

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

The Political Economy of Growth Models and
Macroeconomic Imbalances
in Advanced Democracies

by

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A thesis submitted to the Department of Government of the
London School of Economics for the degree of Doctor of
Philosophy, London, September 2016



Declaration

I certify that the thesis I have presented for examination for the PhD degree of the London School of Economics and Political Science is solely my own work with the exception of Chapter 4, which was co-authored with David Soskice. I certify that the theoretical, empirical and written work for this chapter was equally divided between both authors. The copyright of this thesis rests with the author. Quotation from it is permitted, provided that full acknowledgement is made. This thesis may not be reproduced without my prior written consent. I warrant that this authorisation does not, to the best of my belief, infringe the rights of any third party.

I declare that my thesis consists of 61,140 words.

For Sara

Acknowledgements

I would like to start by thanking my supervisors David Soskice and Dominik Hangartner. The thesis would have been significantly weaker without their contributions, and the last four years much less enjoyable without their friendship and support.

I am greatly indebted to David as both a supervisor and a co-author. He has been a huge intellectual inspiration and his tireless encouragement and guidance along this journey have been truly invaluable. I hope that the wide-ranging and enlightening discussions that have characterised our time at the LSE together can continue for years to come. His boundless enthusiasm and curiosity about the world mean I always leave his office more excited about research (and a little smarter) than when I went in.

Dominik's methodological expertise has infinitely improved the papers in the thesis. He has also been a wonderful help in navigating the thorny world of early career researching. I am especially grateful to him for his assistance in getting the second chapter of this thesis published. I would never have got it over the line without his considerable input at each stage of the process.

Special thanks also need to be extended to Wendy Carlin. From my first days as an undergraduate she has always been in my corner. She is the type of academic I aspire to be—curious, hardworking, caring, and fiercely intelligent. She played many roles during my years as a doctoral student—unofficial supervisor, boss, teacher, and friend. She also educated me in the delicate art of ‘managing David Soskice’, which is one life skill that I shall continue to use well beyond the PhD.

I am also grateful to Peter A. Hall, Andy Eggers, Bob Hancké, and Jonathan Hopkin for useful discussions about my research, and would like to extend my gratitude to the Economic and Social Research Council for funding my postgraduate studies.

The experience of writing a PhD thesis can sometimes be difficult and can often be lonely. Luckily for me, I have gone through the process with a fantastic group of friends. Their intellectual achievements gave me something to aspire to, and their generosity of spirit and sense of humour made working alongside them a real pleasure. I would like to thank them for many things.

Jack, for being one step ahead of me in the PhD process and being so generous with his time in providing advice and guidance, and for always being on hand to discuss with humour and insight the world outside of academia. Laura, for always knowing the right time to down tools and head to the pub, and for doing more than anyone else to get us all together outside the office. Øyvind, for his unstinting enthusiasm for research, which can't help but rub off on others, and for teaching me that life really can be super hyggelig. Nic, for bringing a little Italian charm to my time at the LSE, converting me to espressos, and being a first-class holiday planner. And finally Jessie, for being a wonderful and generous person who always puts others first, and for some truly memorable rants.

Turning to my family, I would like to thank my mum for providing so much love and support over my lifetime and for always believing in me. I would like to thank my brother Chris and his wife Abby for helping make my life outside the PhD so rich and enjoyable, and of course, for all the braais. It would be remiss not to also thank my late father, who started me on this journey and whose work ethic and intellectual accomplishments I have always strived to emulate.

This thesis is dedicated with deepest love to my most important champion, my wife Sara. On the days when it all felt hopeless, she was always there to prop me up and push me forward. Her warmth, humour and friendship have provided the platform for all of my successes throughout the last four years. I could not have completed this thesis without her unending love and support, and for that I will always be grateful to her.

