keji wushi nian zongshu* [Overview of fifty years of Chinese science and technology], Retrieved from: [http://www.stee.agri.gov.cn/tjzl/nkjwzjx/t20040309\\_176004.htm](http://www.stee.agri.gov.cn/tjzl/nkjwzjx/t20040309_176004.htm).

The communist educational system was markedly successful in providing the Chinese work force with basic education. Within a political climate weary of intellectualism, the development of higher education however trailed significantly behind (see table 14).

The strategy of ‘focusing on the key objectives’ led central research institutes to replicate a small number of advanced technologies.<sup>166</sup> However, econometric analysis suggests the overall contribution of technological development during the communist era was marginal, with total factor productivity increasing accounting for an estimated eleven per cent in the period 1952-1978 (Brandt & Rawski 2008).<sup>167</sup>

Several explanations combine to account for the limited role of innovation in pre-reform development. First, due to government’s template for industrialization emphasis was overwhelmingly on capital construction. This focus came at the expense of investments in science, technology and education. The restraining influence of this particular strategy on the proliferation of science and technology was compounded by political and ideological factors. Due to the backward state of science and technology, China had initially relied heavily on foreign expertise. On October 12, 1954 the Chinese and Soviet government jointly signed the Agreement on Scientific and Technological Cooperation, which laid the foundation for an intensive exchange of Soviet technology and scientific personnel.<sup>168</sup> During this period, intensive transfer of Soviet technology was paired with Soviet training and collaboration between Russian and Chinese researchers. However, rising political tensions between Mao and Soviet leadership prompted Khrushchev to recall all Soviet scientists and engineers in 1960 (Schoppa 2000). This setback for China’s science and technology system was greatly exacerbated by

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<sup>166</sup> In 1964, China successfully tested its first atomic bomb. 1965, Chinese researchers had succeeded in the development of artificial insulin. By 1970, the launch of Satellite ‘East Red No.1’ marked the successful completion of the strategy of “two bombs and one satellite” which had been the shibboleth of military modernization. Moreover, lack of interdependency in the attributes of these isolated technologies, development of which requires disparate competences, further attests to the fragmented quality of the innovation system.

<sup>167</sup> See table 5, p. 76

<sup>168</sup> *xin zhongguo dangan: “zhongsu guanyu gongtong jinxing he sulianmeng bangzhu jinxing zhongda kexue jishu yanjiu yidingshu” qianshu* [Records of the new China: The signing of the Sino-Soviet agreement on the joint implementation and Soviet assistance in Implementing major scientific and technological research], Retrieved from [http://www.gov.cn/test/2009-09/27/content\\_1427664.htm](http://www.gov.cn/test/2009-09/27/content_1427664.htm).

Mao's increased hostility towards 'revisionist elements' within society. Antagonism against the intellectual classes and the institution of Western science during the Cultural Revolution<sup>169</sup> led to attrition of the scientific and academic institutes, and it would take until 1985 for the proportion of technical personnel within the industrial workforce to equal 1965 levels (Naughton 1996).

However, the limited relevance of innovation to the plan economy cannot only be attributed to patterns of expenditure and political turmoil, but also was a result of the structural features of the science and technology system. Within the communist bureaucracy, the State Science and Technology Commission was in charge of overall planning of research and bore responsibility for the fiscal and operational administration of the central research institutes. Industrial planning was however the purview of the State Planning Commission and State Economic Commission. Although the objectives of scientific research were to be informed by the broad needs of aggregate economic development, a lack of reciprocity between the industrial and scientific planning mechanisms rendered research insensitive to the concrete demands of manufacturing plants (Liu & White 2001). Because SSTC and the industrial ministries were situated at the same level of the bureaucratic apparatus, scientific constituents had no authority over the industrial bureaux or vice-versa. Thus, rather than attenuating information asymmetries between actors by ensuring a clear correlation between industrial demand and scientific and technological efforts, bureaucratic administration actively contributed to the insulation of science and industry. The juncture in bureaucratic organization also resulted in coordination problems within the area of implementation. Moreover, although the State Science and Technology Commission was nominally responsible for the diffusion of scientific and technological results to industry, it lacked incentives to proactively engage in efforts to disseminate research findings. The science and technology system depended on central government for funding, which evaluated the former's performance in terms of completed scientific and technological items (*keji xiangmu*). Therefore, research institutes expended little effort on the development of ties with industry. For its part, industrial ministries were overwhelmingly preoccupied with

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<sup>169</sup> 1966-1976.

increasing output, resulting in a tendency towards uncritical expenditure on technological procurement rather than attentiveness to complementarity and absorption. Finally, within the politicized climate of the 1960's and 70's, diffusion of scientific and technological results hinged on grass roots endeavors (Cao 2012)

All in all then, innovation was but a peripheral element of economic development under the command economy. Rather, as part of the 'non-productive' segment of the economy, scientific and technological activity was explicitly subjugated to the objective of expanding industrial capital.<sup>170</sup> With the exception of issues of particular relevance to social or military objectives, investments in scientific and technological development were eschewed in favor of alternatives which were considered to contribute directly to the increase of output of industry and agriculture. This forestalled the development of intellectual capital, prerequisite to the introduction of more efficient or valuable technology. In spite of limited coordination between the two spheres, the organization of the science and technology reflected a strongly 'linear conception of innovation'<sup>171</sup> (see figure). However, lack of incentives and institutionalized relations for the diffusion and implementation of technology precluded the absorption of novel technologies by industry, or led to inefficiency due to the incommensurability of centrally developed general purpose solutions and the organizational and technical specificities of various manufacturing process (Gu and Lundvall 2006).

### *Innovation in the reform era*

The death of Mao and subsequent ousting of the 'gang of four' normalized bureaucratic and economic relations, allowing the state to take on the task of the restoration and development of the dilapidated science and technology system. From the 1975 onwards, Deng Xiaoping advocated the principle of the four modernizations. According to this

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<sup>170</sup> Socialist economic theory distinguishes between productive (*shengchan*) and non-productive accumulation (*fei shengchan jilei*). The former encompasses contributions to industrial and agricultural capital, while the latter includes investments in public services, logistics and communication and science and education (Brødsgaard 1983)

<sup>171</sup> see Freeman, 1995. Note however, that in the original characterization of the linear conception, it is scientific progress which provides the impetus to research and development, although later the guiding principle of 'technology-push' was gradually replaced by that of 'market-pull' (Fischer 2001).



concept, science and technology constituted the ‘major productive force’.<sup>172</sup> Deng rehabilitated the rehabilitated China’s scientists, whom Mao had branded intellectual revisionists, by declaring them ‘mental workers for the cause of socialism’.<sup>173</sup> However, implementation of organizational changes required to reposition scientific and technological activity from the economic periphery to the proved much more cumbersome. Efforts to comprehensively rebuild the national science and technology system commenced with the ‘national outline for scientific and technological development (1978-1985)’. Practices which had developed under the header of scientific dialecticism were abrogated. A standardized examination system replaced the plethora of inconsistent entrance policies of universities to promote the development of the scientific and technical workforce. The plan also reinstated hierarchical work-relations within research institutes, which had been discarded during the Cultural Revolution. Furthermore, a performance-based reward system for S&T personnel was introduced. The diffusion of scientific and technological findings within the research system was promoted through the development of scientific publications, and greater cooperation between institutes. The formation of stronger links between science and industry was to be promoted through a centrally coordinated system for technology transfer and the intensification of the engagement with research of cadres responsible for enterprise administration.<sup>174</sup>

In spite, or perhaps, because of the focus on rebuilding China’s science and technology system, its centralized, hierarchical character was maintained.<sup>175</sup> A total of

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<sup>172</sup>*zhou enlai zai si jie da hui baogao zhong chongshen “si ge xiandaihua”* [Zhou Enlai reiterates the four modernizations at the fourth plenum of the national people’s congress], Retrieved from : <http://news.sina.com.cn/c/sd/2009-09-23/113218709998.shtml>.

<sup>173</sup>*deng xiaoping zai quanguo kexue dahui kaimu shishang de jianghua* [Speech delivered by Deng Xiaoping during opening of the National Science Conference], Retrieved from : <http://scitech.people.com.cn/GB/25509/56813/57267/57268/4001440.html>.

<sup>174</sup>*1978-1985 nian quan guo kexue keji fazhan guihua gangyao (caoan)* [Summary of the outline of the national plan for science and technology development 1978-1985], Retrieved from: [http://www.most.gov.cn/ztzl/gjzcggy/zcggy/shg/t20050831\\_24438.htm](http://www.most.gov.cn/ztzl/gjzcggy/zcggy/shg/t20050831_24438.htm).

<sup>175</sup> The 1978 plan was drafted under the auspices of Mao’s successor Hua Guofeng, who accepted the need for technological modernization but at the same time insisted on the correctness of the fundamental principles of the plan economy.

108 objectives within eight key areas were specified.<sup>176</sup> By 1982, it had become obvious that the science plan had been overly ambitious, and accordingly, the number of objectives was reduced to 38. Although the invigoration of scientific efforts had not brought about the anticipated technological outcomes, several significant changes were made in the organization of the science system within the early years of reform. In 1981, the SSTC issued its Outline of the Report on Policy for the Development of Science and Technology. It criticized many of the structural deficiencies of pre-reform planning and organization of innovation, such as the lack of attentiveness to the scientific realm with the pragmatic challenges of economic development and the torpor of industry regarding implementation of novel technology. Considering the emphasis Deng had placed on science and technology, it was no surprise that the concerns raised in the Outline permeated into the apex of the bureaucracy. In 1982, State Council decided to establish the State Leading Group for Science and Technology (*guowuyuan keji lingdao xiaozu*). Consisting of leadership of the State planning, economic, science, defense and education commissions as well as CAS representatives and headed by Premier Zhao Ziyang, the leading group sought to consolidate control over science planning and administration.<sup>177</sup> Its deliberations led to the promulgation of the 1985 Decision on the Reform of the Science and Technology System which laid the foundation of China's modern innovation system. The policy altered both the guiding principles and coordinative mechanisms for innovation. Although science and technology planning remained an essential feature of the Chinese innovation system, the reform era system departed from the principles of centralized and hierarchical allocation and instead came to envelop a host of coordinative mechanisms which range from the interventionist to non-intrusive. Although reforms clearly implied a departure from communist-era institutions, it is less obvious how best to characterize the system which has come to replace them or how this transformation has influenced the significance of innovation as a driver of broader institutional change and

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<sup>176</sup> These areas (not including national defense) were: agriculture, energy, material science, electronic engineering, laser technology, aeronautics, high energy physics and genetic engineering.

<sup>177</sup> CC 1982, *zhonggong zhongyang, guowuyuan guanyu chengli guowuyuan keji lingdao xiaozu de tongzhi* [Notice by the Central Committee of the CCP and State Council on the Establishment of the State Leading Group for Science and Technology].

economic development. The following section begins to address this question by discussing changes in incentives to technological development, organization of innovation-related activities and the scale and substantive foci of scientific and technological endeavors.

### **Guiding principles of innovation in the reform era**

With the adoption of the four modernizations as the official slogan for economic development, the subjects of science and technology came to permeate economic discourse. As in the communist era, close correlation between scientific and technological and economic development was deemed crucial. However, the inefficacy of the communist system of centralized science and technology planning, geo-economic tendencies, and more recently, the externalities of capital-intensive growth led to a reconsideration of the nature of the interdependency between technology and economy. Under communism, planning of scientific and technological development operated under an economic logic of simple addition and linear progression and focused by and large on measures which were believed to directly increase productivity. By contrast, the rationale of reforms which have resulted in the current constellation of institutions was much in line with the basic assumptions of NIS, and addressed both ‘governance’ and ‘strategic’ elements. This meant a reorientation (or expansion) of the substantive focus of science and technology planning, as well as a reappraisal of the appropriate roles of market exchange and bureaucratic administration in the coordination of the constituent activities within the innovation system.

### *Substantive focus of science and technology policy*

As clearly demonstrated by the concept of the four modernizations, the emphasis on production technology persisted in the reform era. However, the socialist approach to industrial upgrading, which sought to derive its guidelines for scientific and technological activity from the identification of bottlenecks in production has been appended by different concerns and rationales. Korean and Japanese precedents convinced government that China could ‘leapfrog’ (*kuayeshi fazhan*) within technology-intensive industries

through absorption of mature technologies (Cao, Suttmeier, and Simon 2009).<sup>178</sup> According to this concept developing nations have singular opportunities to achieve or approximate the technological frontier within selected sectors by skipping certain stages within the development trajectory of these technologies. Specifically, such development is possible when knowledge and technology is pervasive within international markets, when innovation regimes are rapid (resulting in quick commodization and low costs), technological development is science- rather than experience based (i.e. radical rather than incremental) and innovation is complementary, rather than labor-substituting (Soete 1985). It is furthermore understood that developing nations are particularly apt to engage in leapfrogging because the low proportion of specialized skilled labor within the overall workforce reduces opportunity costs of switching from one mode of production to another.

Notwithstanding the opportunities provided by China's opening up, progressive integration within the global economy was believed to pose grave challenges as well. From the early 1990s onwards, government argued that "within the new regime of international competition, technological advantage is becoming a major determinant of the future trajectory and fate of the nation".<sup>179</sup> According to this perspective, rapid scientific and technological advances made by developed nations (precisely within areas of technology which present opportunities for leapfrogging)<sup>180</sup> herald a transition towards a novel production regime. The state thus believed that China's sustained economic competitiveness hinged on matching medium-term efforts to increase productivity of extant industry with long-term objectives to harness competences in key areas of emerging industrial technology.<sup>181</sup>

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<sup>178</sup> State Council 2001, *guomin jingji he shehui fazhan di shi ge wu nian jihua keji jiaoyu fazhan zhuanxiang guihua* [Dedicated program for the development of science, technology and education of the tenth five-year plan for social and economic development], Chapter 2.

<sup>179</sup> State Council 2001, Chapter 1, see State Council, 1991, *zhonghua renmin gongheguo kexue jishu fazhan shi nian guihua he "ba wu" jihua gangyao (1991-2000)* [Outline for the ten-year plan for the development of science and technology and the eight five-year plan (1991-2000) of the P.R.C.].

<sup>180</sup> E.g. information and communication technology, new materials science and biotechnology, see State Council 2001, Chapter 1.

<sup>181</sup> State Council 2006, chapter 2.

In recent years, strategic motivations for the development of domestic technological capacity have been accompanied by concerns over the externalities of economic development. The ‘scientific development concept’ (*kexue fazhanguan*), promulgated by President Hu in 2003, stressed the urgency of social and environmental pressures brought on by industrialization. Emphasis on knowledge and technology-driven industry would adjust investments in favor of labor, ultimately resulting in a higher wages and greater consumption expenditure. Simultaneously, a transition to less capital-intensive activities and the development of new energy technologies would reduce environmental strain. Recent science and technology planning has reflected this emphasis on competitiveness and sustainability. Development of a select group of technology-intensive industries, renewable energy technology, and sustainable production methods have become focal points within the latest plan for the development of science and technology.<sup>182</sup> Irrespective of the considerable substantive shift of foci within science planning, emphasis remains very much on the industrial component of the economy. Key areas of research seek to promote frugality and technological efficiency, but do not imply a departure from the industrialist mode of development. The central perception is that the current predicament of the economic system is essentially one of technical optimization of industrial production.

In the wake of the introduction of the scientific development concept (which lays out the center’s economic *problematique*), and the plan for scientific and technological development, State Council articulated a new set of ‘emerging strategic industries’ (*xinxing zhanlue chanye*), which are to form the core of the novel industrial paradigm.<sup>183</sup>

### **Organization of activities within the NIS in the reform era**

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<sup>182</sup> State Council 2006, chapter 3

<sup>183</sup> These industries are: Energy saving and environmental technology, next generation information technology; biotechnology; advanced equipment (aeronautics and aviation, intelligent traffic systems, intelligent manufacturing equipment), renewable energy, new materials science, and renewable energy automobiles. State Council, 2010, *guanyu jiakuai peiyu he fazhan zhanluexing xinxing chanye de jue ding* [Decision regarding the expedited nurturing and development of the emerging strategic industries]; State Council, 2012, “*shi’er wu*” *guojia zhanluexing xinxing chanye fazhan gui hua* [Outline for the national development of the emerging strategic industries under the twelfth five-year plan].

In the three decades which have passed since the initial impetus to reform was given, the simplistic initial rationale of innovation policy -which posits a sequential procession from economic need to scientific discovery to industrial application- has been supplanted by one of a more diverse and multi-temporal inter-dynamic between market-forces and technological progress (see Perez 1983). Not surprisingly, this non-linear and multifaceted logic is reflected within the principles which inform the distribution and organization of innovative activity.

### *Education and human capital*

While during the initial period of reform, focus was on the reorganization of industrial research, the development of education was assigned greater importance from the mid-1990s onwards. At the Fourth Session of the Eight National People's Congress,<sup>184</sup> President Jiang Zemin's concept of 'revitalizing the nation through science and education' (*kejiao xing guo*) was adopted as the official guideline for economic development. The importance attached to the new policy was explicated by the establishment of the National Leading Group for Science, Technology and Education (*guojia keji jiaoyu lingdao xiaozu*), chaired by Premier Zhu Rongji.<sup>185</sup> Accordingly, State Council stipulated that governmental outlays for science and education ought to increase at a rate above the growth of budgetary revenue.<sup>186</sup> Although this heuristic has not been consistently enforced, the new emphasis on education, caused government outlays to increase as a proportion of GDP, from 2.65 to 3.7 per cent between 1995 and 2010 (NBS 2011, tables 2-11, 20-38).

However, policy was not geared towards the uniform expansion of educational attainment. Driven by the objective to rapidly increase the stock of highly skilled labor, considered a precondition for the transition of productive activity towards high

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<sup>184</sup> 1996.

<sup>185</sup> State Council 1998, *guowuyuan guanyu chengli guojia kexue jiaoyu lingdao xiaozu de jueding* [Decision on establishing the National Leading Group for Science, Technology and Education]. Retrieved from: [http://www.law-lib.com/law/law\\_view.asp?id=67295](http://www.law-lib.com/law/law_view.asp?id=67295).

<sup>186</sup> (Xinhua 2003).

value-added industries, focus has particularly been on development of tertiary education. In response to Jiang's new line for economic development, the Ministry of Education stated in its 1998 plan that "[We must] actively develop higher education, and the enrolment rate in tertiary education must achieve approximately eleven per cent; and in accordance with the objectives of the national innovation system, [we must] develop a pool of highly educated talent capable of innovation."<sup>187</sup> Increased government spending was accompanied by the marketization of tertiary education. Tuition fees were introduced in 1997, allowing for household contributions to further drive expansion (Bai, 2006). Regulation resulted in the of rapid increase university education proportionate to overall education (see table 15).

	Level	1978	1990	1995	2000	2005	2010
Enrollments	Primary	52.59	55.86	53.47	45.17	35.96	35.12
	Secondary	47.10	43.20	45.35	52.90	58.87	57.00
	Tertiary	0.31	0.94	1.18	1.93	5.17	7.88
Graduates	Primary	32.43	39.66	39.04	37.17	25.14	22.79
	Secondary	67.34	59.04	59.36	61.37	71.04	69.67
	Tertiary	0.23	1.31	1.60	1.46	3.82	7.54

Table 145: Enrolment and graduates in primary, secondary and tertiary education as share of total, 1978-2010

Source: NBS, 2012, tables 20-8, 20-9

Fearing general efforts to develop tertiary education would fail to ensure sufficient supply and quality of human capital to furnish the immediate demands of the innovation system, government policy reverted to the principle of focusing on major bottlenecks. In response to the dearth of human capital within the science and technology system, government initiated a variety of programs intended to effectuate the return of distinguished foreign-educated scientists of Chinese origin. These returnees have come to constitute the

<sup>187</sup> Ministry of Education 1998, *mianxiang 21 shiji jiaoyu zhenxing xingdong jihua de tongzhi* [Action plan for the Vitalization of education in the 21<sup>st</sup> century]. Bai (2006) provides a more pessimistic rationale for the uptake of tertiary education, stating that government's emphasis on university training was rather intended to defer the pressing problem of youth unemployment.

core of China's science and technology system.<sup>188</sup> National state-sponsored programs were established to nurture a select class of academic institutes of global standard, which could provide the scientific talent which in the longer term would comprise the core of the Chinese science system.<sup>189</sup> The selective manner in which policies addressed the issue of educational development clearly suggest a developmentalist rather than liberal approach. Rather than intervening when high opportunity costs prevent optimal supply of education,<sup>190</sup> the state has sought to concentrate its efforts on the establishment of a consolidated pool of talent which may directly contribute to the realization of the objective of a robust innovation system.