Abstract

The papers in this thesis explore the political economy of the macroeconomic imbalances that built up between advanced democracies during the Great Moderation—the long period of reduced macroeconomic volatility and low inflation that preceded the global financial crisis. More specifically, the papers focus on the role that institutions, political systems and electoral politics, and government demand-side policies played in the imbalances that emerged in real exchange rates and current accounts. The first paper uses macroeconomic data on OECD economies and a new statistical approach for causal inference in observational studies—the synthetic control method—to estimate the effect of the European Monetary Union (EMU) on the current account balances of individual member states. This counterfactuals approach provides strong evidence that the introduction of the EMU was responsible for the divergence in current account balances among member states. The second paper maps out the complex set of interrelationships between varieties of capitalism, growth models, and political systems in advanced democracies. The new approach to comparative political economy developed in the paper provides a theoretical framework that helps explain the current account divergence between the export-led coordinated market economies (CMEs) and the consumption-led liberal market economies (LMEs). The third paper brings modern macroeconomics back into political science. The paper sets out a suite of simple open economy macroeconomic models and uses them to show how governments pursuing different demand-side policies can result in persistent current account imbalances between countries within a system of independent inflation-targeting central banking. Taken together, the papers provide important theoretical arguments and empirical evidence on the political (and political economic) drivers of the macroeconomic imbalances that were a crucial precursor to the worst global economic downturn since the Great Depression of the 1930s.

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List of abbreviations

AD	Aggregate Demand
AIAS	Amsterdam Institute for Advanced Labour Studies
AMECO	Annual Macro-Economic Database
CME	Coordinated Market Economy
CPE	Comparative Political Economy
CRA	Community Reinvestment Act
DG ECFIN	Directorate-General for Economic and Financial Affairs
DSGE	Dynamic Stochastic General Equilibrium
EC	European Commission
ECB	European Central Bank
EMU	European Monetary Union
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GVA	Gross Value Added
ICT	Information and Communications Technology
ICTWSS	Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts
ILO	International Labour Office
IMF	International Monetary Fund
IRS	International Risk Sharing
IS	Investment–Saving
ISIC	International Standard Industrial Classification
LME	Liberal Market Economy
MIP	Macroeconomic Imbalances Procedure
MME	Mixed Market Economy

MSPE	Mean Squared Prediction Error
NAIRU	Non-Accelerating Inflation Rate of Unemployment
NK	New Keynesian
OECD	Organisation for Economic Co-operation and Development
PPP	Purchasing Power Parity
PR	Proportional Representation
SGP	Stability and Growth Pact
SMD	Single Member District
SNB	Swiss National Bank
SUTVA	Single Unit Treatment Value Assumption
SWIID	Standardized World Income Inequality Database
UIP	Uncovered Interest Parity
UK	United Kingdom
US	United States
WZB	Wissenschaftszentrum Berlin für Sozialforschung

List of ISO country codes

OECD (2011b) 3-digit ISO country codes:

Australia	AUS
Austria	AUT
Belgium	BEL
Canada	CAN
Chile	CHL
Denmark	DNK
Finland	FIN
France	FRA
Germany	DEU
Greece	GRC
Hungary	HUN
Ireland	IRL
Israel	ISR
Italy	ITA
Japan	JPN
Korea	KOR
Mexico	MEX
Netherlands	NLD
New Zealand	NZL
Norway	NOR
Poland	POL
Portugal	PRT
Spain	ESP
Sweden	SWE
Switzerland	CHE
Turkey	TUR
United Kingdom	GBR
United States	USA

Introduction

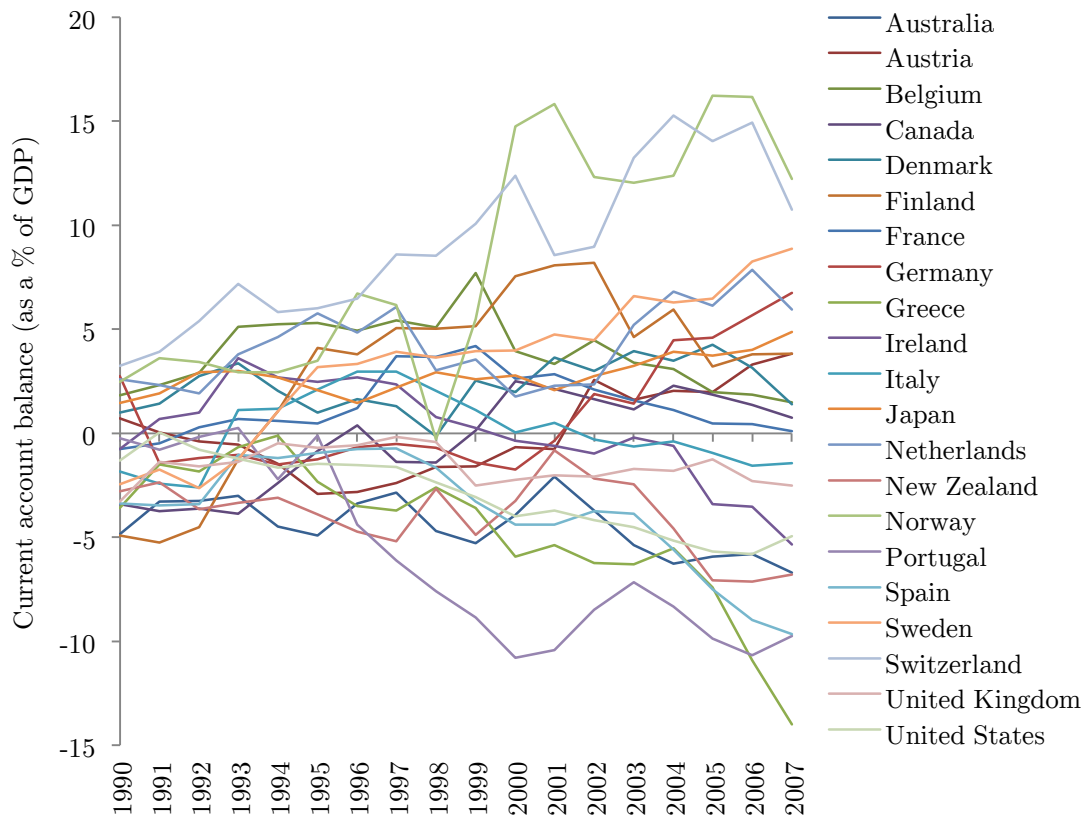
In my view ... it is impossible to understand this crisis without reference to the global imbalances in trade and capital flows that began in the latter half of the 1990s

—Ben S. Bernanke, Chairperson of the Federal Reserve, March 10th 2009 ^{*}

The global financial crisis of 2008-09 culminated in the most severe economic downturn in the world economy since the Great Depression of the 1930s. As Chairperson Ben Bernanke's words at the nadir of the crisis illustrate, policymakers and economists were quick to point the finger of blame at the current account imbalances that built up between countries prior to the crisis. Figure 1.1 shows the current account balances of a selection of OECD countries between 1990 and 2007. We can see that current account balances diverged markedly from the second half of the 1990s onwards. There is also a distinct geographical nature to the divide; the northern European economies and Japan accumulated surpluses and the southern European and English-speaking economies accumulated deficits.

^{*} This excerpt is taken from Chairperson Ben S. Bernanke's speech *Financial Reform to Address Systemic Risk*, which was delivered at the Council on Foreign Relations in Washington D.C. on March 10th 2009. Bernanke was the Chairperson of the Federal Reserve between February 2006 and February 2014. This quote also appears in Obstfeld and Rogoff (2009, 131).

Figure 1.1. Current account balances, 1990-2007



Source: IMF World Economic Outlook, April 2016.

Current account imbalances made the global economy vulnerable to a financial crisis as they reflected the build up of dangerous asset price and credit bubbles and left current account deficit countries vulnerable to a *sudden stop* in external financing (Blanchard and Milesi-Ferretti 2012; Lane 2012; Lane and Milesi-Ferretti 2012). Lane and Milesi-Ferretti (2012, 252) find strong empirical evidence that current account balances in run-up to the crisis “widened beyond levels consistent with sustainable medium-term positions”.