### *Research and Development*

The policy of opening up and reform had effectuated the rise of a 'dual track economy' in which market demand appended central stipulation of production quota (Lau et al. 2000), and the center gradually rescinded from promulgating mandatory quota in favor of issuance of guidelines as reform progressed (Naughton 1996). The development of an economic compartment governed by principles of market exchange provided opportunities to reconsider the efficacy of bureaucratic administration of research and development. The 1985 Decision of the Central Committee of the Communist Party of China on the Reform of the Science and Technology System had dispensed with the view of all S&T as non-productive and instead regarded the results of applied and experimental research as tradable commodities.<sup>191</sup> Accordingly, the contract responsibility system which had been introduced within industry in the early 1980s was extended to the area of industrial research. Under this system, institutes conducting applied research were

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<sup>188</sup> According to Prevezer (2008), returnees comprises 54% of academicians within the Chinese Academy of Sciences and 72% of scientific directors within the national program for the development of high-tech research in 2003.

<sup>189</sup> The '985' Program of 1998 provides central funds to foster the development of an approximate 100 elite universities.

<sup>190</sup> For consumers with comparatively low expendable income, investments in education constitute a major cost both in terms of tuition and foregoing more immediate returns of labor.

<sup>191</sup> CC 1985, *zhonggong zhongyang guanyu kexue jishu tizhi gaige de jue ding* [Decision of the Central Committee on the reform of the science and technology system], Chapter 1. Retrieved from <http://cpc.people.com.cn/GB/64162/134902/8092254.html>.



required to become financially independent by engaging in contracting with enterprise. Market mechanisms were introduced so as to foster greater efficiency through competition, and encourage institutes to proactively seek out opportunities within industry beyond planned items, thus contributing to the alleviation of the problem of poor science-industry reciprocity.<sup>192</sup>

As reform progressed, the relationship between planning and market became characterized by the principle of ‘stabilizing the vanguard and opening up a portion’ (*wenzhu yi tou fangkai yi pian*).<sup>193</sup> Within the realm of science and technology, this implied releasing bureaucratic control over the majority of industrial research. In 1999, the Decision for Strengthening Technological Innovation, Developing High Technology and Realizing Commercialization gave the impetus for the privatization of the greater part of industrial research institutes.<sup>194</sup> These were either corporatized, or merged with existing enterprise and required to finance their operations solely by engaging in contracted research or commercial exploitation of research results (OECD 2008).

Maintaining the vanguard meant “to consistently support basic and high tech research and major R&D concerning the long term development of the economy, society and national defense, to create excellent capacity and diligently strive for major breakthroughs, so as to elevate overall national scientific and technological prowess[.]”

<sup>195</sup> Within the planning system, direct fiscal allocation was replaced by a tender mechanism. Funds were disbursed through several central programs whose scope coincided with the substantive emphases of the strategy for science and technology

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<sup>192</sup> State Council 1988, *shenhua keji tizhi gaige ruogan wenti de jue ding* [Decision on certain issues regarding the deepening of reform of the science and technology system]

<sup>193</sup> CC, State Council 1993, *guanyu jianli shehui zhuyi shichang jingji tizhi ruogan wenti de jue ding* [Decision on certain Issues regarding the Establishment of a Socialist Market Economy], Chapter 8.

<sup>194</sup> CC, State Council 1999, *guanyu jiaqiang jishu chuangxin, fazhan gao keji, shixian chanyehua de jue ding* [Decision for strengthening technological innovation, developing high technology and realizing commercialization].

<sup>195</sup> State Commission for Science and Technology, Commission for Economic Restructuring 1994, *guanyu fabu <shiying shehui zhuyi shichang jingji fazhan, shenhua keji tizhi gaige shishi yaodian> de tongzhi* [Notice concerning the promulgation of the main action points for deepening reform of the science and technology system in accordance with the requirements of the development of the socialist market economy], Retrieved from <http://cpc.people.com.cn/GB/64184/64186/66700/4495209.html>.

development. Chief of these are the national key technology program, and the national program for key projects in basic research. Moreover, planning was complemented with an expansive variety of instruments which sought to prompt institutes and enterprise to engage in research and development in designated priority areas, most important of which has been the national program for the development of high-tech research (see figure).

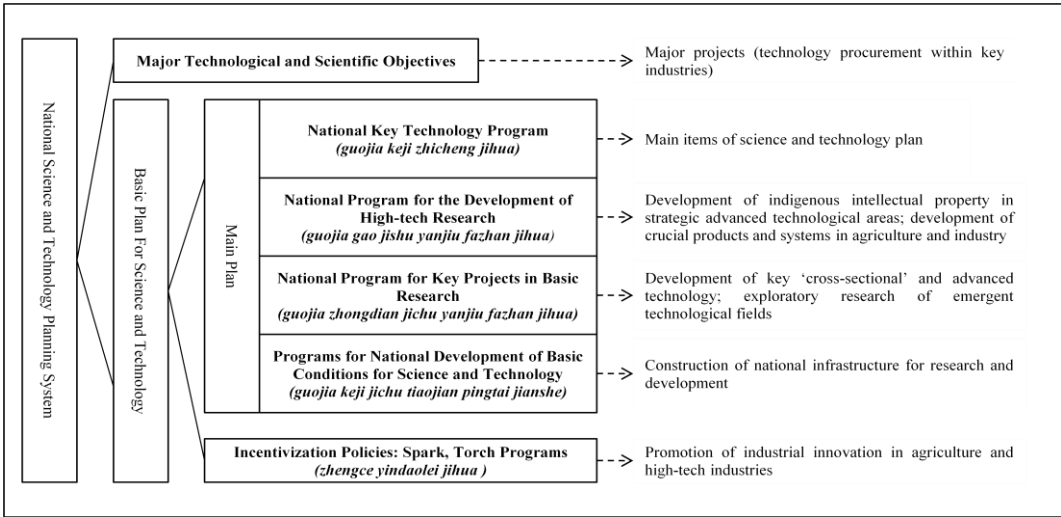


Figure 197: The Chinese system of science and technology planning

Source: Adapted from MOST 2006, *zhongguo kexue jishu fazhan baogao* 2006 [China science and technology development report], Chapter 2

As a result of the reform of science and technology policy, subsidies, infrastructural investments and procurement mechanisms now comprise the major part of government outlays. The state continues to provide the funds for virtually all basic and advanced research (which enterprises is loath to undertake considering the lack of immediate commercial applications, but is nevertheless considered of crucial importance to China's future economic competitiveness). However, within the industrial sphere, the state has limited itself by and large to indirect investment, while enterprise funds the greater part of research and development (see table 16). Contraction of the scope of direct allocation, corporatization and marketization, and an emphasis on promoting industrial innovation have resulted in a gradual shift, with the majority of expenditures for research and development now accounted for by enterprise. Combined with the emphasis on central

Program	Total Funds	
	(yuan million)	of which government funds
<i>National Program for Key Projects in Basic Research</i>	9.71	9.62
<i>National Program for the Development of High-tech Research</i>	8.88	3.44
<i>National Key Technology Program</i>	19.33	5.39
<i>Programs for National Development of Basic Conditions for Science and Technology</i>	3.19	3.19
<i>Incentivization Programs</i>	74.89	1.39
<b>Total</b>	<b>116</b>	<b>23.03</b>

Table 156: Outlays for main research programs and incentivization programs, 2009

Source: MOST, 2010

coordination of scientific and technological efforts, the distribution of R&D related activity calls to mind the government-enterprise nexus which characterizes the developmental NIS.

#### *Diffusion and implementation*

Commercialization of science and technology necessitated the development of novel institutions for technology diffusion and industrial policy measures. State Council's 'Provisional Regulations on Technology Transfer' of 1985 encouraged research institutes and enterprise to actively engage in the sale and procurement of technology within 'technology markets'. Exchange proceeded on a contractual basis and institutes were entitled to retain revenues from technology sales.<sup>196</sup> That same year, China's Patent Law came into effect.<sup>197</sup> Consecutive policies expanded the scope of the technology market to include not only the sale and licensing of patents and research services, but also design, intelligence and intermediary services, as well as technical training (Baark 2001). Official data indicates that, although the volume of trade within the technology market was

<sup>196</sup> State Council, 1985, *guowuyuan guanyu jishu zhuanrang de zanxing guiding* [State Council's provisional regulations on technology transfer], Retrieved from: <http://www.hncd.gov.cn/portal/dzzw/zcfg/zh/webinfo/2004/09/1226649672655059.htm>.

<sup>197</sup> Under the Chinese patenting law, invention patents are valid for 20 years and design and utility patents last 10 years (Kou 2010).

initially marginal, it has consistently accounted for a considerable proportion of extramural expenditure on science and technology. Amongst services traded, research, development and technological services (i.e. design) have comprised the major part,<sup>198</sup> suggesting technology markets have indeed contributed to government's objective of promoting technological diffusion. Nevertheless, actors within China's NIS have generally opted to develop technology internally rather than purchasing it on the market. This preference for autonomous development suggests the failure of these markets to alleviate many of the uncertainties inherent in technological transactions. Chief amongst these is the risk of expropriation. Although China's intellectual property regime was established concurrently with its technology markets, protection of proprietary technology has been notoriously inconsistent (Cao, Simon, and Suttmeier 2009). On the demand side, uncertainty about the technological functionality, lack of expertise in appraising technology and limited absorptive capacity of enterprise may have inhibited the growth of technology markets (OECD 2008).

Judging technology markets incapable of autonomously realizing the desired upturn in the diffusion of technological results, additional measures were taken (Gu 1996). Drawing on precedents in the United States, government proceeded to set up a host of high technology development zones, which provided enterprises engaged in technology-intensive industry with infrastructural support and a variety of fiscal benefits. The Torch Program, established in 1988, has provided the main vehicle for the establishment of these zones. Its objectives were two-fold; in addition to promoting the diffusion and commercialization of scientific and technological research, development zones and science parks were to ensure an increase of the proportion of technology-intensive products within overall industrial output and within export goods in particular.<sup>201</sup> Subsequently, a great number of such development zones have been established. In 2013, at the national level alone, China boasted 88 high-tech development zones and 86 university science parks, targeting a variety of actors and technologies (see

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<sup>198</sup> Between 70-80% in the period 2000-2009, NBS, MOST 2010.

<sup>201</sup> State Science Commission 1991, *guojiaji huoju jihua xiangmu guanli banfa* [Measures for management of national-level objectives of the Torch Program].

table 17).

Name	Number	Supervising Ministry	Function	Objectives
<i>National High-Tech Industrial Development Zone</i>	88 (2011; 35 added since 2007) <sup>202</sup>	Ministry of Science and Technology	Provide infrastructure and fiscal incentives to high-tech enterprises	Intended to foster the development and diffusion of domestic commercial technological capacity through indigenous development and adoption of foreign technology in 11 key areas <sup>203</sup>
<i>National University Science and Technology Parks</i>	86 (2013) <sup>204</sup>	Ministry of Education, Ministry of Science and Technology	Provide tax incentives and subsidies to academic spin-offs	Intended to foster indigenous innovation, develop and diffuse commercial applications for S&T <sup>205</sup>

Table 17: Overview of China's national level science and technology areas

These areas have rapidly evolved to become a key component of China's economy. Nevertheless, while the zones have clearly spurred on the development of technology-intensive industry, it is questionable to what extent they have truly contributed to the objective of integrating China's scientific and industrial spheres. The vast majority of revenues of enterprises in development zones and science parks derive from production, with technological activities comprising only some 7 per cent of overall income. Moreover, average outlays for research and development within the development zones have only been marginally higher than elsewhere (see table 18). Finally, the major part of production has been undertaken by foreign enterprise of Sino-foreign joint

<sup>202</sup> <http://book.smeif.cn/a/dibaqi/tebiebaodao/20110527/304.html>, Accessed February 14, 2012, MOST, 2012

<sup>203</sup> These areas are electronics and telecommunication; biological engineering and new pharmaceuticals; new materials; advanced production; aeronautics; nautical engineering; nuclear (civilian) applications; new energy and energy efficiency; environmental protection; modern agriculture and applied manufacturing and technology in other reforming traditional sectors.

<sup>204</sup> <http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s3335/201001/82289.html>, Accessed February 14, 2012.

<sup>205</sup> [http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe\\_784/200612/14718.html](http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe_784/200612/14718.html), Accessed February 14, 2012.

ventures, which have tended to focus on low-value added activities.<sup>206</sup> It thus appears that the objectives of increased production in technology intensive sectors has detracted from efforts to increase the innovative capacity of domestic enterprise (Yu et al. 2009).

	<b>HTDZs</b>	<b>% of national total</b>
Enterprise (1,000)	57.03	17.5%*
Revenue (yuan billion)	13,342.5	28.2%
<i>from products</i>	79.1%	
<i>from merchandise</i>	8.5%	
<i>from technological activities</i>	6.9%	
<i>misc.</i>	3.5%	
Exports	2,064.6	16.8%
<i>general trade, %</i>	16.4%	
<i>processing with supplied materials</i>	7.2%	
<i>processing with imported materials</i>	69.7%	
Intramural R&D expenditure	226.9	34.7%
Average expenditure on R&D**	2.1%	1.8%†

\*As proportion of enterprises over designated size (annual sales of yuan 20 million and over)

\*\* As proportion of sales revenue; † national average

*Table 168: Indicators of enterprises in high-technology development zones*

Source: Compiled by author from data from MOST 2011, *zhongguo kexue jishu fazhan baogao*

[China science and technology development report], Chapter 13; sts.org.cn; NBS 2012

The institutions for diffusion within the Chinese NIS seem peculiarly at odds with the organization of education and research and development. While the latter demonstrate a drive to nurture competences in selective areas and state coordination, consistent with the developmentalist perspective, the indigenous invention of the technology market is characterized by the absence of central direction or a particular focus. Rather, it seems that the decision to regard technology as a resource prompted government to draw a parallel to the experience of broader economic reform. The 1985 Decision which provided the impetus for the technology market espoused a conviction that the disjuncture

<sup>206</sup> In 2010, foreign enterprise and joint ventures accounted for 65.1 % of total GVIO in high-tech industries (MOST, NBS 2011).

between the S&T system and industry could be surmounted by allowing research institutes to undertake research assignments directly from enterprise, much like sanctioning market production within agriculture and industry resolved shortages for commodities which had been neglected under the command economy.<sup>207</sup> However, this comparison neglected the aforementioned uncertainties which characterize exchange of technology. In the face of the modest volume of technology transactions, reform has sought to motivate actors -research institutes and enterprise alike- to engage autonomously in the development and commercialization of technology. For an answer to this predicament government has looked to the West, rather than the East for inspiration. However, while in the United States and Europe, science parks were established with the explicit objective of facilitating interaction between and within science and industry, in China this qualitative orientation was substituted by an emphasis on a more immediate upturn in productivity in high-technology industry. Combined with the decentralization of fiscal responsibility towards enterprise and research institutes, it is unsurprising that pursuit of the more immediate returns of production has predominated over investment in innovation.

Preoccupation with increasing output has also guided more direct interventions. In order to expedite the modernization of industry, central government promoted technical renovation (*jishu gaizao*), that is, importation of foreign technology to improve backward production facilities.<sup>208</sup> Purchases of turnkey installations within priority areas of industry quickly came to account for a major part of science related expenditure of local governments, particularly in coastal areas which had opened up to foreign trade. Direct purchases were complemented with a 'market for technology' policy, where access to Chinese markets was made conditional on the transfer of foreign technology.<sup>209</sup> However,

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<sup>207</sup> CC 1985, Chapter 3.

<sup>208</sup> CC, State Council 1984, *guanyu pizhuan <yanhai bufen chengshi zuotanhui jiyao> de tongzhi* [Notification regarding the symposium of a portion of coastal cities]. Note that, somewhat confusingly, government differentiates between technological renovation (*jishu gaizao*) and technology introduction (*yingjin jishu*). The former refers to the purchase of turnkey solutions (i.e. machinery), while the latter refers to the purchase of technology (patents, licenses, etc.).

<sup>209</sup> NPC 1979, *zhongwai hezi jingying qiye fa* [Law on Sino-Foreign Joint Ventures]; State Council 1986, *guanyu guli waishang touzi de ruogan guiding* [Some regulations regarding the promotion of foreign

these strategies have not been without difficulties. Core technology for many of China's key strategic industries has not been readily available for purchase due to competitive concerns of foreign enterprise. Moreover, even in instances when technology was shared, advances have been stilted by the limited absorptive capacity of Chinese enterprise (Kim & Mah 2009). The limited success of technological renovation and the market for technology strategy in improving the technological capacities of Chinese enterprise, along with an upturn of concerns over future competitiveness have recently resulted in a shift towards import-substitution. Technology procurement constituted a core element in the latest of government's plans for scientific and technological development. The objectives of procurement policy have been twofold. First, government sought to establish preferential conditions for indigenous enterprises, and secondly it hoped to promote development of proprietary technological standards.<sup>210</sup> This has led to a two-pronged strategy. Some 16 national scientific and technological major objectives (*minkou keji zhongda zhuanxiang*) were defined at the national level. The focus of this program was consistent with the overall substantive priorities of science and technology policy, i.e. the areas of generic industrial technology, industries of national strategic importance and high technology.<sup>211</sup> Although detailed information on expenditures for the objectives is not available, the Ministry of Finance stated that it expected to raise some 700 billion yuan over the course of the projects, over 200 billion of which would be provided by national government.<sup>212</sup>

Many of the relevant industries are dominated by the centrally-managed conglomerates. Far from being mere happenstance, these business groups were considered instrumental to the realization of Chinese technological competitiveness

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investment].

<sup>210</sup> MOST 2005, *guojia zhongchangqi kexue he jishu fazhan guihua gangyao (2006-2020) nian* [Outline for the national medium and long-term plan for the development of science and technology, 2006-2020], Chapter 8.

<sup>211</sup> MOST 2005, *guojia zhongchangqi kexue he jishu fazhan guihua gangyao (2006-2020) nian* [Outline for the national medium and long-term plan for the development of science and technology, 2006-2020], Chapter 4.

<sup>212</sup> MOF 2009, *caizhengbu jieshi minkou keji zhongda zhuanxiang zijin guanli zanxing banfa* [Ministry of Finance explains the temporary measures on the management of funds for the national scientific and technological major objectives], Retrieved from:

[http://www.china.com.cn/policy/txt/2009-09/25/content\\_18597639.htm](http://www.china.com.cn/policy/txt/2009-09/25/content_18597639.htm).



(Nolan 2001; Pei 2005).<sup>213</sup> By centering procurement policies on these industrial conglomerates, government hopes to leverage their considerable market share to create *de facto* international technological standards. Centrally coordinated initiatives have been complemented with local policies. In the wake of the promulgation of the long-term plan, government issued its Measures on Management of the Approval of Indigenous Innovation Products. Subsequently, procurement catalogues extending preferential conditions for domestic manufacturers in government procurement tenders were developed at both national and local levels. Catalogues focused on electronics, ICT, software, new energy and energy-saving technology (McGregor 2011). As an incentivizing instrument, procurement has some advantages over less interventionist approaches. By guaranteeing payment for innovative efforts, procurement eliminates the uncertainties inherent in innovative activity (or rather, transfers associated risks to the state). However, the scope of procurement and related industrial policies has clearly traversed the boundaries of liberalist interpretations, which hold that such measures are appropriate when there exists a pertinent societal need for services or products which is however left unfulfilled by the market (Edquist et al. 2000). Rather, with a view towards ensuring China's future economic competitiveness, government has focused its procurement efforts on indigenous provision of advanced technology, thereby potentially foregoing more immediate needs or more efficient foreign technological alternatives. The strategic orientation of these policies reiterates the developmentalist logic. However, whereas in other East Asian nations, protection of domestic technology-intensive industry was accompanied with a strong emphasis on international competition, development of innovative capacity and indigenous technology<sup>214</sup> in China has rather focused on exploitation of the scale of its domestic markets.

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<sup>213</sup> The 'program for the development of science, technology and education under the tenth five-year plan for national economic and social development stated: "In order to increase the innovative capacity and core competitiveness of enterprise[...] we must promote large enterprise and conglomerate enterprises and let them become the major force within international competition", MOST 2000, *guomin jingji he shehui di shi ge wu nian jihua keji jiaoyu fazhan zhuanxiang guihua*, Chapter 3.

<sup>214</sup> As mentioned previously, high-tech products have come to account for a major portion of Chinese exports, but the indigenous technology component in those exports is generally marginal.

## **Institutional change and patterns of innovative activity within the socialist market economy**

After three decades of reform, China's innovation system has increasingly diverged from the centralized hierarchical science and technology system of the command era. Prior to reform, science was considered a non-productive activity, and no economically meaningful distinction was made between physical instruments of production and the knowledge embedded therein. This changed when the 1985 Decision designated technology a tradable commodity. This conceptual change, along with the development of a market economy, resulted in a profound restructuring of the organization of technological development. Driven by a concern over the perennial rift between science and industry, initial reform of the science and technology system sought to exploit the allocative function of the market. The marketization of research, corporatization of institutes and decentralization of a host of relevant policies closely resembled broader institutional changes. In agreement with the concept of the socialist market economy, this has resulted in a system where government sets out the overall direction for technological development but operational aspects have been largely devolved unto enterprise. More recently technology has come to be considered not merely an economic commodity but a fundamental prerequisite for national economic competitiveness. This is strongly reflected in the latest of government's plans for the development of science and technology, the current preoccupation with technological standard setting and a preponderance of recent policy geared towards the accumulation of a technological repository within designated areas of industry.