The central objective of my thesis is to better understand the current account imbalances that emerged during the Great Moderation—the long period of reduced macroeconomic volatility and low inflation that preceded the global financial crisis in 2008-09.[†] This is important from an academic perspective, as there are many interesting puzzles still to be solved, such as: Why did the external balances of the north and south of the Eurozone diverge during the 2000s? Why did the English-

[†] The term Great Moderation was first introduced by Stock and Watson (2002).

speaking countries amass substantial deficits and the northern European countries amass substantial surpluses during the Great Moderation? Why did governments and central banks not intervene to dampen down the current account imbalances? Why did some countries have consistently superior export performance than others? Better understanding the imbalances is also crucial for policymaking in the post-crisis world. If politicians and policymakers are to take steps to avoid dangerous imbalances re-emerging in the future, then they first need a clear idea of the *political* and *economic* mechanisms that drove the pre-crisis imbalances.

The economic drivers of the imbalances have been thoroughly studied (Blanchard and Milesi-Ferretti 2012; Lane 2012; Obstfeld 2012; Obstfeld and Rogoff 2009), but the political (and political economic) drivers of the imbalances have received much less attention. The three papers in my thesis (Chapters 2, 3 and 4) aim to fill this gap in the literature by looking at the role of *institutions*, *political systems and electoral politics* and *government demand-side policies* in the imbalances. The remainder of the introduction looks at each of these three areas in turn and discusses how they intersect with the papers in my thesis, as well as highlighting the points of departure of my work from the previous literature. The following subsections emphasise two notable features of the thesis: (i) it uses a range of methods—Chapter 2 uses advanced quantitative methods; Chapter 3 uses mixed methods; and Chapter 4 uses formal modelling; and (ii) it has important interdisciplinary elements; while it is firmly rooted in political science, it seeks to incorporate frontier concepts, ideas, and models from macroeconomics. The substantive contributions of my three papers, as well as their implications and limitations, will be discussed in Chapter 5 of the thesis.

Institutions

One of the biggest and most ambitious institutional changes in recent economic history was the introduction of the European Monetary Union (EMU). The EMU irrevocably fixed exchange rates among the countries that joined. It also meant member states had to cede control of monetary policy to the European Central Bank

(ECB) and commit to operating fiscal policy within the confines of the Stability and Growth Pact (SGP). The theoretical literature has picked out several channels through which the EMU drove the current account imbalances between the north and south of the currency union during its first decade, such as its effect on competitiveness in countries with different wage-setting institutions (Johnston, Hancké, and Pant 2014), its effect on cross-border lending from the north to the south (Hale and Obstfeld 2016), and its effect on fiscal deficits (Efthyvoulou 2012).

In contrast, the empirical literature has yet to come consensus about whether the current account imbalances were driven by the EMU (Belke and Dreger 2013; Campa and Gavilan 2011; Schmitz and von Hagen 2011) or factors outside of the currency union, such as the rise in oil prices and the emergence of China as a major exporter of low value-added goods (Chen, Milesi-Ferretti, and Tressel 2013; Guerrieri and Esposito 2013). Chapter 2 of the thesis aims to fill this gap in the literature by using macroeconomic data on OECD economies and a new statistical approach for causal inference in observational studies—the synthetic control method—to estimate the effect of the EMU on the current account balances of individual member states. This is the first time this method has been used to study the effect of the EMU on current account balances. The method is uniquely well placed to shed new light on the debate because it creates *counterfactuals* that show what would have happened to the current account balances of individual member states had they not joined the euro. In other words, it allows estimation of the *causal* effect of the EMU on current account balances.

Institutions also form a cornerstone of Chapter 3 of the thesis, specifically the complementary political-economic institutions at the heart of varieties of capitalism. Hall and Soskice’s (2001) influential framework divides the advanced democracies into two groups: liberal market economies (LMEs), where firms coordinate primarily via market mechanisms and hierarchies, and coordinated market economies (CMEs), where firms coordinate primarily via non-market relationships and resolve many of their problems through strategic interaction. Varieties of capitalism is often referred to as a supply-side approach to comparative political economy (e.g. Baccaro and

Pontusson 2016). In Chapter 3, I develop a new approach to comparative political economy (CPE), which combines both the supply side (political-economic institutions) and the demand side (demand drivers of growth and government demand-side policies) of the economy. The chapter argues and empirically demonstrates that the northern European CMEs pursued *export-led* growth models during the Great Moderation and the LMEs (the English-speaking countries) pursued *consumption-led* growth models. The chapter provides a strong theoretical underpinning as to why current account imbalances emerged between the CMEs and the LMEs during the Great Moderation.

The varieties of capitalism framework focuses on differences in institutions *between* countries (or groups of countries). The Great Moderation also saw institutional changes that occurred *across* the OECD countries, as ideas changed around best practices for macroeconomic management and economic policymaking. Two of these changes indirectly contributed to the build up of current account imbalances: the move to independent inflation-targeting central banking and the opening of financial markets. As emphasised in Chapters 3 and 4 of the thesis, these changes, *paradoxically*, gave governments more discretion to pursue demand-side policies that supported the national growth model. This was especially true in the consumption-led LMEs, where the growth model favoured policies aimed at expanding domestic demand.

These institutional changes were critical *enablers* for governments in the LMEs to pursue expansive demand-side policies because they enhanced credibility in financial markets and anchored inflation expectations. This gave the LMEs easy access to external borrowing and the ability to run persistent current account deficits (without pressure for adjustment). A similar argument holds for the southern European economies, who acquired a credible low inflation regime when they joined the EMU. This novel argument provides a potentially more plausible reason than the mitigation of the time-inconsistency problem in monetary policymaking (Barro and Gordon 1983) for why a government with an output target below equilibrium

would voluntarily give up control of monetary policy to an independent central bank.

Political systems and electoral politics

The role of politics in the current account imbalances of the Great Moderation has been all but ignored in the literature up until now. In the new approach to CPE set out in Chapter 3 of the thesis, political systems and electoral politics play a central role.

Lijphart's (1984, 2012) widely used typology for classifying political systems divides countries into *consensus* democracies and *majoritarian* democracies. Consensus democracies typically have proportional representation (PR) electoral systems that produce coalition governments, representative parties, and interest group involvement in policymaking. In contrast, majoritarian democracies typically have majoritarian electoral systems that produce single-party governments, leadership parties, and government control over policymaking (Soskice 2007).

In Lijphart's terminology, the CMEs are consensus democracies and the LME are majoritarian democracies. Chapter 3 argues that the distinct political systems of the LMEs and the CMEs exert a strong influence on the long-term electoral viability of different growth models. Parties in majoritarian systems have to compete for the median voter and governing is closely tied to winning elections. Representative parties in consensus democracies, on the other hand, safeguard the long-term interests of their constituents and have to work with interest groups (e.g. unions, employers' associations) to set policy. Majoritarian political systems therefore provide a strong electoral incentive to pursue a growth model centred on *consumer spending*, whereas consensus political systems are better suited to a growth model built around long-term *export sector competitiveness*.

There are two further avenues through which political systems reinforce the LMEs' consumption-led growth model and the CMEs' export-led growth model. As Rogowski and Kayser's (2002) model of regulation shows, majoritarian electoral

systems with high vote-seat elasticities tilt policy in favour of consumers, while PR electoral systems with low vote-seat elasticities tilt policy in favour of producers. The greater *clarity of responsibility* in majoritarian systems also means that governments in the LMEs are held more accountable for short-term economic performance at the ballot box (Powell and Whitten 1993).

The theory of political behaviour underpinning the new approach to CPE in Chapter 3 of the thesis sees the promotion of national growth models, and advanced sectors especially, as a valence issue for voters (as do Iversen and Soskice (2015b)). Chapter 3 argues that there is a strong electoral incentive for governments to support national growth models, and hence pursue policies that further contribute to current account divergence. This link between politics and current account imbalances has been underexplored in the previous literature. Understanding the political origins of the imbalances is particularly important for the future, as it provides reason to be pessimistic that governments in advanced democracies will unilaterally take action to correct current account imbalances should the re-emerge.