The Chinese model of governance, in which the state actively seeks to promote the technological competitiveness of indigenous enterprise, clearly diverges from the liberalist orientation and invokes comparisons to the developmental policy of East Asian counterparts. The current innovation system reflects an understanding of innovation which has departed from the simplistic linear perspective and rather seeks to account for the complex nature of interactions between different relevant actors. Accordingly, the institutions of the socialist science and technology system have evolved into a more expansive constellation which encompasses elements of central coordination, -

administered by the Leading Group for Science, Technology and Education and the various functional ministries- protectionism – in the guise of a variety of fiscal and non-fiscal regulations implemented by the industrial and regional bureaucracies - and incentivization – notably in the form of the various programs established by government from the mid-1980s onward -(see figure 17). The post-1985 organization of innovation-related activity for the most part accorded with a developmentalist logic. Educational reforms have focused on the development of a university system capable of supplying scientists and engineers who can complement and gradually supplant the foreign-educated researchers who still constitute the vanguard of China’s science and technology system. Within research as well, emphasis has been on actively encouraging the formation of crucial intellectual resources, by aiming for breakthroughs within a select set of fundamental industrial technologies and emergent technological fields.

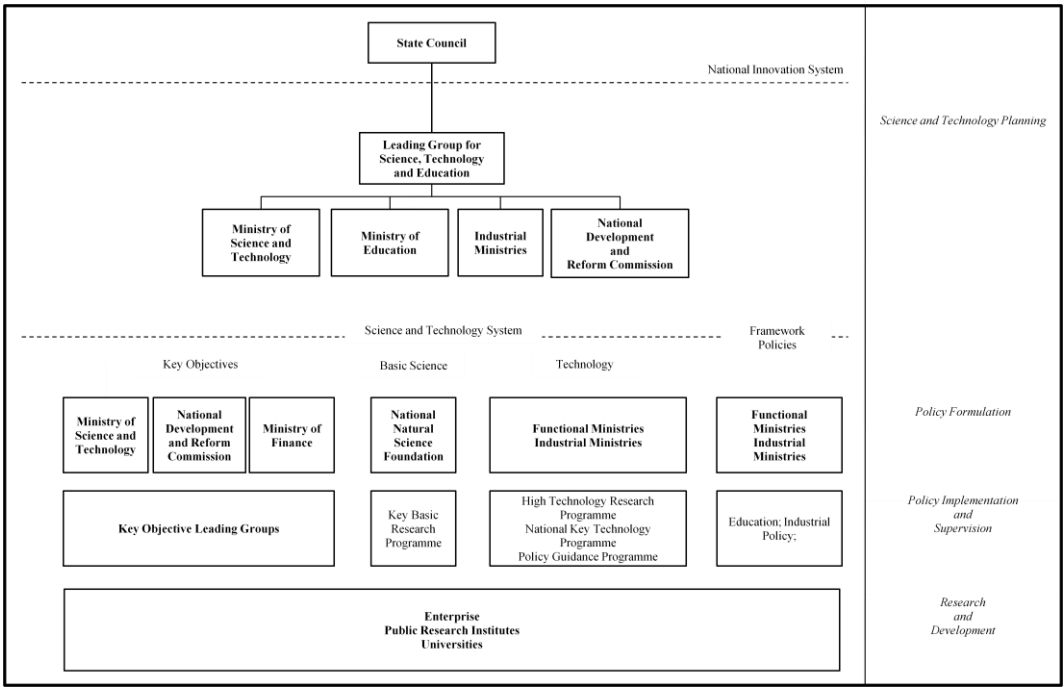


Figure 208: Organization of China’s innovation system, present

Source: Compiled from various sources by author

Technological development has been explicitly geared towards increasing the efficiency and quality of industrial production. To this end, a two-pronged approach of technological

renovation and enterprise-led research has been pursued. Through a combination of industrial policy and fiscal incentives, government has sought to incentivize enterprise to hone its innovative capacities.

Activity	Market-socialist NIS
<i>Education</i>	Impel household investment through liberalization; state nurtures elite S&T talent
<i>Research</i>	Impel enterprise investment through marketization; state funds and research institutes target industrial research within ‘bottleneck’ areas
<i>Development</i>	Undertaken by corporatized research institutes, enterprise, subsidized through S&T parks
<i>Diffusion</i>	Within emerging strategic industry, central SOEs are mandated with implementation by administrative fiat, complemented with industrial policy; traditional industries rely considerably on ‘technological renovation’
<i>Implementation</i>	

Table 17: State-science-industry relations in the market socialist NIS

The result has been a rapid upturn of entrepreneurial R&D. From the turn of the 21<sup>st</sup> century onward, corporate technology-related expenditure has shifted from purchase of foreign technology to autonomous development (figure 18).

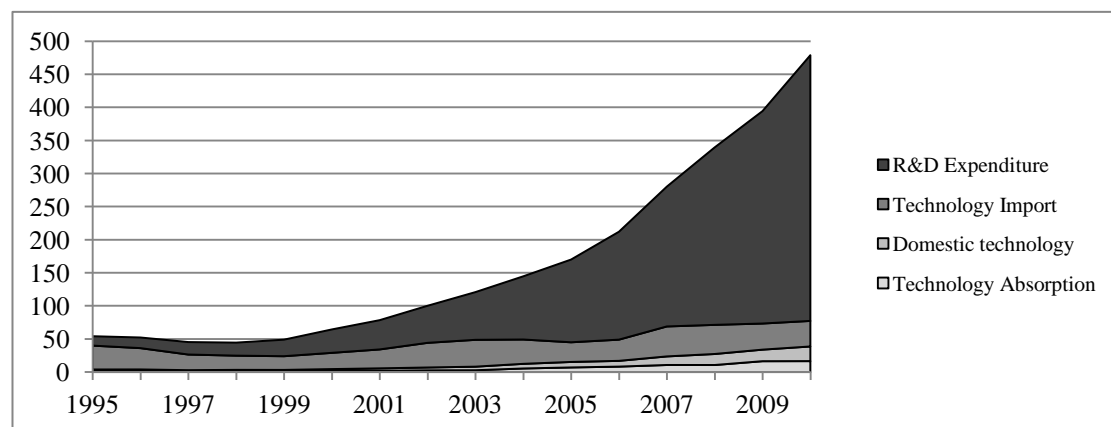


Figure 219: Expenditure on R&D and technology in large and medium-sized enterprise, 1995-2010 (billion yuan)<sup>215</sup>

Source: Compiled from NBS, MOST 2006, 2009, 2010, table 2-1-1; NBS 2011, table 20.44

<sup>215</sup> (Intramural) R&D expenditure relates to efforts autonomously undertaken by enterprise to research and or develop new technology, or improve extant technology. Technology imports comprise the transfer of knowledge (patents, blueprints, other codified intellectual capital) from foreign to domestic constituents. Domestic technology relates to such transfer between Chinese actors. Finally, technology absorption denotes expenses incurred while learning to use novel, externally acquired technology, such as training, consulting etc.

However, the Chinese innovation system also has its peculiarities, which are difficult to reconcile with conventional models of national innovation systems. First, although the public sector plays a major part in the performance of basic research in virtually all national innovation systems (Nelson 1993), the remit of Chinese public research institutes extends to applied research as well. Enterprises, by contrast, have focused almost exclusively on experimental development of existing technologies. Thus while enterprise has indeed come to account for the greatest part of R&D expenditures, it seems unwarranted to conclude that it therefore has become the main innovative actor within the national system (see table 20).

	<b>Total</b>	<b>Basic Research</b>	<b>Applied Research</b>	<b>Experimental Development</b>
Enterprises	<b>73.2%</b>	1.6%	11.6%	86.6%
# LMEs	<b>55.3%</b>	0.8%	6.4%	65.8%
RI	<b>17.2%</b>	40.9%	48.0%	11.1%
HEI	<b>8.1%</b>	53.8%	34.2%	1.5%

*Table 180: Distribution of R&D expenditure by performer, 2009*

Source: NBS, MOST 2009, table 1-6

Two reciprocal factors can be put forward to explain the prevalence of public institutes within the area of applied research. First, due to the CCP's particular interpretation of the appropriate functions of planning and market exchange, the state has insisted on maintaining control over the overall trajectory of technological development. The guidelines of planning are, on the one hand to ensure the commensurability of the progress of Chinese science with major global developments, and on the other to selectively work towards the resolution of perceived industrial bottlenecks and socio-economic pressures. The former notion has indeed been shared by many of the Chinese state's East Asian counterparts, who pursued a two-sided strategy of building competences in advanced upstream technologies, while increasing the technological competence of industry through reverse engineering (Nelson 1993). However, the notion on addressing 'reverse salients'<sup>216</sup> within the national production system is a legacy of

<sup>216</sup> In his seminal study of the development of the electricity network, Hughes (1993) put forward the military

socialist industrial planning, and as such particular to China. The consequence has been an approach towards science planning which is remedial, rather than truly strategic.

The second, arguably more straightforward explanation is that indigenous enterprise simply lacks the requisite competences to engage extensively in applied research. Enterprise investment in R&D proportionate to revenue still remains low in comparison to developed nations (Gu et al. 2009), as does the share of enterprises which systematically engage in research (OECD 2008). Due to the emphasis on consolidation of scientific human capital within the public S&T system and industry's narrow focus on production, research conducted within domestic enterprise has overwhelmingly focused on incremental modifications or variations on existing technology. This in stark contrast to foreign enterprise, which continues to account for the majority of registered inventions (see table 21).

<b>1985-2010</b>	<b>Invention</b>	<b>Utility<sup>217</sup></b>	<b>Design</b>
<i>Domestic</i>	9.9%	50.2%	39.9%
<i>Foreign</i>	75.2%	2.7%	22.2%
<b>2010</b>	<b>Invention</b>	<b>Utility</b>	<b>Design</b>
<i>Domestic</i>	10.77%	46.21%	43.02%
<i>Foreign</i>	74.6%	3.0%	22.43%

*Table 21: Distribution of Chinese patent grants by type and applicant, 1985-2010*

Source: SIPO, 2011

While limited entrepreneurial engagement in applied science clearly separates the Chinese model from the liberalist NIS, such a pattern is not uncharacteristic for developmentalist systems (at least in their incipient stages). Within these models, entrepreneurial efforts tend to be focused rather on building technological competences through a 'reverse trajectory' of purchase, assimilation, modification and indigenous development (Perez & Soete 1988; Westphal et al. 1985). Chinese patterns of

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analogy of 'reverse salients' (referring in its original meaning to that section of an advancing front which lags behind) to explain how such bottlenecks functioned as focal devices for innovative activities aimed at improving the efficiency of the overall system.

<sup>217</sup> Granted for a shorter term than invention patents, the utility model generally covers incremental innovations.

technology-related expenditure seem to acquiesce with this model; the purchase of turnkey installations (i.e. technological renovation) has been accompanied by an increase of intramural R&D (see figure 19).

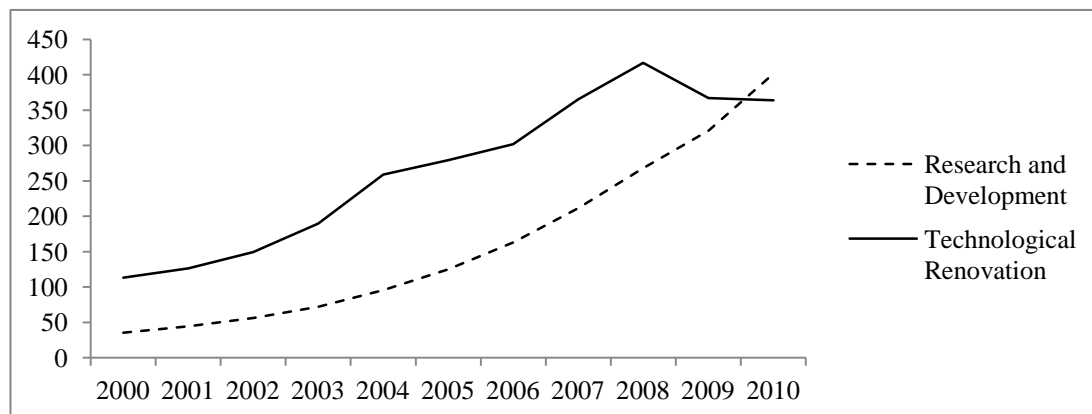


Figure 22: LME expenditure on intramural R&D and technological renovation, 2000-2010 (billion yuan)

Source: NBS, MOST 2006, 2009, 2010, table 2-1-1; NBS 2011, table 20.44

However, further examination into the distribution of expenditures suggests that China's business system has not adhered to the 'reverse trajectory' of competence building. Instead, it appears that technological renovation and research and development have been pursued as substitutes rather than complements. From its incipience in the mid-1980's the policy of technological renovation has been embedded within the operational mandate of state-owned enterprises. Under the contract responsibility system, SOEs were allowed to retain their revenues only after they had obligated government-stipulated objectives for technological renovation.<sup>218</sup> By contrast, private enterprise has been more prone to engage in research and development. As below figures demonstrate, within state-owned enterprise the ratio of outlays for renovation compared to research and development has on average been markedly higher than that in private enterprise. A comparison of output metrics further suggests the limited relevance of research activities within the operations

<sup>218</sup> State Council 1988, *quanmin guosuoyouzhì gongye qiyè chéngbào jīngyíng zérènzhi zàn xíng tiáoli* [Temporary regulations for the contract responsibility system of all industrial state-owned enterprises], Article 8.

of the majority of state-owned enterprises (see table 22).<sup>219</sup>

	<i>Firm average</i> (1000 yuan)				Patent application/ 1000 firms	Revenue from new products (%)
	R&D (intramural)	R&D (extramural)	Technology renovation	Technology acquisition		
SOE	3,735.74	344.94	9,506.91	343.89	3.95	13.04
Private	230.07	11.05	270.32	8.55	14.27	5.75
Foreign	1,561.05	133.80	741.74	417.05	6.05	17.09

*Table 19: Average expenditure on R&D, technology renovation and relevant output metrics (by ownership), 2009*

Source: Calculated from NBS, MOST 2010, tables 2-15, 2-21, 2-39, 2-45, 2-51

To an extent, the discrepancy between public and private enterprise can be accounted for by their distribution over different industries. To wit, due to the pre-reform emphasis on the development of heavy industry, state-ownership has remained concentrated within traditional capital intensive sectors which generally fall within the range of moderately technology-intensive industries. China's high-tech industries, by contrast are predominantly comprised of private enterprise, such as corporatized research institutes or university spin-offs (see table 23).

	R&D /revenue	Renovation /revenue	State share of GVIO
High tech	1.49%	0.58%	8.88%
Medium-High	1.18%	1.12%	23.18%
Medium-Low	0.53%	1.51%	32.77%
Low	0.32%	0.50%	9.18%

Note: Sectoral classification according to ISIC rev.3 technology classification of manufacturing industries into categories based on R&D intensities (OECD, 2011)

*Table 203: Expenditure on R&D and technology acquisition by sector, 2009*

Source: Calculated from NBS, MOST 2010, table 2-18, 2-53; NBS 2010, 14-2, 14-6

<sup>219</sup> Note that the high ratio of revenue from new production among SOEs confirms this postulation since the statistical definition for new products includes products manufactured with new production technology.



Although Chinese patterns of technology-related spending thus conform to the intrinsic characteristics of industry, the essence of the developmentalist model is not to simply follow the general techno-economic features of various industries, but rather to deliberately coordinate the allocation of both physical and intellectual capital to a selective host of strategic industries. The disjunction between spending on research and development and technological renovation within sectors and amongst private and public enterprise suggests a failure to coordinate efforts at industrial modernization with the development of indigenous innovative capacity.

## **Conclusion**

This chapter started out by asking how to best characterize the Chinese system of innovation, and to what extent the pursuit of innovation and technological development has provided a guiding influence for the overall trajectory of institutional reform and economic development. In the preceding sections, I discussed how the hierarchical and centralized S&T system, whose purpose was to support the project of socialist industrialization gradually transformed into a set of institutions which are more sensitive to the complexities of the innovative process (i.e. the iterative and non-linear interrelation between research, development, diffusion and implementation). Comparing the organization of innovation-related activities to the archetypal liberalist and developmentalist models, it was clear that the overall orientation of the current system has considerably more affinity with the latter. Through a combined strategy of devolvement and consolidation, the state has sought to build an indigenous base of human and intellectual capital capable of fulfilling its technological objectives. In part, these goals have been articulated with reference to the experiences of Japan and East Asia's newly industrialized economies (i.e. Korea, Taiwan, Hong Kong and Singapore). A focus on technological leapfrogging (accelerated development within selected fields of technology with a strong foundation in basic science) and reverse development (the building of competences through the assimilation, modification and development of engineering-based technologies) has come to replace the command-era perspective that the intrinsic advantages of socialist planning would suffice to ensure China's eventual

technological competitiveness.

Regardless, institutions for innovation display a variety of peculiar inconsistencies. For example, while in Japan and Korea, development, diffusion and implementation of technological results depended much on coordination within diversified business conglomerates (so-called *keiretsu* and *chaebol*, see Fligstein and Feeland 1995), within China recourse has been taken to market-appending forms such as the technology market and science parks. Although from the 1990s onwards government has pursued a strategy in which state-owned conglomerates are to compose the vanguard of China's internationally competitive economy (Keister 1998; Nolan 2001), SOEs have relied overwhelmingly on a strategy of technological renovation (i.e. the application of turnkey solutions). Poor performance within the area of research and development could be interpreted as an outcome of the path-dependent fissure between public science and industry. Because efforts to integrate the two realms (such as technology markets and science parks) have predominantly targeted the market economy, it seems plausible that they have had but little influence on public enterprise. Second, because of government's insistence on stipulating and coordinating key areas of scientific and technological activity (e.g. industrial bottlenecks and frontier technologies), the public S&T system, comprised of CAS and other central research institutes has continued to undertake the majority of applied research. Finally, incentives for public enterprise and local government have emphasized short-term growth over investments in long-term, cumulative processes of learning and technological specialization.

This last point hints at two other pertinent aspects of China's innovation system. Emphasis on immediate upturns in production explains in part why enterprises within China's science parks and technology development zones have mostly eschewed research and development and instead focused on manufacturing (Yu et al. 2009). The influence of incentives for production is compounded by the tenuous quality of the intellectual property regime, which renders the profitability of innovation highly uncertain. Overall, the particular organization of state planning and market forces has been a result of the Chinese conception of the 'socialist market economy', which reserves for the state the prerogative of identifying the most pressing societal and economic needs, while

‘allocative efficiency’ ought to be ensured through the profit incentive and market competition. Yet, rather than strategically guiding the development of competences within a select host of industries, planning has been predominantly concerned with maintaining the overall industrial orientation of economic development in the face of emerging threats and opportunities within the international economy (such as the appearance of new production regimes) and internal socio-economic developments (such as increasing disparity and the negative externalities of capital- and energy-intensive production). This reactive policy however seems to ignore the cumulative and path-dependent nature of technological development and the organizational requirements of different types of technology.

Lack of a clear overarching objective or regular interaction between China’s innovative actors suggest that the conceptual framework of the innovation system, while illuminating various aspects of innovation policy, fails to provide a coherent explanation for the constellation of economic institutions or the current trajectory of economic growth. Although China has absorbed elements of East Asian developmentalism, these have been embedded within a broader institutional context which has continued to espouse incentives for extensive accumulation, at the expense of the development of the technological and organizational competences which allow for the continual reconfiguration of productive processes. This at once explains the marked discrepancy between central discourse of ‘scientific development’ and actual patterns of accumulation over the last decade, and prompts pressing questions regarding the potential for the shift towards an intensive pattern of accumulation within the constraints of the current institutionalized state-industrialist nexus. Nevertheless, this general picture is contrasted by dynamics within a set of upstream industries, where bureaucratic planning, industrial policy and enterprise activity have effectuated rapid technological development. The final empirical chapter examines in detail the institutional conditions and resultant patterns of allocation of labor and capital, and inter-constituent interaction responsible for this success, and ponders whether they might constitute the blueprint for a novel mode of economic development.

## CHAPTER 6

### A CHINESE INSTITUTIONAL ADVANTAGE? TECHNOLOGY-INSTITUTIONAL RECIPROCITY IN NETWORK INDUSTRY

#### Introduction

In the preceding chapter, it was argued that the considerable upturn of expenditure on research and development and comprehensive change of the institutional framework for innovation have failed to bring about the necessary conditions for a shift towards an intensive pattern of accumulation. The developmentalist model promotes the nurturing of competences and intellectual capital within selected industries through strong reciprocity between state and enterprise, guided by comprehensive planning (Westphal 1990; Wade 2003). These qualities appear to be absent within China. The overall orientation towards extensive accumulation of the state-industrialist nexus has interspersed with the incentives and mechanisms for coordination furnished by China's national innovation system, resulting in a tenuous relationship between scientific and technology planning and the development of the technological competences of industry. Nevertheless, the state has played an important role in shaping patterns of innovative activity, and indeed, contributed to its success. Examination of the distribution of intellectual capital across industry suggests concentration of technological competences within a select set of upstream sectors. An explanation for the development of technological competences within these upstream sectors is sought in the manner in which institutional conditions acquiesced with the technical and organizational demands of the industry.<sup>220</sup> Besides constituting major compartments of the centrally-managed public economy, these industries share other significant commonalities. Based on technical systems characterized by high complexity and integration, they possess certain organizational and

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<sup>220</sup> Indeed, the reciprocity between the organizational-technological characteristics of industry and national institutions for labor, finance and inter-actor relations is a basic assumption within the varieties of capitalism and regulation literatures.

techno-economic characteristics which set them apart from those industries where production is a predominantly autonomous endeavor.

This last empirical chapter provides an analysis of the telecommunications industry, which has been the central locus of innovative activity. This chapter will commence with an exposition of the notion of *industry-institution reciprocity* which underpins explanations of technological performance in both the regulationist and VoC varieties of comparative political economy. The subsequent section provides a brief description of the organizational and technological characteristics which characterize network industries such as telecommunications. This is followed by an overview of the contours of the development of China's telecommunications sector. This development was enabled by the complementary institutional environment which took shape during the reform era. The notion of 'informatization' (*xinxihua*), which gained support amongst top Party-state leadership, rendered development of the telecommunication sector a major imperative for China's economic bureaucracy. However, the institutional configuration of the telecommunications industry was also much influenced by the broader dynamics which determined the relations between China's main economic constituents. Consolidation, plan-based fiscal allocation, and 'orderly competition' (*youxu jingzheng*) within the operations segment has combined with exposure to international competitors and advantageous industrial policy within the equipment segment, providing domestic industry both with the means and incentives to hone its innovative capacity. A similar reciprocity between institutions and organizational characteristics obtains in China's other network industries, and may constitute the basis for a Chinese 'institutional comparative advantage'.

### **Technology, industrial organization and institutions**

Within the previous chapter, aggregate patterns of innovative activity were examined with reference to the framework of national innovation systems. This perspective stipulates a variety of general institutional conditions which furnish incentives for actors to engage in such pertinent activities as research, development, diffusion and implementation, and moreover for coordination between these processes. At least two general approaches can

be outlined. The liberalist variety seeks to ensure that production and exchange of technology (understood as productive intellectual capital, rather than the capital which is its embodiment)<sup>221</sup> can proceed without friction through enhanced property rights, specialized finance and accreditation of human capital and research which alleviates the information paradox.<sup>222</sup> The developmentalist model rather focuses on the expedited establishment of technological competence by directing research and human and physical capital towards the achievement of a select number of planned objectives. However insightful, these approaches only highlight generic issues of the economic and social organization of innovation, and by and large ignore the diversity of methods of production and application amongst different types of technology. As such, the line of enquiry pursued by the NIS literature has centered on issues of whether and to what degree innovation and technological development take place, rather than how innovative activity is distributed across various industries.

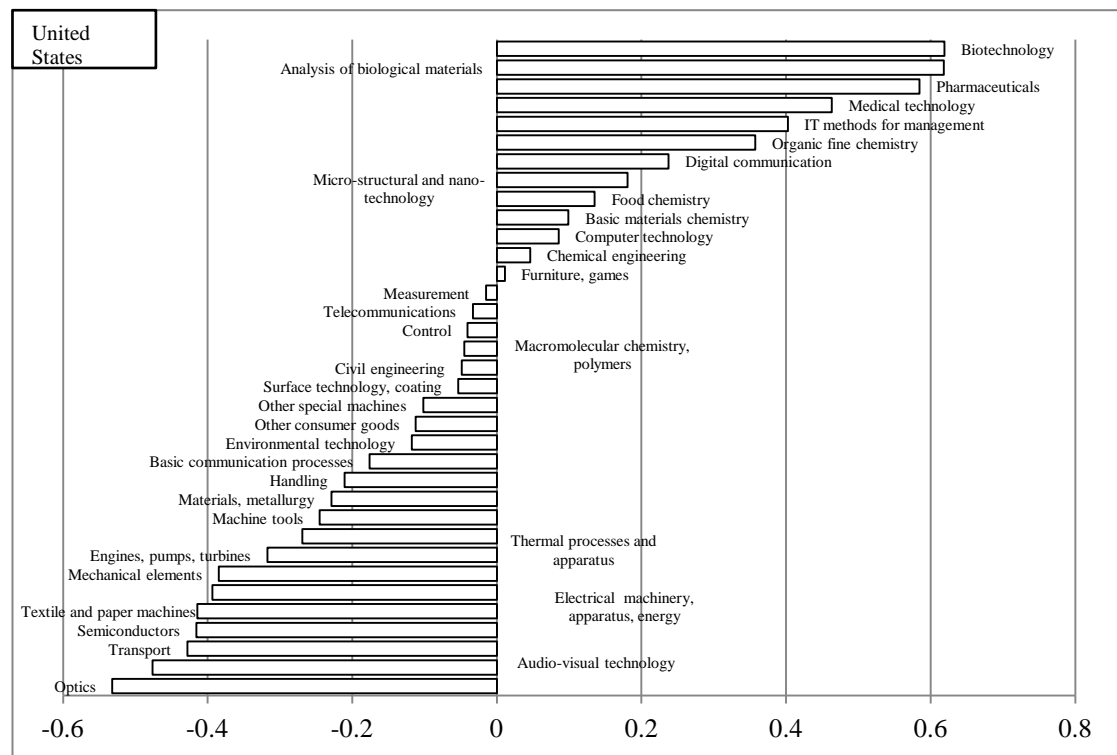
Recently, the literature on comparative capitalism has tended towards an explanation of innovation that emphasizes how technology instills organizational and economic constraints on industry actors (Amable 2000; Boyer 2005; Boyer 1988; Hall & Soskice 2001). For example, the archetypal distinction between liberal and coordinated market economies (LME and CME respectively) within VoC has a counterpart in the dichotomy of radical and incremental technology. Within LMEs coordination between the various subsystems is achieved predominantly through market exchange. Because within markets, affiliation between constituents (based on spot-contracts) tend to be transient and coordination is achieved chiefly by way of the price system, finance, labor and education tend to be of a generic variety, allowing for maximum fungibility. This in turn allows for the rapid organization and dispersion of disparate resources and competences, resulting in an institutional comparative advantage in sectors which rely on the reconfiguration of a varied array of intellectual capital and resources into techniques and products which differ significantly in nature to extant ones (i.e. 'radical innovations', see Dewar & Dutton,

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<sup>221</sup> See Orlikowski, 1992.

<sup>222</sup> To this last point, consider how educational standards, research awards and reputation serve as uncertainty-reducing heuristics when information about the quality of services, trustworthiness of actors is not readily available (Arrow 1963; Podolny 2001).

1986; Freeman, 1995). Within CMEs by contrast, coordination within the economic system is less mediated by the market mechanism and instead effectuated through reciprocal interaction between economic actors. Strong and long-term ties between enterprise, labor and finance prompt specialization in industries where progress builds cumulatively on prior knowledge and change in the technologies and resources utilized within production occurs gradually (i.e. ‘incremental innovation’, *ibid*). The following figures reproduce the results of Hall and Soskice’s 2001 study (using updated data from the World Intellectual Property Organization on patent families<sup>223</sup> granted between 2001 and 2005). The figures map the ‘relative specialization index’<sup>224</sup> of intellectual capital for the U.S. (the quintessential LME) and Germany (the exemplary CME).



<sup>223</sup> Patent families are clusters of patents grouped around a particular technology filed in a variety of nations. Compared to single patents, patent families ought to provide a better indication of national specialization in intellectual capital because the complexity and expenses associated with the application for patent families and greater scrutiny exerted in patent examination ought to deter the inclusion of purely strategic ‘junk patents’.

<sup>224</sup> Specifically, the index indicates the logarithm of the proportion of a country’s patents within industry *i* as a share of total industry *j*, compared to the share of patents within that same industry within the global aggregate of patents.

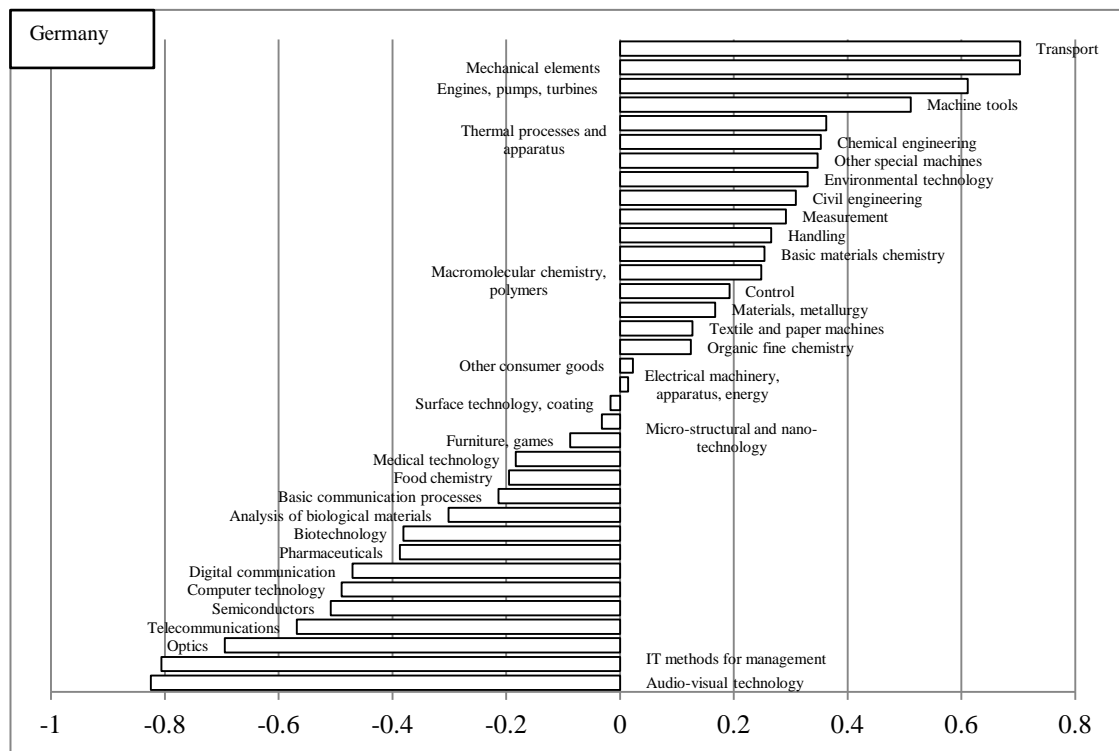


Figure 231: Relative specialization in radically and incrementally developing industries (U.S., Germany), 2001-2005

Source: Compiled by author on basis of (World Intellectual Property Organization 2008, p.55, annex C)

A positive score indicates that enterprises within a nation hold an above-average share of intellectual capital associated with that particular industry, while a negative score denotes the opposite. Patterns of specialization within the U.S. and Germany are largely opposite of one another. Whereas U.S. enterprises agglomerate in ‘radical’ industries, such as biotechnology and ICT, German firms concentrate on incremental sectors such as chemical and mechanical engineering.

The inferred relationships between institutions and technological specificities which impel, and allow for a particular pattern of industrial organization are conceptualized as follows. The predominant characteristics of technology will exert demands on economic organization, and more specifically, industrial organization. Alternatively, the formal institutions for labor, capital and inter-actor alignment will act as a constraint on the patterns of organization which can actually be achieved. Thus, in order for commensurate



degrees of static and dynamic performance<sup>225</sup> to obtain, reciprocity between formal institutions and the technological demands on organization needs to exist (or in the regulationist idiom, “organizational/institutional isomorphism”, Boyer, 2005, p. 545).

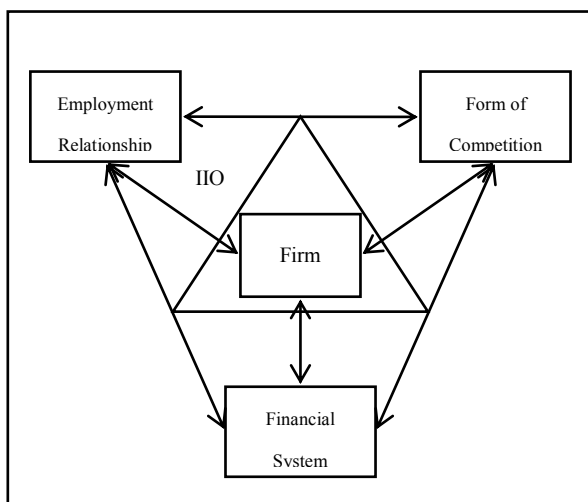


Figure 242: Sectoral patterns of specialization: technological-organizational and organizational-institutional reciprocity

Source: Adapted from Boyer 2005, p. 545

These postulations provide the analytic framework for the subsequent examination into the distribution of innovative activity within the Chinese economy. The Chinese pattern (see figures 38, 39) is neither skewed towards incremental nor radical technology. This is to be expected, considering that China’s mode of regulation, founded upon an idiosyncratic state-industrialist nexus, deviates considerably from both the market-based arrangements of LME and the bureaucracy<sup>226</sup>-appending institutions which characterize the CME. An explanation of China’s patterns of innovative activity thus requires identifications of pertinent socio-economic technological qualities which acquiesce with the Chinese mode of regulation discussed in preceding chapters. Not only does this advance conceptualizations of comparative economic organization by elaborating the taxonomy of organizational-institutional interdependencies beyond the market- and firm-centered variety, but it also provides a potential answer to the pressing question of

<sup>225</sup> Static performance relates to allocative efficiency and x-(in)efficiency (see Leibenstein 1966) while dynamic efficiency relates to technological progress (Schumpeter 2010).

<sup>226</sup> To be understood here in the sense of the Williamsonian dichotomy between market and bureaucracy (i.e. firm), see (Williamson 1991).

whether an intensive mode of accumulation could take shape within the constraints of China's extant economic system.

### The distribution of intellectual capital across China's industries

The previous chapter enumerated the factors detracting from the developmentalist strategy of pursuing creation of a designated set of technological capabilities through close state-industry cooperation. The distribution of intellectual capital amongst China's industries reaffirms that science and technology planning has not sorted its desired effects. Below figures depict the relative specialization of Chinese patents within different classes of technology for the years 2001 and 2009 respectively. Grey bars represent technological areas corresponding to the foci of S&T planning as stated within the 1991 'national outline for the development of science and technology and the eighth five-year plan' (first figure), and the 2001 'program for the development of science, technology and education of the tenth five-year plan for social and economic development (second figure), which first articulated the technological foci which are to form the foundation of China's novel industrial paradigm.<sup>227</sup>

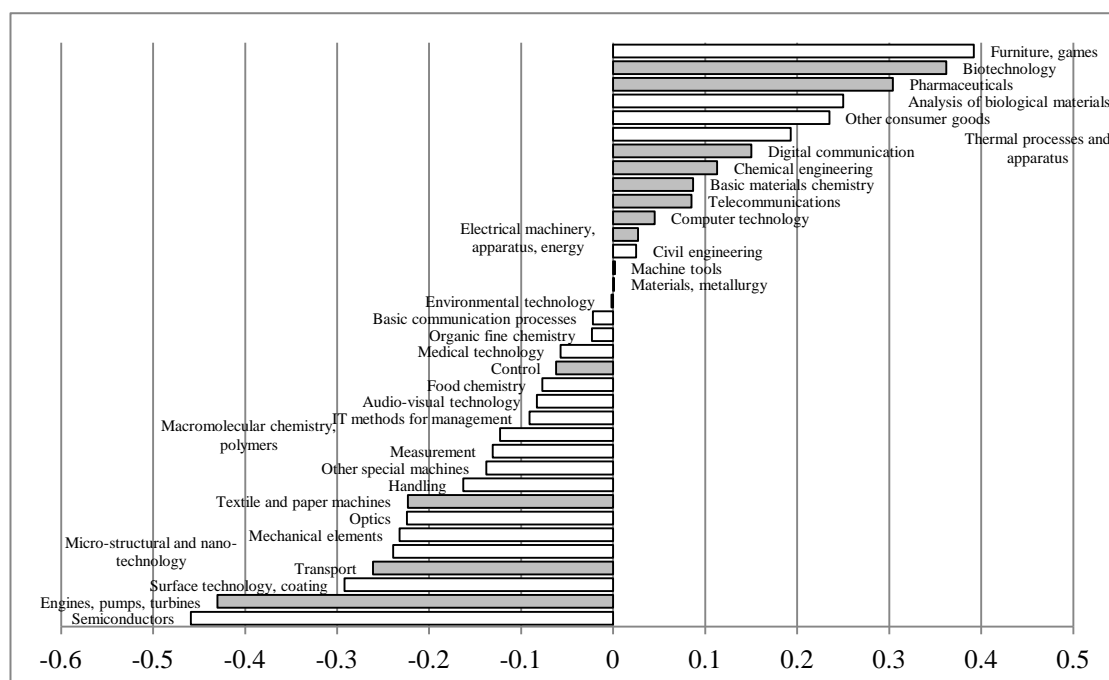


Figure 253: Relative specialization for foreign-oriented patent families, 2001

<sup>227</sup> Technology-industry concordance as per ISIC rev.3 technology classification of manufacturing industries and WIPO 2013, IPC-Technology Concordance Table.

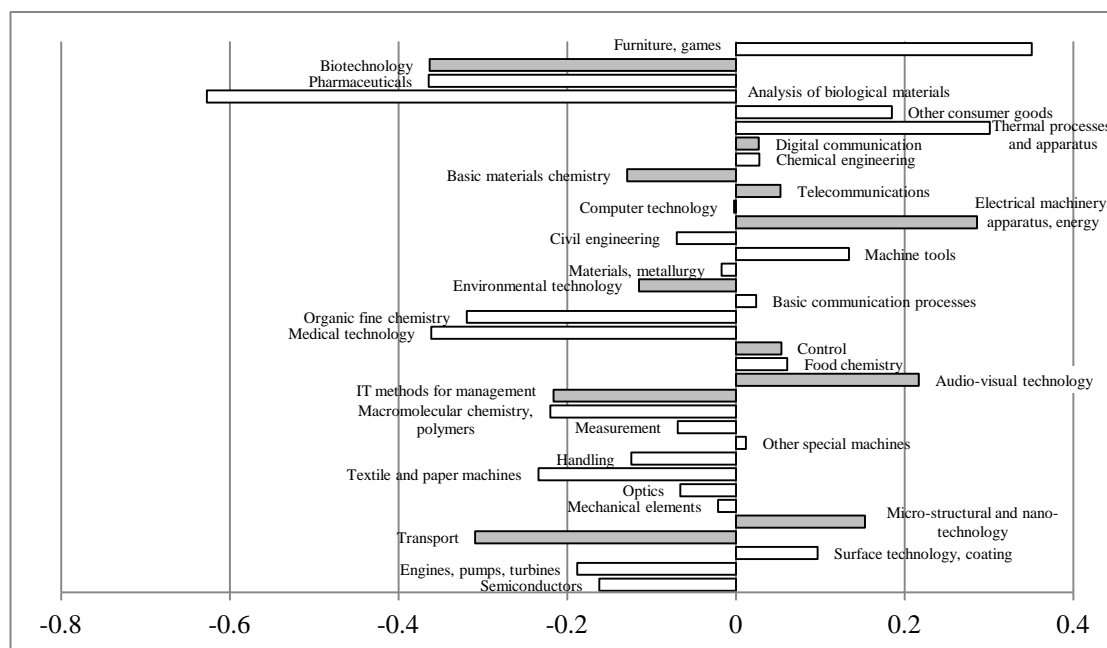
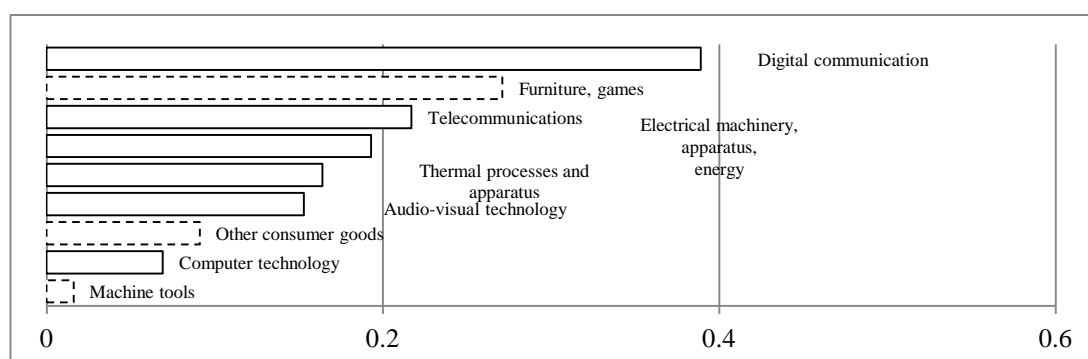


Figure 264: Relative specialization for foreign-oriented patent families, 2009

Source: Calculated from data obtained through private correspondence with WIPO

As can be gleaned from the above figures, patterns of relative specialization have been peculiarly volatile<sup>228</sup> and do not seem to accord with the foci of science and technology planning in any straightforward fashion. This is however not to say that the state doesn't exert considerable influence over the indigenous development of technology. With the exception of certain marginal or miscellaneous categories (furniture, assorted consumer goods, machine tools), accumulation of intellectual capital has been concentrated within spheres of technology which are strongly related to upstream state industry.