Government demand-side policies

A demand-side policy is any government policy aimed at affecting domestic demand, such as monetary policy, fiscal policy, and the encouragement (or mitigation) of credit expansion.[‡] In the era of independent inflation-targeting central banking, only the latter two policies remain in the hands of governments.

The new approach to CPE set out in Chapter 3 argues that governments in advanced democracies have a clear electoral incentive to pursue policies that support the national growth model (as discussed in the previous subsection). These demand-side policies reinforced the divergence in current account balances between the export-led CMEs and the consumption-led LMEs during the Great Moderation.

The fourth chapter of the thesis (co-authored with David Soskice) looks at government demand-side policies through the lens of modern macroeconomics. The

[‡] The terms credit encouragement and credit mitigation are borrowed from Fuller (2015).

dominant models of the macroeconomy used in political science (see Persson and Tabellini 2000) leave no place for government demand-side policies to affect macroeconomic outcomes beyond the very short run, because they are still rooted in new classical theory from the 1970s and 1980s (Iversen and Soskice 2006b). These models are also typically *closed* economy, which means they are unable to provide any insights into current account imbalances. We try to bridge the gap between the empirical evidence from the Great Moderation and the macroeconomic models used in political science by setting out a suite of simple modern *open* economy macroeconomic models.

The models presented in Chapter 4 show how governments can influence the economy in the medium run and how persistent current account imbalances can arise within a system of inflation-targeting central banking. We hope the models can re-invigorate the long dormant research agenda at the intersection of macroeconomic and policies science. The chapter also provides empirical evidence that governments in the LMEs and the CMEs pursued systematically different demand-side policies during the Great Moderation—as the theory of political behaviour set out in Chapter 3 would predict. We show that governments in the LMEs encouraged credit expansion more than those in the CMEs (Fuller 2015), and that the fiscal stance of the LMEs loosened more than the fiscal stance of the CMEs during the 2000s. This divergence in demand-side policies helped drive the current account imbalances among advanced democracies during the Great Moderation.

An overview of what comes next

The remainder of the thesis is made up of three separate papers—each a self-contained piece of research—and a concluding chapter. Chapter 2 uses the synthetic control method to estimate the causal effect of joining the EMU on the current account balances of individual member states. Chapter 3 explores the complex set of interrelationships between growth models, varieties of capitalism and political systems in advanced democracies. It then uses these insights to shed new light on the pre-crisis current account imbalances, as well as cross-country variation in the

evolution of income inequality and credit expansion. Chapter 4 develops a set of simple modern open economy macroeconomic models and uses them to: (i) show that governments can have medium-run effects on the macroeconomy, and (ii) show how governments pursuing different policies can lead to persistent macroeconomic imbalances within a system of independent inflation-targeting central banking. In the final chapter, I discuss the substantive contributions of the paper, point to some of the limitations in my analyses, and provide some promising avenues for future research.

Estimating the effect of the EMU on current account balances: A synthetic control approach^{*}

ABSTRACT

The European sovereign debt crisis wrought major political and economic damage on the European Monetary Union (EMU). This led to a reassessment of the pre-crisis period of economic growth and stability in the EMU, shifting attention to the macroeconomic imbalances that emerged between member states, especially those in current account balances. This paper uses macroeconomic data on OECD economies and a new statistical approach for causal inference in observational studies—the synthetic control method—to estimate the effect of the EMU on the current account balances of individual member states. This *counterfactuals* approach provides strong evidence that the introduction of the EMU was responsible for the divergence in current account balances among member states in the run-up to the euro crisis. The results suggest that the EMU effect operated through multiple channels and that fundamental changes to the institutional framework of the EMU may be required to safeguard the currency union against a re-emergence of dangerous external imbalances in the future.