<sup>228</sup> Based on the cumulative and path-dependent qualities of learning, knowledge would be expected to develop in consistent and self-reinforcing manner (Breschi et al. 2000; Teece 1996).

Technology Field	Industry
Digital communication; Telecommunications Computer technology; Audio-visual technology	Information and telecommunications technology (office equipment, telecommunications)
Electrical machinery, apparatus, energy	Energy generation
Thermal processes and apparatus	Utilities (i.e. gas, water supply)

Figure 275: Technological specialization in China, 2001-2009 average

A preliminary observation is that innovation appears to cluster around technologies that serve as inputs for centrally controlled network industries. A pertinent question is what factors have resulted in an environment conducive to the development of technological competences within these industries. Deeper understanding of the conditions which have impelled this particular focus requires in-depth consideration of the patterns of interaction between central government, industrial bureaucracy and public and private enterprise. In the subsequent section, focus is on telecommunications, a subsector of information and communication technology (ICT), in which China's comparative share of intellectual capital is the largest. The ICT sector is a rather eclectic composite, comprising a plethora of communications, broadcasting and computing technologies. Although recently, digitalization has led to increasing convergence between these technologies (Casper & Soskice 2011), they are rooted and within China, remain enveloped in disparate technological trajectories and regulatory frameworks (Ma 2009).

Industry	Expenditure on R&D ( million yuan)	R&D Personnel	Patents in Force	Revenue from New Products million yuan)	R&D Expenditure/ Revenue (%)	R&D Personnel/ 100 Employees	Average Patents/ Firm	Revenue from New Products/ Total Revenue (%)
Telecommunication Equipment	26994	99380	15611	426055	3,16	11,12	9,73	49,89
Computers and Office Equipment	661	46861	5016	230094	0,04	2,87	2,99	14,00
Broadcasting and TV Equipment	664	5539	307	8184	1,62	5,53	0,64	20,01
Domestic TV Sets and Radio Receivers	10639	22324	1348	157833	2,72	4,13	1,24	40,32

Table 214; Comparative data on innovation in- and outputs in ICT, 2009

Source: MIIT 2010, NBS 2010, tables 1-1-4, 2-1-3,

While production of computers and components accounts for the largest share of industrial revenue and exports among ICT (MIIT 2010), the telecommunications industry has by far been the most innovative. (table 24).

In accordance with the overall approach of this thesis and the conceptual framework presented above, the following section commences by explicating the organizational and techno-economic qualities particular to network industries such as telecommunications, and then continues to discuss elite conceptions, patterns of accumulation and the mode of regulation within the telecommunications industry.

### **Accounting for the innovative prowess of China's telecommunications industry**

#### *The organizational and techno-economic particularities of network industries*

Network industries differ from conventional industries in that creation and delivery of services or goods necessitates development of complex and integrated technical systems. In principle, such systems have three main components<sup>229</sup> (Davies 1996; Antonelli 1995; Hughes 1993):

- 1) *Terminal systems* provide end-users with a means of receiving (or transmitting) commodities (e.g. data, energy).
- 2) The *transmission system* comprises the network through which the commodity is routed to the receiver. Switching equipment connects any two points between which transmission need occur.
- 3) Finally, a *control system* coordinates traffic flows so as to ensure most efficient use of network capacity.

From these technical features derive (or, until recently were commonly believed to derive)<sup>230</sup> a certain set of specific economic conditions (Armstrong 1997; Antonelli 1995):

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<sup>229</sup> An important distinction between telecommunications and traditional utility services such as energy and water supply being that within the former the flow of traffic is bi- rather than unidirectional.

<sup>230</sup> see Liebenau & Bourdeau de Fontenay, 2006.

- 1) *Economies of density* refer to the mitigating influence of concentrated utilization on the costs of network provision. Per unit costs of delivery are lower when network assets are used to deliver services to a larger number of users.
- 2) On a more general level, *scale economies* are particularly significant in network industries. These derive from the indivisibility (or imperfect divisibility) of technology.<sup>231</sup> A network is comprised of dedicated sub-systems (described above), which are required irrespective of network size. However, in networks of sufficient size, associated expenses can be spread out over a multitude of users, bringing down average costs.
- 3) On account of their specificity and interdependency, capital items cannot be put to alternative use or disposed of in the market. Such *sunk costs* serve as a deterrent to market entry, since initial investments are irrecoverable in case of failure.
- 4) *Network externalities* or *disproportionalities* imply increasing returns to scale on the consumer side. Disproportionality occurs when each additional node in the network yields an increment of utility not only to that constituent, but all users in the network. The property of increasing utility sets ‘many-to-many’ networks such as telecommunications apart from ‘one-to-many’ systems such as broadcasting and energy (although recent developments such as network convergence and smart grid technology are undermining such traditional distinctions). It follows that the greatest social utility is obtained from a network which mutually connects all users.<sup>232</sup>

These techno-economic qualities insert particular organizational demands on processes of production and innovation. The sunk costs of constructing network infrastructure require long-term financial commitment of operators (Davies 1996), which in turn creates a desire for operational stability on part of these actors.<sup>233</sup> Absent constraints on

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<sup>231</sup> Indivisibility refers to the “discreteness of factors” (Schwartzman 1958, p.102) which render it more efficient for such factors to be employed in productive processes of large scale.

<sup>232</sup> Specifically, Metcalfe posited that the value of a connection equates to  $n \cdot (n - 1)$ , supposing a fully meshed network.

<sup>233</sup> The rapid expansion of networks within the U.S. during the 1990s ought to be regarded as an anomaly explicable by 1) ubiquitous supply of equity capital, which allowed enterprises to effectively transfer the risk to investors and 2) misguided investor expectations of exponential returns of the internet economy.

competition, perceived risk may deter industry entry or subsequent investment in development. Compounding this mitigating influence on competition is the need to preserve economies of density and scale economies. If this impels not direct restriction of competition, it at least requires close collaboration on issues of network interconnection and technological standardization amongst rival operators. This holds true to a yet greater degree when network externalities are pervasive. Historically, the aforementioned characteristics have prompted an organization of network industries along lines of a *de jure* monopoly. Despite, or perhaps, because of transition towards more liberal regimes –predominantly within telecommunications and to a degree, energy- within Western nations, the need for regulatory coordination of technological standards and inter-actor alignment has remained (Gentzoglanis & Aravatinos, 2010; Wu, 2010).

The sunk costs associated with network construction and the need for expansive coordination in order to ensure efficient interconnection bear on processes of innovation too. However, the incremental-radical juxtaposition cannot exhaustively describe these implications. Another dichotomy, that of autonomous and systemic innovations is of avail (Teece 1996). Within the ‘science-based’ industries (dominated by U.S. firms), innovation is not only radical, but also largely autonomous. This is to say that innovations constitute discrete technologies, which in principle can be used independent of other productive alignments. Circumstances of low interdependency emphasize flexibility and fungibility, and success in innovation hinges on the capacity for actors with disparate capabilities to coalesce and then quickly disband. Production processes predicated on chemical and industrial engineering<sup>234</sup> (which constitute the vanguard of the German economy) draw on a foundation of common scientific knowledge. Innovation occurs predominantly as actors make independent, predominantly incremental alterations to established production processes. Such innovation can consequently be called semi-autonomous. This requires that enterprises furnish workers with intensive vocational training (i.e. long-term labor contracts) (Dore et al. 1999). Capital is provided either by banks which maintain intimate links with enterprise, or raised by enterprise itself (Porta et al. 1999). The implications of autonomous and semi-autonomous innovation for each of the institutional domains are

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<sup>234</sup> Transport, machine tools etc.

listed in the below table.

	<b>Autonomous</b>	<b>Semi-autonomous</b>
<b>Finance</b>	Equity-based	Bank-based/ industrial
<b>Labor</b>	Flexible employment, fungible competences	Long-term employment, specialized skills
<b>Inter-actor alignment</b>	Market-coordinated	Enterprise-coordinated

*Table 25: Institutions for autonomous, semi-autonomous innovation*

By contrast, within sectors such as telecommunications and energy, innovation is overwhelmingly systemic. Due to the myriad technological components of systems, innovation depends on specialized actors within a wide range of disciplines. The interdependency of these components however necessitates a high degree of coordination (Teece 1996). Interdependency has economic implications too. Innovation within one sub-system often requires adjustments in other parts of the system (Davies 1996). The holistic nature of innovation, compounded by the sunk cost quality of expenses requires a capacity to take on financial risk which often traverses that of banks or single enterprises. Following sections examine how China's institutions for finance, finance and inter-actor alignment were able to furnish conditions under which such coordination and entrepreneurial risk-taking could take place. However, first attention is directed to how changing evaluations of the role of telecommunications by China's political-economic elite provided scope for requisite institutional changes.

### *The telecommunications sector and concepts of control*

Within the socialist template of expedited industrialization, there was but little impetus to the development of the telecommunications system. A mere 0.8% of budgeted outlays for industrial ministries was allocated to the Ministry of Post and Telecommunications under the first five-year plan.<sup>235</sup> Considered a non-productive element of the economy, construction was by and large limited to dedicated networks for bureaucratic and military

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<sup>235</sup> SPC 1952, Chapter 1.



use (Yu & Li-Hua 2010). This appraisal changed first with the introduction of the four modernizations in the early years of reform. Emphasis on the development of heavy industry was believed to have constrained the modernization of energy, telecommunications and logistics. In the face of rapid expansion of production and decentralized exchange, expedited development of these upstream sectors was given a prominent position within economic planning.<sup>236</sup> Foreign direct investment in equipment manufacturing was considered the primary means of technological modernization. However, concerns over national security and the techno-economic particularities of the telecommunications network espoused a conviction that service provision ought to remain under strict central control.<sup>237</sup>

In the early 1990s, the strategic significance of telecommunications was elevated as China's economic administrators came to regard it as a key component of an unfolding 'global technological revolution'.<sup>238</sup> Related to this general perception of changing technological paradigms was the concept of 'informatization' (*xinxihua*). Informatization was understood as a holistic process of techno-economic transformation. Rapid development of information and communication technologies would result both in a shift towards production of information services over traditional processes of manufacturing. Moreover, information would come to comprise a key input in industrial production processes. The notion of informatization entered central discourse in the late 1980s (Mueller & Tan 1997). The subsequent increase in importance of the concept owed no

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<sup>236</sup> State Council 1985, *guomin jingji he shehui fazhan di qi ge wunian jihua (tiyao)* [Outline of the seventh five-year plan for national social and economic development], Chapter 6.

<sup>237</sup> In June 1979, State Council approves of MPT's proposal to recentralize telecommunication administration, stating that: "Post and telecommunications are the Party's and nation's nerve system, and are a vanguard of the economy, they possess the special characteristics and construction of the whole network must proceed in integrated fashion" (Anonymous 2008).

<sup>238</sup> State Council 1990, *guomin jingji he shehui fazhan shi nian guihua he di ba ge wunian jihua (tiyao)* [Outline of the ten-year plan and eight five-year plan for national social and economic development], Chapter 2: "[We must] actively follow the trajectory of global technological revolution, and strenuously obtain new technological results in such high technology areas as biological engineering, electronic messaging, automated control, new materials, new energy sources, aeronautics, nautical engineering, lasers, superconductors and telecommunication. [We must] continue to promote the implementation of the Torch programme, establish high-technology development zones, and push forward the commercialization and industrialization of high technology results and expedite the diffusion towards traditional industries".

doubt much to the influence of Jiang Zemin, who had served at the helm of the Ministry of Electronics Industry (MEI) in the 1980s. Speaking at the national congress of the CCP in 1997, Jiang emphasized the need to “transform and enhance traditional industry, develop emerging and high-technology industry, and push forward with the informatization of the economy”.<sup>239</sup> The following five-year plan provided an expansive enumeration of application for information and communication technology within industrial production and the service sector.<sup>240</sup> In order to execute this strategy of ‘bringing about industrialization through informatization’ (*xinxihua daidong chanyehua*), the state maintained that it was necessary to strictly adhere to centralized planning of technological standards and network construction (Ure & Liang 2000).

Recently, emphasis on international competitiveness has caused the state to focus on a number of strategic emerging industries. Telecommunications technology is considered not only a crucial input for domestic industry but increasingly also an arena for global competition.<sup>241</sup> Nurturing indigenous intellectual property is believed to depend on the promotion of domestic standards, increased investment in research and development and leverage provided by domestic markets.<sup>242</sup> As such, informatization continues to drive industrialization, but the reverse is also held true.

### *Development of the telecommunications industry*

The growth of China’s telecommunication sector has been remarkable, even by Chinese standards. In 1978, the number of telephone subscribers totalled approximately 1.93 million, and a mere 0.2% of the population owned a telephone set (NBS 1988). By 2010, the telephone penetration rate (the number of fixed and mobile telephone sets per 100 persons) had reached 86.4 % and the number of subscribers had risen to 1.15 billion, rendering China’s telephone network the largest in the world (NBS 2012). Between 1990

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<sup>239</sup> Jiang 1997.

<sup>240</sup> State Council 2000, *guomin jingji he shehui fazhan di shi ge wu nian jihua gangyao* [Outline of the tenth five-year plan for national social and economic development], Chapter 4.

<sup>241</sup> State Council 2005, *guojia zhongchangqi kexue he jishu fazhan guihua gangyou (2006-2020 nian)* [Outline for the medium and short-term national development of science and technology], Chapter 6.

<sup>242</sup> State Council 2006, *2006-2020 nian guojia xinxihua fazhan zhanlue* [National strategy for the development of informatization], Chapter 5.

and 2010, the telecommunications industry has grown at an average of 31.3%, almost double the overall average rate of growth of the economy. Currently, revenues from telecommunications services alone make up close to a fifth of the value of the whole service sector (NBS 2012), making the telecommunications sector not only one of China's fastest growing, but also one of the most profitable (DeWoskin 2001).

Growing at a steady but slow pace in the initial phase of reforms, rapid expansion commenced in the 1990s. Introduction of mobile telephony was a primary driver of accelerated growth. While initially high prices of mobile services prohibited wide-spread adoption, lower fixed costs of mobile network construction and enhanced economies of density in comparison to fixed line services agreed with China's geographic conditions.<sup>243</sup> Network expansion in turn promoted economies of scale and provided further growth (NBS, 2012).<sup>245</sup>

### **Technological development and innovation**

Technological development kept steady pace with the overall expansion of the network. Following Deng's reforms, efforts to modernize China's telecommunications infrastructure intensified. Rapid growth fueled demand for transmission and control technologies with greater capacity, prompting increasing convergence with the global technological frontier. As can be gleaned from table 26, the Chinese telecommunications network has incorporated novel technologies at an increasing pace. The catch-up process with the international technological frontier reached a new stage at the turn of the millennium, when China commenced with commercial development of its first proprietary technological standard for mobile communications.

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<sup>243</sup> Lower costs of infrastructure obtain from wireless signal transmission, obviating the need to engage in costly ducting. This is particularly relevant in remote and/or inaccessible areas. On the other hand, enhanced economies of density result from cellular technology, which allow for reuse of the radio frequencies along which signals are carried. For further information on the techno-economic characteristics of telecommunications, see (Rosston & Teece 1995; Armstrong 1997).

<sup>245</sup> The transition from fixed towards mobile technology implied a commensurate redistribution of revenues amongst the two technologies. While in 2001, revenues from fixed line transmission services were slightly higher than those of mobile services, they had fallen to about a third of mobile revenues by 2009 (ITU 2010).

System	Global *	China*	Notes
<b>Fixed</b>			
<i>Micro-wave relay</i>	1947	1964	Reduced costs of (long-distance) transmission
<i>Stored program control switching</i>	1965	1976	Reduced costs of routing; In 1989, China produced its first SPC switch
<i>Fibre optic relay</i>	1983	1990	Reduced costs of (long-distance) transmission
<i>ISDN</i>	1988	1991	Integrated communications system with enhanced data transmission capabilities
<b>Mobile</b>			
<i>TACS</i>	1985	1987	First analog cellular mobile technology
<i>GSM</i>	1991	2001	First digital cellular mobile technology, enhanced efficiency of spectrum usage, roaming capabilities
<i>3G</i>	2000	2009	Enhanced data capabilities; In 2000, China's proprietary standard, TD-SCDMA was approved by the ITU
<i>4G</i>	2006	2011	Enhanced data capabilities; China's proprietary standard, TD-LTE was approved by the ITU in 2010
<b>IP/TCP</b>			
<i>World-wide web</i>	1993	1995	In 1995, China commenced operation of CHINANET
<i>VoIP</i>	1995	1997	

\* Date of first commercial deployment

*Table 226: Global and domestic development of telecommunications technology*

Source: Compiled from various sources by author

In tandem with the rapid expansion of telecommunications services, China developed a thriving telecommunications technology industry. From 1990 to 2009, China's share in global trade in telecommunications and office equipment grew from roughly 1 to 26.2 per cent (WTO 2010). Undeniably, much of this astonishing growth has been the result of direct investment of foreign equipment manufacturers, seeking to profit from comparative labor cost advantages or lured by the prospects of China's burgeoning consumer market. Indeed, in 2009, 62 per cent of industrial output of the telecommunications equipment sector was produced by foreign-invested enterprise (NBS, NDRC, MOST 2010).

Nevertheless, the output of the indigenous telecommunications sector is formidable,

reaching 318 billion yuan in 2009 (USD 46.6 billion). Moreover, indigenous manufacturing is not unequivocally relegated to the low value-added increment of the industry; while overall labor productivity of domestic firms still trails behind that of foreign firms, Chinese manufacturers appear to have been rapidly catching up in the last decade (table 27).

	<b>Labor Productivity</b> (Revenue/ Personnel 1000 yuan)
Domestic (1995)	180.54
Foreign (1995)	406.04
Domestic (2005)	303.88
Foreign (2005)	1292.69
Domestic (2009)	848.07
Foreign (2009)	1036.04

*Table 237: Productivity of foreign and domestic telecommunication equipment manufacturers, 1995-2009*

Source: Compiled from MIIT 2009, 2005; NBS, NDRC, MOST 2010, table 1-2-5

This increase in productivity has been paired with comparatively high expenditure on research and technology acquisition. While domestic enterprise accounted for about a third of industry revenues, its share of expenditure on research and development almost reached two thirds in 2009 (NBS, MOST 2010). Moreover, in contrast to general tendency, state-owned enterprise within equipment manufacturing has foregone investment in ‘technological renovation’ in favor of research and development.<sup>246</sup>

The rapid expansion and modernization of the telecommunications network and the emergence of a domestic equipment manufacturing sector capable of innovation has been underscored by a number of marked successes. In 1989, Zhongxing Telecommunications Equipment (ZTE) developed the ZX-500, China’s first stored program control switch. By the end of the decade, virtually all newly installed switches were produced by domestic

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<sup>246</sup> Note that the apparently marginal presence of state-owned enterprise is attributable to the fact that state-controlled firms within telecommunications have been restructured into limited liability shareholding companies, in which the state nonetheless retains a controlling stake.

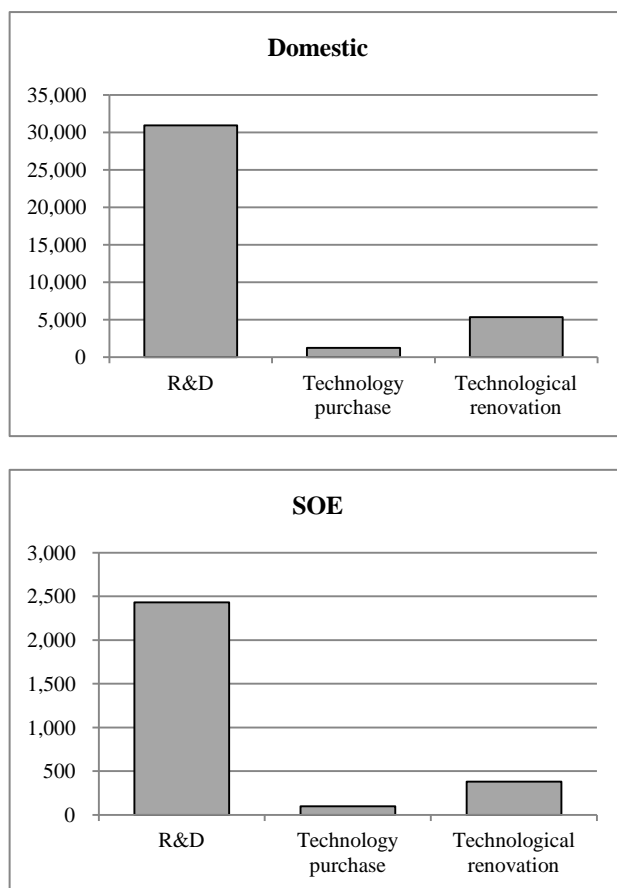


Figure 26: Patterns of technology expenditure in local equipment manufacturers (total), 2009 (million yuan)<sup>247</sup>

Source: MOST, NBS 2010, tables 2-1-4, 2-1-5

manufacturers (Xinlang 2004). In 1995, China Telecom's efforts to merge China's emergent data-networks into a national digital infrastructure culminated in CHINANET. TD-SCDMA, a third generation mobile technology developed primarily by Datang, was recognized as an international standard by the accreditation body of the International Telecommunication Union in 2000. By 2012, China Mobile's TD-SCDMA network boasted over 128 million subscribers. The continuous development of competences in cellular telecommunication technology was attested to by the introduction of TD-LTE, one of three candidate systems for 4G. Given that the general lack of incentivizing and coordinating mechanism within the Chinese economy militates against innovation, what allowed for these successes in the development of systemic technologies? The following

<sup>247</sup> Domestic enterprise includes all Chinese (i.e. non-foreign invested) enterprise other than pure SOEs.

section describes how the institutions which envelop the telecommunications sector allowed for the coordination of human capital, finance and inter-firm coordination conducive to such innovation.

### *Institutional development within the telecommunications sector*

#### **Development and deployment of human capital**

During the communist era, research on telecommunications focused predominantly on the absorption of foreign technologies in order to facilitate the modernization of China's obsolete infrastructure.<sup>248</sup> As such research was delegated to a large degree to industrial institutes. The Ministry of Post and Telecommunications established the Research Institute of Post and Telecommunications (*youdian kexue yanjiuyuan*) in 1957 to oversee functional and regional institutes pertained with both technological research and issues of network planning. While MPT's joint administration of research, infrastructure construction and network operation ensured for strong science-industry reciprocity, the peripheral status of telecommunications within economic planning and bureaucratic volatility hampered progress.<sup>249</sup> Changes to the bureaucratic administration of research commenced in the second half of the 1980s. Under the sixth five-year plan (1981-1985) the development of the electronics industry was designated a national priority. While MPT remained responsible for network construction and operation, production of telecommunications equipment manufacturing became the purview of the Ministry of Machine and Electronics Industry (Ma 2009).<sup>250</sup> Seeking to expedite development of the sector, the ministry pursued a liberal regulatory approach and actively encouraged foreign direct investment. These policies coincided with a drive for network modernization by MPT, which struggled to ensure sufficient capacity due to its outdated infrastructure. Low labor costs and lucrative market prospects prompted an influx of world class equipment

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<sup>248</sup> Science Planning Commission 1956, *1956-1967 nian kexue jishu fazhan yuanying guihua gangyao* [Outline for the Plan on Long-term Development of Science and Technology, 1956-1967], Chapter 7.

<sup>249</sup> Due to the militarization of the economy in the 1960s following the abrogation of Sino-Soviet diplomatic relations, control of the telecommunications network was entrusted to the People's Liberation Army. The MPT was reinstated in 1973 (Anonymous 2008).

<sup>250</sup> Reorganized into the Ministry of Electronics Industry in 1992.

manufacturers, and provided the Chinese telecommunications sector with access to advanced technology. Simultaneously, the upturn in demand for modern equipment, combined with the greater mobility provided by the trends towards corporatization and marketization resulted in a host of public-private initiatives from actors in contiguous industry.

Zhongxing Telecommunications Equipment (ZTE) was incorporated in the Special Economic Zone of Shenzhen in 1985 as a collaboration between plant 691 of the State-owned Military Industry Enterprise, specializing in semi-conductor manufacturing, and Hong-Kong based Yunxing Electronics Trading Company. Initially engaging in value-added assembly of a variety of electronic products, the company decided to establish a research unit in 1986. Through reverse engineering, ZTE succeeded in development of a small capacity digital switch in 1989 (zhongxing tongxun anli yanjiuzu [ZTE case study research] 2012). The first large stored program control switch was jointly produced by Post and Telecommunications Industrial Corporation, a conglomerate of production plants and research institutes owned by MPT (Fan 2006) and the telecommunications research institute of the PLA. Ren Zhengfei, former deputy head of the telecommunications research institute of the PLA, established Huawei in 1988. Initially operating as a trader of telecommunications equipment, its research efforts resulted in the development of its C&C08A switch in 1993. Following Huawei and ZTE, China's third largest equipment manufacturer was established in 1998 when MPT's Research Institute was incorporated as Datang Telecom Technology (Xinlang 2004). Notably, the three enterprises that came to dominate the domestic equipment industry all precipitated out of the public research system, providing them with a fundamental appreciation of the advanced technologies introduced by foreign enterprise. Corporate efforts were appended by research within educational institutes. In tandem with the emergence of indigenous human and intellectual capital as a government priority in mid-1980s, outlays for research and training were increased. Among 39 universities that form the vanguard of the national 985-programme for the advancement of Chinese academia, five operated under the direct control of the Ministry of Industry and Information Technology (MIIT), the latest incarnation of the MPT.



The organization of research and training within the telecommunications industry has facilitated its technological advancement in a number of ways. The initial integration of network construction, operation and technological research within the MPT prevented the onset of a rift between science and industry and provided the ministry with the experience of complex technological coordination. In the 1980s, liberalization of equipment manufacturing, along with the concurrent trend of corporatization of public industry allowed for autonomous association between actors with relevant competences, who heretofore had been obstructed by bureaucratic divisions between sectors. Faced with competition from technologically advanced foreign enterprise, these enterprises initially focused singularly on the development of digital switching technology, which presented a pertinent bottleneck in China's outdated telecommunications network.<sup>251</sup> Successful local enterprise chose to forego joint-ventures with foreign technology leaders in favor of a trajectory of gradual competence building through a process of reverse engineering. Moreover, their ties with public industry or research allowed them to effectively coordinate with the MPT. These companies have continued to allocate large portions of their resources to research and development, diversifying their repositories of intellectual capital and corporate talent in order to provide end-to-end solutions. Concurrently specialized academic departments ensured a steady flow of engineering graduates. Nevertheless, as demonstrated by the development of China's national innovation system, without further conducive conditions, an increase in skilled labor and research is a necessary but not sufficient condition for successful innovation.

### **Corporate investment, industrial policy and government procurement**

As stated previously, due to the relevance of sunk costs and scale economies, systemic innovation necessitates substantial (and largely non-recoverable) investment and long-term financial planning. While often, the requirement to take on financial risks associated with systemic innovation surpasses the capacity of single firms, within the

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<sup>251</sup> Prior to the introduction of the stored program control switch, telephone traffic was routed through centrally controlled mechanical switches, which was both costly and time consuming. Introduction of intelligent switching technology greatly alleviated these costs.

Chinese telecommunications industry (as elsewhere prior to liberalization) regulatory constraints on competition provided operators with rents sufficient to fund rapid expansion and modernization of the network. In 1979, State Council allowed MPT to charge installation fees equivalent to costs to expedite network expansion.<sup>252</sup> In 1982 the ‘three 9-1 remittance’ policy allowed PTBs to retain ninety per cent of revenues from taxes, non-operating income from foreign activities and interest on intra-budget loans. As a result of these and related policies, retained revenues of the operational arm of MPT increase rapidly. Funds obtained in this manner came to comprise the main source of capital for network expansion in the initial stages of network development (Ou 2000, p.94).

Supply-side fiscal transfers were appended by subsidies for the equipment industry. In September of 1993, the Ministry of Finance decided to accelerate the rate of depreciation of switching technology. Such indirect procurement promoted sales of more moderately priced domestic equipment in rural areas in particular, where low population density rendered the limited capacity of switches but a minor concern. In late 1996, MPT convened national operators and equipment manufacturers to participate in a consumer alliance, exhorting alliance members to purchase domestically produced equipment. Subsequently, by end of 1997, 90 per cent of newly installed stored program control exchanges were domestically produced (Xinlang 2004).

Increasing concerns over international competitiveness and the transition towards higher-value added economic activity caused the premises for fiscal allocation to shift to the development of indigenous intellectual capital. In 2004, NDRC, MOST and MII jointly initiated the TD-SCDMA R&D and Industrialization Programme, which extended 798 million yuan to further development of the indigenous standard, research on which had been instigated by Datang (Yu & Li-Hua, 2010). Because much of the fundamental technology had been researched over the course of development of foreign 3G technology,

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<sup>252</sup> MPT, Ministry of Finance, State Pricing Office 1979, *guanyu dui shinei dianhua xinzhuan yonghu shouqu zhuangfei de lianhe tongzhi* [Joint notification on charging costs for new telephone installation to urban subscribers].

TD-SCDMA was realized at a low cost. However, the largest portion of expenses was incurred in construction of the network. Upon completion of field testing, the state mandated China Mobile (which had been given control of China Telecom's mobile network assets), with the roll-out of a national network operating on the national standard. China Mobile extended significant subsidies to Datang, Huawei, ZTE and software companies to develop network and terminal equipment, and value-added services (Anonymous 2009a). Mandated corporate transfers have been complemented by further subsidies for products containing indigenous intellectual property. Following the promulgation of the 2006 'plan for scientific and technological development', the Ministry of Finance and Ministry of Science and Technology issued regulations for procurement by local government and state-owned enterprise of 'indigenous innovation products' (*zizhu chuangxin chanpin*).<sup>253</sup> These regulations prioritize products with Chinese technology within strategic emerging industries.<sup>254</sup> Central government has taken a similar approach. Focus has been on 13 major projects (*guojia zhongda keji zhuanxiang*) co-funded by the state and enterprise, amongst which development of a next-generation wireless broadband infrastructure based on TD-LTE, TD-SCDMA's successor.

High, non-recoverable costs, accompanied with considerable uncertainty pertaining to the appropriability of returns on investment in research and development (Mitchell & Teece 1995) tend to prompt under-financing in systemic technologies (Berggren & Laestadius 2003). Within this context, active government support has served as an indispensable expedient. State investment has come in two guises. Initially, supply-side stimuli focused on the accelerated modernization of the core network. Price subsidies and favorable taxation policy led to the rapid increase of retained earnings of the Directorate General, which utilized this capital to expand network capacity to keep up with rapidly growing demand for telephony services. From the 1990s onwards, public finance has

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<sup>253</sup> Ministry of Finance, Ministry of Science and Technology 2008, *zhizhu chuangxin chanpin zhengfu caigou yusuan guanli banfa* [Measure on management of the budget for government procurement of indigenous innovation products].

<sup>254</sup> Modern office equipment and software; new energy sources and devices; energy-saving and high-efficiency products (McGregor 2011).

increasingly come to emphasize import-substitution. Procurement by upstream state-owned enterprise and local government has been appended by central support for a host of major scientific and technological projects. Product and technology procurement are mutually reinforcing. The latter eliminates uncertainties regarding appropriability of returns of technology (provided of course that functional requirements are met) by creating a market for new products and services (Edquist et al. 2000). At the same time, procurement reduces risks of rent-seeking because returns are conditional on performance of innovation.<sup>255</sup> Product procurement promotes economies of scale in production, and thereby bolsters competitive potential. Notwithstanding the indispensable role of long-term finance, it cannot instill the inter-actor coordination required for systemic innovation. As will be related below, the concurrent existence of a state-controlled upstream sector and liberalized equipment manufacturing industry provided apposite conditions.

### **Vertical and lateral coordination and competition**

Technological systems require a multitude of functionally distinct but interconnected components to interact in regular fashion. Effective deployment and operation of such systems hinges on a capacity for complex coordination. However, development and change of (the various elements within) the system requires an altogether different and heterogeneous set of technological competences. While it is not unimaginable that a single actor possesses both the necessary technological and coordinative capabilities,<sup>256</sup> the increase in the pace of systemic innovation over the last three decades and coalescence of previously separate industries have impelled a shift away from the centralized, monopolistic model of technological development.<sup>257</sup> China's regulatory

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<sup>255</sup> By contrast, corporate subsidies may prompt enterprise to forego innovation in favor of more immediate returns, as seems to be the case in many of China's science and technology parks.

<sup>256</sup> As was indeed the case with AT&T which commenced as a technology company and went on to be the sole network operator in the United States for almost a century (Vieter 1994).

<sup>257</sup> This upturn in systemic innovation was prompted by advances in electronic engineering and subsequently in computer science. Convergence of mobile and fixed telecommunications technology, internet and broadcasting is the result of a standardization of transmission protocols (specifically, TCP/IP) which operates irrespective of the transmission medium (radio wave, optical fiber, etc.).

particularities have combined with intra-industry dynamics to create conditions conducive to this transition within development and implementation of innovation within telecommunications.

#### *Inter-actor alignment in the telecommunications service sector*

A first beneficial condition was the consolidation of control over China's network assets within the Ministry of Post and Telecommunications. Although during the Third Front, control over telecommunications was transferred to the People's Liberation Army, the broad remit of the MPT was reinstated in the late 1970s. Contrary to the general trend towards industrial decentralization, State Council ordained that, due to the particular economic and organizational requirements of the sector, the bureaucratic authority of MPT's line branches was to supersede that of local post and telecommunications bureaus (Mueller & Tan 1997). This approach was maintained throughout the first phase of reforms. Issued in 1988, the 'sixteen character' policy insisted on "overall planning, integration of the lines and branches [of government], the hierarchical division of responsibilities and united construction" (Hexun 2008).<sup>258</sup> Due to continued central administration of network development, tendencies towards fragmentation (which, in light of the importance of interconnection would have been particularly detrimental to telecommunications) and overcapacity which plagued other sectors were averted.

Unfortunately, MPT's monopoly on the provision of telephony services led it to be indifferent to the efficiency with which network expansion occurred (Wu, 2009). A second factor beneficial to technological development has been the gradual introduction of competition within the upstream segment. Central government's emphasis on the accelerated development of telecommunications provided opportunity for other actors to enter the telecommunications market. Despite vehement objection by the MPT, State Council approved of the establishment of two additional operators, China Unicom (*zhongguo liantong*) and Jitong in 1993.<sup>259</sup> In 1995, MPT's regulatory and operational

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<sup>258</sup> This policy covered telecommunications as well as other network industries, see the ninth five-year plan, Chapter 4.

<sup>259</sup> *guowuyuan guanyu tongyi zujian zhongguo lianhe tongxin youxian gongsi de pifu* [State Council official reply: Approval of the establishment of China United Telecommunications Ltd., Co.], December 14, 1993.

responsibilities were officially separated when the latter were invested in the newly established China Telecom. In 1998, the MPT and MEI were merged into the Ministry of Information Industry. A third bureaucratic reform saw the creation of the Ministry of Industry and Information Technology which took on responsibility for all but those upstream industries in which vested bureaucratic interest was particularly strong (Brødsgaard 2010).<sup>260</sup> While MIIT has continued to restrict private and foreign entry into the telecommunications market,<sup>261</sup> practices of preferential treatment of one state-owned operator over the other have abated as the ties between enterprise and (former) industrial ministries have diluted (Fu & Mou, 2010; Wu, 2009). Seeking to establish a condition of ‘orderly competition’ (*youxu jingzheng*), NDRC engaged in a series of bouts of industrial restructuring.<sup>262</sup> The latest round of reorganization, in 2008 saw the formation of three telecom operators (China Unicom, China Mobile and China Telecom). Notwithstanding limited direct competition,<sup>263</sup> the introduction of novel technology has resulted in a significant change in industry structure. As a result of the rapid diffusion of mobile telephony services, China Mobile has now come to replace China Telecom as the largest state-owned operator. This in turn impelled China Telecom to focus increasingly on development of its fixed broadband network (see table 28). Intra-industry dynamics thus

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China Jitong was established by direct order of Zhu Rongji (then Vice-Premier of the State Council). China Unicom was jointly established by the Ministry of Electronics Industry (MEI), Ministry of Railway (MOR) and Ministry of Electric Power (MEP).

<sup>260</sup> Thus, the MIIT failed to integrate the Ministries of Railway and Energy (which were however demoted in official stature) and the State Administration of Radio, Film and Television, which continues to regulate China’s broadcasting industry

<sup>261</sup> Under current regulations, non-state entities seeking to engage in service operation require registered financial assets of at least 100 million yuan for local or regional service operation and assets of at least 1 billion yuan for national service operation. Moreover, the state is to maintain a minimum 51 per cent share in all basic service operators (MIIT 2009, *dianxin yewu jingying xukezheng shenpi guanli banfa* [Measures on the management of the examination and approval of telecommunications service operation licenses]. Voon and Mitchell (2010) note that further liberalization is unlikely as no binding commitment to this effect were made under WTO agreements.

<sup>263</sup> In 2001, China Telecom’s northern fixed line assets were transferred to China Netcom (now China Unicom), while China Telecom retained its assets in the south, effectively creating two regional monopolies. Similarly, China Telecom’s mobile assets were transferred to China Mobile, which currently holds approximately 60 per cent of the mobile market. Pearson (2007) further notes that the experience within telecommunications prompted a like bout of industrial reorganization in the energy industry.

provide another major impetus to technological development

	Fixed		Mobile		Internet	
	Subscribers (million)	Revenue* (billion yuan)	Subscribers (million)	Revenue* (billion yuan)	Subscribers (million)	Revenue* (billion yuan)
China Telecom	163.0	43.34	160.62 (3G: 69.05)	49.17	90.12	87.67
China Mobile			710.3 (3G: 87.9)	364.19		
China Unicom	91.96	43.84	239.31 (3G: 76.46)	126.04	63.87	36.37

Table 248: Distribution of market share in telecommunications, 2011

Source: China Telecom, China Mobile, China Unicom annual report, 2012

At the same time, restrictions on price competition and state-stipulated operational mandates appear to have averted the onset of reckless expansion. Since market distribution is ultimately the prerogative of the state, operators have little to gain from excessive investment in capacity. What evidence is available suggests that capital construction has closely followed demand, limiting the destabilizing effects of technological implementation on short-term supply (see figure 26).

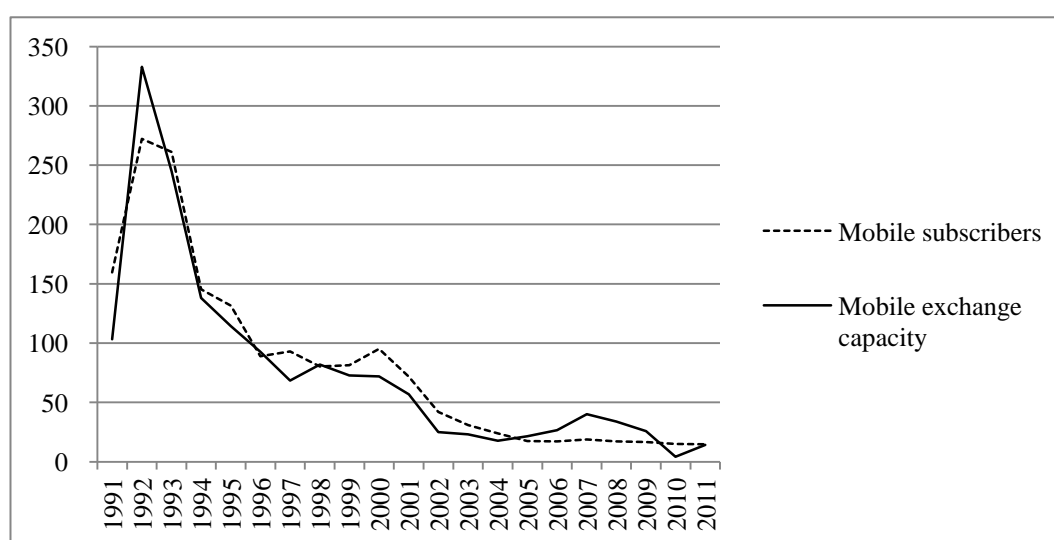


Figure 27: Growth of subscriptions and network capacity (percentage), 1991-2009

Source: Calculated from NBS 2010

### *Inter-actor alignment in the equipment sector*

While within service operations, a condition of ‘orderly competition’ has asserted itself, the situation within equipment manufacturing has been somewhat different. Due to MEI’s initial strategy of attracting foreign direct investment the equipment market quickly became saturated with technologically superior imports, and domestic enterprise was predominantly occupied with trading or low-value added assembly. However, foreign entry was crucial to attraction and absorption of technology. When a small number of domestic enterprises able to engage in the autonomous production of digital switches emerged in the 1990s, the state sought to promote further development through import substitution. Shortly upon its establishment in 1998, MII promulgated a licensing regime covering fixed and mobile systems and terminal equipment as well as internet technology.<sup>264</sup> The ministry has used its regulatory discretion to promote the objective of indigenous innovation by prioritizing licensing of domestic manufacturers. Nevertheless, foreign manufacturers have continued to play an important role in the technological development of China’s telecommunications sector. The disparate specialized skills required for successful development of systemic technology, have prompted intensive cooperation between domestic and foreign enterprise. Within the mobile sector, development and deployment of third and fourth generation technologies have been pushed forward by industry alliances. These consortia comprise local and foreign enterprise with dedicated capabilities in such areas as terminal development, chipset manufacturing and wireless transmission equipment.<sup>265</sup> Within these alliances, China’s service operators have assumed a central position, coordinating the various technological endeavors to ensure compatibility between sub-systems and the existing network (Kwak et al. 2012).

Innovation within network technology is complicated by the need for significant inter-actor coordination, sunk costs and economies of scale. The Chinese amalgamation of market forces and bureaucratic controls has resulted in patterns of organization, within

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<sup>264</sup> MII 1999, *dianxin shebei jinwang shenpi guanli banfa* [Measure for management of approval of network access of telecommunications equipment].

<sup>265</sup> [http://www.zte.com.cn/en/products/wireless/td\\_scdma/200709/t20070926\\_351968.html](http://www.zte.com.cn/en/products/wireless/td_scdma/200709/t20070926_351968.html), accessed October 10, 2013.



and across telecommunications service operation and equipment manufacturing, conducive to technological development. Because control over the network construction and operation remained firmly vested within the industrial bureaucracy even as other industry underwent far-reaching decentralization and marketization, the telecommunications sector did not experience the kind of overinvestment and fragmentation which beset many locally controlled industries. Simultaneously, 'orderly competition' has promoted faster and more efficient expansion of the network and accelerated diffusion of novel technologies. Liberalization of the equipment industry prompted entry of foreign enterprise. While unable to compete, domestic enterprise nevertheless was able to access and absorb advanced technology, resulting in the emergence of indigenous manufacturing capability. Emerging local industry was subsequently supported through preferential industrial regulation and procurement by state-owned service operators. Linkages between the service and equipment sector have been of equal importance for inter-actor coordination. Innovation has been initiated predominantly in the downstream sector, where domestic enterprise competes with advanced foreign manufacturers. Further technological development has been guided by China's telecommunications operators, who coordinate between equipment manufacturers with disparate skills and ensure compatibility through technical specification and standard-setting.

## **Conclusion**

This chapter commenced with an important qualification to the general observation that the state-industrialist emphasis on growth through the addition of fixed capital has detracted from the pursuit of technological development. Examination of the distribution of Chinese intellectual capital demonstrates a comparative specialization in a cluster of technologies closely related to a number of state-controlled network industries. Technology in such industries is systemic (i.e. strong interdependency exists between the many diverse components which make up the overall technology) and characterized by scale economies and sunk costs. Due to these factors, innovation requires a capacity for coordinating the activities of a large number of specialized actors and the ability to

sustain concomitant financial risks over an extended period of time.

An explanation for the ability of the Chinese economic system to engender development of systemic technologies was sought in the manner in which the techno-economic particularities of network industries acquiesced with China's mode of regulation. Pertinent characteristics of the institutional architecture are the concentration of capital within centrally controlled industry, the apparatus of bureaucratic and political instruments of control by which the state seeks to ensure the alignment of managerial and state interests and the institutional focus on industrial organization within China's pillar industries. Nevertheless, without further elaboration of economic incentives to substitute simple investments in fixed capital for the pursuit of innovation, or the development of competences for complex coordination, it remains unclear why China's upstream industry has come to exhibit such dynamism. These issues were further explored within the context of the Chinese telecommunications sector, which has been the primary locus of comparative technological specialization.

Several factors were found to contribute to the rapid expansion and technological development of the telecommunications sector. While under communism, telecommunication was considered a non-productive element of the economy, the discourse of the Four modernizations and subsequently the advent of the notion of informatization, and emphasis on domestic intellectual capital caused key political figures to take an active interest in rapid development of the sector. Regulation of telecommunications services has resulted in a condition of 'orderly competition'. Stringent demarcation of regional and operational boundaries has allowed state-owned operators to accumulate significant retained earnings. Nevertheless, competition between fixed and mobile telephony has forced operators to invest in novel technologies, while simultaneously curbing expansionary tendencies. Industrial investment has been appended by public finance, in the guise of direct research funding, technology procurement (i.e. orders for development of entire systems) and equipment procurement. This has mitigated the financial risks inherent within systemic innovation and ensured economies of scale within equipment manufacturing (see Edquist et al., 2000).

The organization of skilled labor likewise contributed to the innovative capacity of

the telecommunications sector. Initially, research, production of equipment, network construction and operation all fell under the purview of the Ministry of Posts and Telecommunications. This not only ensured reciprocity between research and production, but also provided MPT with experience in technological specification and standardization. The subsequent split and liberalization of equipment manufacturing allowed engineering and managerial staff from research institutes and contiguous industry to focus on market production and development, and provided the mobility to associate with other specialized actors. Entry of foreign enterprise provided access to advanced technology while upstream procurement and state subsidies shielded domestic manufacturers from full global competition.

Finally, regulators and state-owned operators have been instrumental in coordinating the technological initiatives which originate within the equipment segment. Under the header of developing capacities for indigenous innovation, government has actively supported and guided processes of technological standardization. Service operators occupy nodal positions in industry alliances by providing technological specification and arbitrating amongst the various domestic and foreign participants.

From the experience of the telecommunications sector, some general postulations can be made about the necessary reciprocity between institutional conditions and systemic technologies. The requirement for financiers to be intimately familiar with the relevant technologies signifies a large role for industrial actors. At the same time, due to pervasive financial uncertainties and the necessity of long-term commitment, systemic innovation tends to be under-financed by markets (Berggren & Laestadius 2003). As such, investment needs to be appended through state funding. In China, upstream state-owned enterprise has played a strategic role in the financing of systemic innovation. Development of network technologies (terminal, transmission and control systems) requires a diversity of specialized competences. Science-industry linkages for systemic innovation to some degree resemble those of the coordinated market economy, where academic departments and industrial research institutes provide specialist training and scientific research, while enterprises engage in development and production. However, because the technologies embedded in networks are highly interdependent innovation

requires intensive coordination. Through technological specification and standardization, network operators and regulators provide the parameters which ensure the overall compatibility of disparate technologies. Moreover, operators' downstream relationships allow them to intermediate between the various equipment manufacturers and thus serve as nodal points in technological consortia. Thus, a third category of technological development can be added to the distinction introduced at the beginning of this chapter (table 29).

	<b>Autonomous</b>	<b>Semi-autonomous</b>	<b>Systemic</b>
<b>Finance</b>	Equity-based	Bank-based/ industrial	Industrial/state-funded
<b>Labor</b>	Flexible employment, fungible competences	Long-term employment, specialized skills	Cluster-based mobility, specialized skills
<b>Inter-actor alignment</b>	Market-coordinated	Enterprise-coordinated	Enterprise/ state-coordinated alliances

Table 29: Institutions for autonomous, semi-autonomous and systemic innovation

Further in-depth analysis is required to corroborate whether the institutional-industry reciprocity found within China's telecommunications sector obtain in other network industries. However, a cursory examination of research on China's renewable energy sector suggests that many of the factors relevant to development of innovative capacity within telecommunications apply there too. As with telecommunications, interest in technological development commenced with the four modernizations,<sup>266</sup> and increased in the new millennium due to concerns over energy-efficiency and identification of renewable energy as a potential area for leapfrogging.<sup>267</sup> Development of a domestic market for renewable energy technology commenced with the attraction of foreign direct investment and domestic enterprise gradually from low-value added assembly to

<sup>266</sup> State Council 1978, *1978-1985 nian quan guo kexue keji fazhan guihua gangyao (caoan)* [Summary of the outline of the plan for the national development of science and technology], Chapter 3.

<sup>267</sup> State Council 2001, *guomin jingji he shehui fazhan di shi ge wu nian jihua keji jiaoyu fazhan zhuanxiang guihua* [Dedicated program for the development of science, technology and education of the tenth five-year plan for social and economic development].

upstream processes in the industrial chain. Chinese manufacturers were supported through research subsidies and preferential procurement by state-owned energy enterprise which in turn have enjoyed supply-side stimuli to expedite on-grid implementation (Liu & Goldstein, 2013; Wang, Yin, & Li, 2010; Yu, Ji, Zhang, & Chen, 2009).

Nevertheless, these studies also note pervasive problems as policies distort supply and demand conditions, leading to build-up of inefficient capacity. The telecommunications sector has not been impervious to these problems. Due to a low-income domestic market and the concurrent introduction of fourth generation technology abroad, development and implementation of TD-SCDMA has been a commercial failure (Vialle et al. 2012). Such concerns, whether understood as a temporary trade-off between market-equilibrium and dynamic efficiency cast doubt on the long-term feasibility of the Chinese variety of state-developmentalism. Moreover, the question still remains whether the promulgated strategy constitutes an appropriate response to extant social and economic tensions. Although such predictions remain tentative, parallels with the Leninist strategy of expedited industrialization ought to instill considerable reservations about the plausibility of a sustainable variety of the current economic system. These issues will be considered in more detail in the concluding chapter.

## CHAPTER 7

### CONCLUSION

#### **Coordination within the Chinese economy**

The foregoing analysis of China's technological dynamism suggested that the magnitude and rate of growth of the Chinese economy do not necessarily provide an adequate representation of its competitiveness. This holds true for analyses focusing solely on metrics of innovation inputs and output, also. By recasting China's innovation system within the conceptual framework of regulationism, and considering its interdependencies with the broader institutional architecture, it becomes clear that current incentives and instruments of coordination do not only produce a pattern of economic activity that is subject to patent constraints, but also inhibit the potential towards the requisite transition towards an intensive mode of accumulation. If the Chinese economy is to overcome impediments to sustainable growth, it will do so by adoption of a form of social organization of innovation that accommodates the path-dependent parameters of its institutional architecture.

This argument built on an extensive analysis of Chinese economic governance and its innovation system. This thesis commenced by noting how China's rising stature in the global economic order has not been accompanied by a commensurate appreciation of the dynamics and structure of its economic system. Long the purview of specialist researchers, only recently has the Chinese economy come to attract the attention of the field of comparative capitalism, - which seeks to account for the diversity of national economic systems by way of a set of general postulations about the organization of production and exchange. Together, expectationist, transitionalist and universalist perspectives have made important contributions in elucidating respectively the persistent directive influence of China's distinctive cultural and political legacy, the remarkable transience of institutional configurations and certain salient regularities in the interaction between the institutional spheres of labor, finance and inter-actor alignment. Notwithstanding the utility of these insights, the diversity of factors held to account for

the general character of, and overall dynamics within, the Chinese economy begs the question of how the respective literatures account for the totality of interdependent social behaviors and interactions which constitute the economic system proper and the role therein of the various described institutions and dynamics.

Accordingly, the first section of this thesis was occupied with identifying a main coordinating mechanism. While market exchange and network-based affiliation play prominent roles within the organization of production and exchange, it was the state-industrialist nexus which accounted for regularities within and across the distribution of capital, the organization of labor and the coordination of constituent interaction. Maintenance of its particular covenant with society, - premised on continuous and rapid growth - and a preoccupation with expansion of its own economic prowess have furnished the main mandates for the state. Industry seeks to perpetuate and embellish its control over capital through the incessant expansion and utilization of productive capacity. The objectives of state and industry are aligned through joint pursuit of a mode of economic development predicated chiefly on rapid and continuous investment in fixed capital.

### *Conceptual and institutional foundations of the state-industrialist nexus*

The state-industrialist nexus has asserted itself in various manners. The concept of control comprised the cognitive and normative program under which the bureaucratic and industrial spheres coalesce into coherent political-economic configurations. Short from directly determining the outcome of Chinese economic development, the concept of control has delineated the basic discursive parameters wherein policy changes could unfold. The chief immutable principle has been the primacy of the state. Despite the gradual co-option of relevant economic constituents (notably the emergent constituency of private entrepreneurs) the state reserved for itself the prerogative of formal institutional development, with other parties retaining consultative status. Moreover, the concept of macro-control, though ill-articulated, provides the state with extensive direct economic control. Moreover, although the concept of primitive socialist accumulation has given way to the notion of the socialist market economy, the primacy of industrial development

has been harbored through the emphasis on the nurturing of pillar industry and the cultivation of the advanced elements of society.

Under communism, the Fel'dman-Preobrazhensky paradigm furnished the theoretical underpinnings for a strategy of expedited industrialization supported through the extraction of agricultural surplus value. The passing of power from Mao to Deng heralded the departure from the unequivocal prioritization of heavy industry in favor of the construction of a socialist market economy in which planned industrial development would be appended by organic market-driven growth of agriculture and light industry. In trying to construct a concept which acquiesces with the general requirements for productivity, stability and sustainability, - while tending to both the interests of the political establishment and industry - government has promulgated an economic system in which the state is assigned the function of macro-control, - a broad prerogative which in addition to fiscal and monetary control, includes direct allocation of capital to perceived strategic objectives or industrial bottlenecks and ownership of pillar industries - and the organization of production and exchange is considered the purview of enterprise.

Although central influence initially waned due to rapid expansion of the market component, the central state reprised its role in the subsequent era, - when upstream public industry was designated the lifeline of the economy and large state-owned conglomerates the vanguard of globally competitive Chinese enterprise. Concerns over the tenability of extant dynamics of growth have prompted a reorientation from traditional industry towards a set of strategic emerging industries. The development of a novel industrial foundation is believed to hinge on the concerted efforts of upstream central SOEs and state allocation of capital. Although the 'scientific development concept' stresses the need to transit from traditional manufacturing to technology-enhanced production and to assign greater importance to domestic consumption, it also reaffirms the perceived necessity of pervasive state control and the continuing accumulation of industrial capital.

Patterns of accumulation have largely accorded with these precepts. Accumulation under communism was characterized by an excessive rate of transfer from agriculture to industry, precipitating a worsening imbalance between the economic departments. The



expropriation of agricultural surplus value resulted in a lack of consumption power, which in turn resulted in the limited production of producer goods for the primary sector. Because productivity remained stagnant, the agricultural sector could not bear the demands for capital exerted upon it by heavy industry. Yet even after the economic reforms of 1978, accumulation continued to be overwhelmingly extensive. More even sectoral development alleviated the excessive concentration of capital in industry. Due to the swift upturn of market activity within sectors outside the purview of the state capital accrued increasingly within the hands of regional government and non-public actors. High demand for consumption goods, supply of which had been depressed under communism fuelled investment in fixed capital within light industry. This in turn promoted expansion of productive capacity in locally controlled sectors producing inputs for manufacturing. As such, the structural changes which had made possible China's remarkable economic growth over the last four decades were accompanied by the development of a private component which eventually would come to exceed the size of the public sector and the formation of a novel economic constituency of private entrepreneurs.

The patent tendencies towards the decentralization of capital within the first period of reform abated in the mid-1990s. The distribution of capital over national and local government and public and private industry demonstrated a countervailing trend in central-local fiscal relations, and a proportional increase of the concentration of capital within state-owned enterprise. The latter held particularly true for the hundred or so central SOEs (*zhongyang qiye*) that dominate China's lifeline industries. In spite of the changes in the distribution of capital over sectors and actors, accumulation has retained its industrial orientation. Indeed, the proportion of fixed capital formation within overall economic growth has not only been consistently higher in the post-reform era than it was under communism, but has even exhibited a marked increase in recent years. Credit and equity finance has augmented the continuous expansion of productive capacity within the public sector. The appropriation of individual and corporate surplus coincided with the devolution of expenses towards the private sector as state-owned enterprise divested itself of surplus labor and its central function in welfare provision. The relation between the

private and public sector evokes comparisons with the dynamics between the economic departments under communism. However, appropriation of rents originating within the private economy has not brought on the type of sectoral imbalance which impeded growth under communism, but did reinvigorate state industry. The maintenance and expansion of extensive growth under the purview of the state has been possible due to a profound reconfiguration of the mode of regulation. Under communism, transfer of agricultural surplus to industry depended on a centrally administered system of capital allocation. However, the distributive process involved a great number of regional and functional bureaux (a result of the idiosyncratic pattern of *tiao-kuai* organization), whose influence resulted in sub-central bureaucracy's emergence as a separate economic constituent. Systemic bias towards heavy industry was reinforced by the development of an indigenous system of industrial relations. The household registration system segregated the rural and urban workforce. The state cultivated its nexus with the industrial workforce through the institution of the *danwei*, or work unit, which severely curbed the autonomy of industrial labor. Administrative staff was managed by way of the *nomenklatura* system of personnel control. These institutions jointly cultivated a strong hierarchical dependency of labor and management on the Chinese Communist Party.

A first precondition for the upturn of economic activity in the post-communist era was the gradual abolishment of the system of material planning and introduction of market production and exchange. The stringent constraints on agricultural organization and production were allayed through introduction of the household responsibility system. Collective enterprise provided a conduit for excess rural labor, which took to the production of under-supplied consumption goods. The proliferation of non-public enterprise promoted organic growth of upstream state industry, rendering self-raised funds the predominant form of capital. As reforms progressed, the quota system was altogether abandoned in favor of a unified tax system. Abolishment of bureaucratic constraints on production furnished the incentives and scope for the rapid expansion of economic activity.

However, introduction of capitalist institutions did not imply the decline of the state. Rather, changes to the fiscal regime proved instrumental in reasserting central control.

Transition towards a system of standardized taxes obviated the need for the center to engage in protracted negotiation with local government and enterprise over the distribution of revenues and reversed the fiscal dependency of the center on sub-central bureaucracy. State monopolization of upstream industry and the credit and equity markets introduced novel mechanisms of expropriation, resulting in a countervailing trend of consolidation. Due to extensive control over listing and stringent restrictions on non-state ownership of public enterprise, the introduction of shareholder capital has not resulted in the formation of a separate rentier class. Consolidation of the bank sector strengthened central government's influence over credit allocation by severing the ties between provincial administrations and local bank branches, and allowed for corporate and individual savings to be funneled into state-owned enterprise. All in all, rather than effectuating the convergence towards a conventional form of capitalism, the financial mechanisms introduced from the mid-1990s onwards provided a novel means by which state-owned industry could appropriate surplus value. As capital flowed towards public industry, much of the costs of loss-making enterprise, of which those associated with the 'iron rice-bowl' system of urban social welfare, - which constituted the crux of the state-industrial worker nexus -, comprised no small part were devolved unto the private sector. In its stead, the state sought to solidify its ties with the managerial class that had developed in the wake of corporatization and marketization. Through its Leninist bureaucratic apparatus, the Party-state perpetuated relationships of hierarchical dependency with leaders of public industry and regional government, while simultaneously seeking to co-opt private-sector entrepreneurs. The aligning principle between these constituents and the center is the shared interest in the continuous development of industrial production.

Insights into the nature and interrelation of China's institutions can be recast in the universalist conception of economic systems. The Chinese concept of control, wherein the perceived need for active coordination validates extensive state control while routine exchange and production are organized in accordance with the allocative function of the market, subsumes both motives of efficiency and entitlement. Likewise, ownership and exchange are predicated on both economic and political principles. However, within the

hierarchy of institutional principles, status and obligation supersede property and contract. The multiplicity of institutional principles is reflected in the concurrent operation of coordinating mechanisms. However, the scope and influence of market, hierarchical, state and societal coordination are unequal within the overall economy and across its components. Although the larger proportion of production and exchange now occurs within the market economy, development of the formal institutional architecture has been skewed towards the state-controlled component. As a consequence, formal market institutions within the private economy have been substituted with relational mechanisms of association, creating a dyad between market and society. State control over finance, labor and inter-actor alignment has emphasized the fortunes of large conglomerates within the public sector and has more recently extended to private enterprise, also. While encouraging expansion of productive capital, bureaucratic and political instruments simultaneously seek to ensure adherence to principles and directives of the Communist Party. The state-hierarchy nexus dominates China's upstream industries and credit and equity markets, and therefore supersedes the influence of the market-society dyad even though it is less encompassing. The results are schematically presented in below table, itemizing the character of institutional motive, principle and coordinating mechanisms for Chinese capitalism.

		<b>Chinese capitalism</b>
<b>Institutional Motive</b>		Efficiency/ Entitlement
<b>Institutional Principles</b>	<i>Ownership</i>	1.Status 2.Property
	<i>Exchange</i>	1.Obligation 2.Contract
<b>Coordinating Mechanism</b>		1.State-Hierarchy 2.Market-Society

*Table 250: Institutional motives, principles and coordinating mechanisms in the Chinese economy*

### **The Chinese economic system gleaned from the vantage point of comparative capitalism**

The Chinese economy traverses the boundaries of VoC's dichotomy of liberal and

coordinated economies. While the coordinated form is also characterized by intensive ex-market interaction between corporation and state, the normative egalitarian orientation and extensive institutionalized mechanisms for inter-constituent bargaining found within the German system bear but little resemblance to the admixtures of meritocratic and clientelistic principles, and bureaucratic controls and economic incentives that characterize the Chinese economy. Beyond these obvious differences in attributes, the coordinated form within the varieties of capitalism emphasizes how incrementally developing production processes influence institutional configurations by requiring patient capital, long-term employment and cooperation within industry. Within the Chinese economy, the quality of institutions which coordinate labor, capital and inter-actor alignment has depended primarily on the relational hierarchy of center, locality and enterprise, rather than the organizational and technical qualities of production.

However, when typologies considered extend beyond those that focus unambiguously on the economics of institutions and allow for the contemplation of political factors, the discrepancy between the Chinese case and postulated archetypes is assuaged. In particular, the ‘statist’ variety (Amable 2000) captures many of the salient attributes of the Chinese system. Schmidt’s claim that within this model “the state...intervene[s]...by taking the place of the markets through nationalized industries, or by orienting the markets through planning and industrial policies” (2007, pp.5, 6) accords with the concept of macro-control which guides the Chinese state’s intercession in the process of market allocation. Similarly, in expounding the statist French system Schmidt argues that although “adjustment is firm-led in...strategy, investment, production[,] the logic of interaction [between enterprise and state] is one of hierarchical authority rather than joint-decision or unilateral action” (Schmidt, 2002, p. 143). The organization of coordination described by Schmidt is strongly reminiscent of manner in which coordinative authority is deposited between industry and state in the Chinese system.<sup>268</sup> According to Becker, due to such a “hierarchical conception of politics and economy...[t]he direct relation between capital and labor tends to be adversarial” (2009,

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<sup>268</sup> Thus at once corroborating Fligstein and Zhang’s comparison of China and France and repudiating their characterization of both as coordinated market economies.

p.58). Indeed, within the Chinese case, institutional changes, such as the abrogation of the iron-rice bowl in favor of a system furnishing but minimal levels of welfare has put the interests of industrialists before those of workers, which is duly reflected in the greater growth of fixed investment compared to consumption expenditure.

Notwithstanding the patent applicability of statist characterizations of the scope, organization and implications of state coordination, they cannot wholly account for the idiosyncrasies explicated within exceptionalist research. The development of central state, sub-central bureaucracy and public and private industry as China's primary economic actors, as well as their inter-dynamics can only be understood within the context of the organizational precepts and particular constraints of the Leninist-Maoist economic system and the socialist market economy. Organic development of a market component in addition to the state-owned industrialist core resulted in institutional fragmentation - or a 'polymorphous capitalism' (Peck & Zhang 2013) - wherein the boundaries of the various institutional configurations coincide with the respective spheres of influence of the center, provinces and private actors. In accordance with the longstanding bias towards the centrally controlled lifeline industries, monopolistic arrangement of finance and inter-actor alignment has promoted the preservation and expansion of capital under central purview. The mantra of regional economic growth has impelled fierce competition amongst local governments. Promotion of high local investment in industry is further fuelled by the link between fiscal revenues and production. The mode of regulation within private industry has remained highly competitive. In order to alleviate competitive pressures and secure access to finance, enterprise has relied on informal institutions such as *guanxi* and political patronage.

Similarly, the 'statist' archetype does not explain the observed institutional impermanence within the Chinese system. Analysis of the communist-era development exposed a mismatch between an extensive accumulation regime and an essentially monopolistic form of regulation which necessitated a (temporary) shift towards a more extensive institutional arrangement. Liberalization and decentralization mitigated the excessive concentration of capital within industry and instilled more efficacious incentives and mechanisms of coordination, allowing extensive accumulation to continue.

Once the constraints on accumulation exerted by the economic planning system were removed, intensification of fiscal control and industrial protectionism reasserted the authority of the central state, prompting progressive consolidation of capital under SOE control.

The centrality of state coordination within the Chinese economies is not only relevant to understanding of the structure of institutional economies, but is also of avail in further probing the fundamental principles of association among the political-economic elite. The transition from a totalitarian administrative economic system to one where the state intervenes selectively corroborates Przeworski and Limongi's postulation that states are indifferent toward the tradeoff between the size of the bureaucracy and overall economic output, - since both furnish it with rents. If this general imperative can account for the orientation of the Chinese state, the overall mechanism of institutional change and patterns of allocation reflect the logic of its particular state-industrialist nexus, whereby the interests of bureaucratic and industrial actors are aligned through the shared objective of expansion of production. However, the covenant between state and industry which comprises the main coordinating principle within the Chinese economy is but one of a variety of possible arrangements. Within the 'collective capitalism' of 1960s Japan, the hierarchical relation between firm and state was reversed, so that the state supported industrial growth, but its rent-seeking tendencies were contained (Lazonick & O'Sullivan 1995). Systems predicated on a reciprocal state-society or state-market dyads can likewise be postulated (see Boyer 2005, p.536).

The consequentiality of the dynamics between coordinating mechanisms ought to be considered irrespective of whether state, market, hierarchy or society constitutes the dominant principle (ibid), but can be considered particularly relevant in light of the conditionality of the prowess of the state. Since within the political sphere ownership and exchange are founded in principles of obligation and reciprocity, state legitimacy depends ultimately on the support of key constituents. Status and obligation are always the expression of some predetermined relationship between particular constituents. By contrast, property and contract are the meta-principles which allow for the development of economic relationships (Williamson 2000). Stated differently, the institutional

principles of status and obligation are a function of social organization, whereas the principles of property and contract provide the preconditions for organization. Accordingly, whereas a universal and unambiguous logic can be attributed to the coordinating mechanism of the market, the quality of state coordination is expressed only in the relational ordering between economic constituents.

The implications for comparative capitalism is that further effort needs to be expended to articulate, in greater detail, the variety of statist types. While this does not bode well for the prospect of a parsimonious taxonomy of economic systems,<sup>269</sup> the proliferation of ideal types is less of a concern than incomplete understanding of the underlying qualities of institutional motives, principles and coordinating mechanisms. After all, ideal types serve only as a heuristic and cannot provide insights within the regularities and persistent divergences in economic organization.<sup>270</sup> Moreover, the level of detail with which the interaction between coordinating mechanisms needs to be explored is chiefly an empirical issue, depending on the knowledge interests of the researcher. In a more general sense, analysis of the Chinese system suggests the relevance of the political sphere - regardless of the quality of the main coordinating mechanism. Echoing the longstanding understanding of regulationist analysis, the institutions which come to guide and constrain the distribution of capital over actors cannot be considered separate from the interests of these constituents. To insist on the universality of principles of property and contract exist does not mean that their corresponding mechanisms (market and hierarchy) do not favor certain constituents over others. Thus, the relationship between economic classes and their respective interests need to be considered in conjunction with the nature of interdependency of coordinating mechanisms.

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<sup>269</sup> For example, if we consider a taxonomy wherein systems are defined by a hierarchical dyadic relationship between the four coordinating mechanisms (e.g. state-hierarchy, market-society etc.), the number of potential forms is  $4 \times 3 = 12$ . When analysis is extended to a triadic or four-way interdependency, the number of forms increases to  $4 \times 3 \times 2 = 24$  and  $4 \times 3 \times 2 \times 1 = 24$  respectively, or 24.

<sup>270</sup> The different understandings the two approaches can provide reflect the differences in the modes of inference. The taxonomical exercise employs relational thinking, whereas the analysis of intra-system dynamics requires logical thought. Logical thought considers universality and consistency in terms of categories and relationships between them, whereas relational thinking turns on assertions of the sameness or likeness of one phenomenon to another.



## **Innovation and institutional advantage**

The state-industrialist nexus has resulted in perpetuation of a predominantly extensive accumulation regime. The intrinsic limitations of a pattern of growth based on the continuous expansion of extant production processes have bared themselves within the Chinese economy in the form of increasing socio-economic divergence, tendencies towards over-accumulation in a variety of industries (primarily controlled by local government) and increasing strain on natural resources and the ecology. Recent exacerbation of these phenomena has provoked a redefinition of the concept of control. The 'scientific development concept' seeks to supplant the current emphasis on capital-intensive, traditional processes of manufacturing with a focus on technology-intensive, higher-valued added production and services. Yet, in spite of a marked upturn of expenditure on research and development and the gradual formation of an extensive institutional framework for innovation, progress towards the development of capacity for indigenous innovation - considered a prerequisite for the transition towards a sustainable model of economic growth - has been limited. Examination of the arrangement of the constituent activities of innovation demonstrated the persistence of an entrenched bifurcation between science and industry, obstructing the commercial development and diffusion of technological advances and, vice-versa, preventing the guiding influence of market demand on technological endeavors to fully assert itself. Due to the peculiar combination of pervasive state influence and lack of intensive coordination between upstream and downstream actors, the Chinese system of innovation can neither be considered liberalist, nor truly developmentalist. The intrinsic obstacles within the innovation system are compounded by the overall orientation of the mode of regulation. Market-appending institutions such as science parks, intended to allay the economic uncertainties and coordinative complexities of innovation have been more instrumental in promoting the expansion of industrial output. In similar fashion, state-controlled industry has continued to rely extensively on the procurement of turnkey installations, - even as institutional conditions render them better equipped to engage in innovation than their private sector counterparts. This antagonism between the institutions of China's innovation system and those coordinating the allocation of capital, labor and inter-actor

alignment effectuates a divergence between the conceptual template for the transition towards intensive accumulation and actual patterns of economic development.

Reciprocity between the innovation system and the economic system proper constitutes an indispensable link in the analysis of the technological links of national systems. The national innovation systems literature has focused on the matters of incentivization and coordination which, due to the peculiar economic qualities of the knowledge/ technology commodity, cannot be exhaustively understood merely by consideration of the institutions which direct common processes of production and exchange. In proffering the liberal and developmentalist constellations, NIS has provided a systematic description of the institutional configurations which provide the requisite conditions for innovation. However, conceptual framework of NIS does not explain why different systems exhibit distinctively varied capacities to sustain such necessary institutions, which may account for charges that the literature is a-theoretical. This hiatus is addressed by examination of how coordinating mechanisms and corresponding institutional domains within economic systems promote or detract from the establishment of institutions for innovation.<sup>271</sup>

The reciprocity between the mode of regulation and institutions for innovation was reiterated in analysis of the substantive distribution of innovative activity. Since development of technologies employed in disparate processes of production differ in regard of their epistemic continuity and the interdependency of its components, innovation in dissimilar industries calls for diverging incentives and methods of coordination. Examination of the Chinese distribution of intellectual capital demonstrated specialization in technologies closely related to a set of state-dominated network industries. Closer inspection of the institutions enveloping the telecommunications sector (which has exhibited both rapid growth and particular technological dynamism) revealed a set of general conditions which accorded with the particular organizational and economic demands for systemic innovation. Within the service segment, central ownership, moderate competition and joint industry and state funding provided scope and

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<sup>271</sup> For a similar perspective, see Amable (Amable, 2000; with Barre, & Boyer, 1998) on social systems of innovation and production.

motivation for network development. Exposure to foreign competition and selective industrial policy compelled domestic equipment manufacturers to hone their skills without having to instantly match the superior technology of global manufacturers. The technological and operational experience and broad remit of the industrial bureaucracy allowed for intensive coordination between the two segments. The manner in which the commensurability of the organizational and technological characteristics of the telecommunications industry and its institutional environment account for the innovative prowess of the sector corroborate the concept of industry-institution reciprocity, central to the varieties of capitalism.

However this analysis refutes the functionalist assumption that the superordinate objective of economic efficiency will without fail impel a co-evolutionary process of industrial-institutional alignment. Within the Chinese case, complementarity rather appears to have been the serendipitous outcome of a process of institutional reconfiguration intended to perpetuate accumulation within the confines of a predetermined socio-economic hierarchy.

### **The prospects for China's economic system**

In this thesis, China's economic development from 1978 onwards has been explained in terms of a process of institutional reconfiguration which brought the communist mode of regulation in line with the extensive quality of accumulation. This general alignment has not prevented the onset of grave economic and social tensions, resulting from the inherent destabilizing tendencies of extensive accumulation and compounded by institutional changes promoting the consolidation of capital within state-controlled industry. For one, the current covenant between state and industrialists has neither encompassed peasants nor workers, leading to increasing socio-economic disparity and undermining stability and institutional legitimacy. Recent attempts to address these issues by direct central fiscal transfers seem as yet incommensurate with the institutionalized pattern of promoting growth through continuous addition to the fixed capital stock. The same bias undermines developmentalist efforts to promote innovation amongst China's enterprises. The lack of compensatory mechanisms for disenfranchised constituents and the dearth of

indigenous innovation are mutually reinforcing. On the one hand, without a continuous increase in relative surplus value (i.e. output per worker) a more egalitarian distribution of income seems unlikely, while on the other, the lack of individual purchasing power subverts intentions to transit towards a model of growth premised on domestic consumption.

The institution-industry reciprocity which obtains in China's network industries suggests potential for a model of development premised on market-competition supplemented by government coordination of and investment in infrastructure and development of systems technology.<sup>272</sup> The recent development of indigenous telecommunications standards and rapid proliferation of China's photovoltaic industry provide a marked contrast with the general dearth of capacities for indigenous innovation and emphasis on low-value added assembly. However it is unlikely these achievements will mitigate social and economic pressures in the short term. The commercial failure of TD-SCDMA demonstrates how technological advancement sometimes comes at the expense of allocative efficiency because it can imply foregoing adoption of more mature technological alternatives which at some present point are more efficient (Rosenberg 1983). In this sense, pursuit of dynamic efficiency (i.e. the increase of productivity over time) can aggravate, rather than alleviate economic imbalances.

Additional qualifications exist. Due to the capital-intensive nature of network industries, their expansion is unlikely to directly result in pervasive wage increases. A balance between investment and consumption may be struck through social redistribution of an increment of the relative surplus value derived through increases in productivity.<sup>273</sup> A second precondition for stable intensive accumulation is persistent, high demand.

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<sup>272</sup> Amable (2003) comes to a similar conclusion on basis of analysis of the public economic varieties of France, Germany and the Netherlands, stating that these countries tend to perform strongly in sectors linked to public infrastructure.

<sup>273</sup> Aglietta's study of U.S. Fordism (2000) described an economic system in which an entrepreneurial class combined Taylorist organization of production with standardized manufacturing (enabled by the introduction of novel technology), allowing for an increase of surplus value. In tandem a 'mode of regulation' developed which ensured stable employment and increasing wages, serving to simultaneously attenuate tensions between capital and labor and create a pattern of mass consumption, ensuring a steady market for the system's standardized output.

Demand for network commodities and services such as energy, logistics and telecommunications is to a large extent derivative of production in downstream industry. Without a commensurate upturn in demand for consumption goods - produced predominantly within the private sector - the concentration of resources into state-owned upstream will cause over-accumulation, risking re-occurrence of the type of economic destabilization that characterized the Leninist-Maoist economy. Effectuating greater demand requires adjustment between the ratios of industrial investment and consumption expenditure, promoting a more egalitarian distribution of surplus value.<sup>274</sup> Given the resilience of the state-industrialist nexus, reconfiguration of the wage-labor nexus can be expected to prove highly problematic. Undeniably, the Party-state's capacity for engendering institutional change is formidable, as attested to by the continuing trajectory of reform. However, if the Chinese economic system is to benefit from the full dynamism of the private sector and actualize the upturn in productivity required to capitalize on its particular institution-industry reciprocity, current exclusivist, clientelistic arrangements have to be substituted by unambiguously enforced property rights and labor contracts. These would motivate industrialists to focus on efficient production and innovation rather than rent-seeking and expropriation of low-cost labor, and provide workers with incentives to engage in training by ensuring appropriate compensation. Although not necessarily entailing retraction of the prerogatives of economic planning and ownership of China's economic lifelines, this would attenuate the political control the state can assert over private market actors. Thus, in order to support ongoing economic development, the Party-state may well have to compromise its other immutable principle, that of political hegemony.

### **Key contributions**

This thesis was motivated by a desire to advance appreciation of the drivers and dynamics of the Chinese economic system and innovation through reconciliation of diverging theoretical approaches and substantive foci. In particular, two disparities were held to

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<sup>274</sup> *Ceteris paribus*, diminishing marginal utility would imply lesser demand for consumption goods when the income distribution is heavily skewed.

impede more profound understanding. A lack of conversance between the literatures examining economic governance and innovation left the former ill-suited to explain endogenous dynamics in the organization of production and its implications for performance, while the latter has largely neglected the manner in which national capacities for innovation are shaped by the incentives and coordinating influences of the broader institutional architecture.

With regards to the dynamics of economic development, analysis of the accumulation regimes and modes of regulation during and following communism explains why, after 1978, economic growth proceeded rapidly without this acceleration demanding a commensurate shift from extensive to intensive accumulation. Likewise, this analysis suggests that the current crisis of Chinese development is of a fundamentally different nature than that which brought on the end of the planned economy. The transition towards intensive accumulation is however beset by constraints, resulting from the entrenched dynamic of investment-driven growth. China's institutions for labor, finance and inter-actor alignment, promoting the shared interest of the state and industrialists in the expansion of production, are ill-equipped to deal with the uncertainty and requirements for coordination inherent within innovation. This observation casts serious doubts on arguments that an upturn in expenditure on research and development and a narrow focus on the innovation system will provide the conditions for sustainable growth. Rather, this research corroborates the importance of reciprocity between industry and institutional architecture. Although within the Chinese case, such reciprocity has not come about as a result of invisible market coordination, success within the telecommunications sector nevertheless stresses the necessity of alignment between the attributes of technology and the organization of finance, labor and the inter-actor coordination.

A second concern related to the discrepancy between generalist and specialist interpretations of Chinese governance. Whereas the former is prone to neglect phenomena inconsistent with the focal scope of purportedly general theories, the latter - finding its *raison d'être* in the explanation of indigenous phenomena- is primed to overstate the relevance of salient idiosyncrasies. Through unpacking of the assumptions

of the varieties of capitalism framework, which has made a particularly strong impact on the broader comparative literature, this thesis was able to provide an analysis that allowed for consideration of the generic attributes of economic systems and the interdependencies thereof. This allowed for examination of how general requirements for coordinating mechanisms - which distribute capital over processes and actors – have been in part fulfilled by idiosyncratic institutions, as well as how Western institutions introduced over the course of reforms have been assimilated within a distinct mode of regulation. The Chinese hybrid - combining a Leninist institutional legacy with a variety of market instruments - has resulted in a set of institutional dynamics defying conventional expectations of capitalist patterns of development.

For one, institutional developments have not progressed uniformly, but rather have unfolded in a manner corresponding to the distribution of control over China's chief economic constituents (central state and enterprise/ local government and enterprise/ private enterprise), resulting in a 'variegated capitalism'. Additionally, processes of corporatization, privatization and marketization commencing in the mid-1990s have often been interpreted as a continuation of a 'liberalization programme', but rather consolidated the state-industrialist nexus. Nor have market reforms prompted a self-reinforcing dynamic, spelling the gradual irrelevance of the state. The respective scopes of bureaucratic control and decentralized market have oscillated in iterative manner, in line with the patently political foundations of Chinese economic organization (i.e. based on notions of entitlement and obligation). Institutional change has been initiated at the central level to ensure the continuation of the state-industrialist nexus while seeking to tend to normative and functional requirements. Gleaned from such a perspective, currently proposed changes to the effect of a redistribution of capital to laborers/ the private sector are a logical consequence of the political and economic strain of the preceding period of centralization.

### **Limitations and avenues for future research**

The analysis presented in this thesis scrutinized concepts and causal relationships proffered by the existing literature and sought to retain and reconcile those deemed

plausible and relevant. Care was taken to account for idiosyncratic institutions and patterns of social organization (identified by exceptionalist studies) by way of a framework built on universal attributes of economic systems (institutional motives, principles and so on), generic components (labor, capital and technology) and common dynamics (reciprocity, complementarity, antagonism etc.). As such, the universalist and exceptionalist approaches were demonstrated to be mutually appending. Universalist frameworks promote the complete articulation of economic systems within a common idiom and safeguard against a lack of theoretical degrees of freedom. Exceptionalist approaches aid in uncovering the implicit assumptions inherent in much purportedly universalist theoretical constructs.

Nevertheless, the embeddedness of China's economic system within the global economy could be further explored. Undeniably, export and foreign direct investments have played major roles in China's development, by expanding demand such as to stave off over-accumulation within industry (Boyer 2012) and introducing additional financial and technological capital. However, 'opening up' (*kai fang*) has been deemed less consequential to the current institutional configuration of the Chinese system and patterns of capital distribution than 'reform' (*gaige*) and consequently, emphasis has been on the latter. In spite of China's progressive integration into the world economy, - of which its accession to the World Trade Organization in 2001 is perhaps the most salient indicator - the state has steadfastly resisted any external pressures to retract its extensive control over industry and finance. Nevertheless, the interrelation between domestic developments and reforms, global economic dynamics and China's behavior within foreign markets forms a key part of a complete understanding of the Chinese economic system, and the intent is for this analysis to be subsequently expanded to deal with these issues in due manner. Another dimension considered in-depth by certain varieties of comparative capitalism is that of business organization. Unfortunately, knowledge of the internal structure and dynamics of Chinese enterprise is incomplete and eclectic, particularly in areas of key interest such as central state-owned enterprise.

This thesis provides ample opportunities for ensuing research. Additional analysis of the Chinese economy, focused on the aforementioned issues will complement and expand



the research presented here, contributing to a more encompassing interpretation. A related issue which clearly merits further consideration is the future development of the Chinese economy and the potential trajectories along which this development may occur. Another fruitful avenue relates to the further theoretical and conceptual specification of comparative frameworks. This research chose to forego taxonomical comparison on basis of predefined, discrete constellations of the institutional domains (along the lines of VoC) in favor of an emphasis on the interrelation between the coordinating mechanisms of state, market, hierarchy and society. The focus of ensuing work within this area would be on further specification of regularities in dynamics and outcomes of different hierarchies of coordinating mechanisms, and further exploration of their efficiency-related and political implications (i.e. the manner in which different configurations champion the interests of different constituents). Such efforts will not only further promote a more profound appreciation of the workings and global implications of the Chinese economy, but likewise contribute to the advancement of the comparative study of capitalism.

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