^{*} A version of this paper was published as: Hope, David. 2016. “Estimating the Effect of the EMU on Current Account Balances: A Synthetic Control Approach.” *European Journal of Political Economy* 44: 20–40. <http://dx.doi.org/10.1016/j.ejpoleco.2016.05.002>.

2.1 Introduction

The European sovereign debt crisis (hereby referred to as the euro crisis) put severe economic and political strain on the European Monetary Union (EMU) and even cast doubt on the future of the wider European project. The no-bail-out clause enshrined in the Treaty of Rome (1957) was broken multiple times, harsh austerity measures plunged the periphery of the currency union into a prolonged recession, and political tensions rose both within and between member states.¹

The euro crisis prompted a reassessment of the EMU, which had been labelled a “resounding success” by the European Commission (2008, 3) after its first decade. When countries joined the EMU and adopted the euro they relinquished control of monetary policy to the European Central Bank (ECB) who assumed responsibility for stabilising member state economies following economic disturbances. While the ECB achieved its main policy goal—average euro area inflation was just above the Bank’s 2% target between 1999 and 2008—, the narrow focus on average inflation masked significant divergence among member states. The period after the introduction of EMU up until the euro crisis was characterised by differentials in inflation, but also in growth, real exchange rates and current account balances (Carlin 2013; Lane 2006).

This paper focuses on the current account imbalances that emerged among EMU member states prior to the euro crisis. On the tenth anniversary of the EMU in 2008, current account balances ranged from -14.5% of Gross Domestic Product (GDP) in Greece to 5.6% of GDP in Germany.² The current account balance is defined as the trade balance (export minus imports) plus net interest and profit receipts from abroad (Carlin and Soskice 2015). It captures inflows and outflows of both goods and services and investment income. Iversen, Soskice and Hope (2016)

¹ The Treaty of Rome was signed in March 1957 and is officially known as the Treaty establishing the European Economic Community (TEEC). For more information on EEC/EU treaties, see: http://europa.eu/eu-law/decision-making/treaties/index_en.htm

² Source: IMF World Economic Outlook database, October 2015.

show that the EMU's current account imbalances had a distinct geographical pattern, with the southern European economies (and Ireland) amassing substantial deficits and the northern European economies amassing substantial surpluses. They also argue that the imbalances were self-reinforcing, as the northern economies trade surpluses were being reinvested into the fast-growing southern economies (also see Hall 2012).

If a country is running a current account deficit it signals that they are a net borrower from the rest of the world. Persistent current account deficits therefore signal rising external indebtedness, which can reflect the accumulation of government debt (as in Greece and Italy), private sector debt (as in Ireland and Spain), or a combination of the two (as in Portugal). Sizeable external deficits can pose serious economic problems. To the extent that they reflect the overheating of the non-tradables sector they can damage the competitiveness of the export sector. This problem is particularly acute in a currency union (such as the EMU) because of the inability to devalue the nominal exchange rate to restore competitiveness. Large current account deficits also make economies more vulnerable to external economic shocks because of the risk of a *sudden stop* in the capital inflows financing the deficit (Lane 2012).

The global financial crisis of 2008-09 shook financial market confidence, making investors reluctant to lend to the EMU's deficit countries and pushing up their government bond yields (von Hagen, Schuknecht, and Wolswijk 2011; Sturm 2011). This escalated into a sovereign debt crisis due to unique features of the EMU; the lack of a credible lender of last resort and the lack of a banking union (De Grauwe 2013; Iversen, Soskice, and Hope 2016; Moro 2014). However, it is clearly no coincidence that the countries that on average ran current account deficits during the first decade of EMU—Italy, Ireland, Spain, Greece and Portugal—were those that later became embroiled in the euro crisis (Brancaccio 2012; Carlin 2013).

This paper investigates the extent to which the introduction of the EMU was responsible for the current account imbalances that emerged between member states in the 2000s. Given the role that current account imbalances played in the euro

crisis it is crucial to the next generation of euro area policymaking that the part played by the EMU (and its institutional framework) in driving the imbalances is better understood. As Bertola et al. (2013) clearly state, any credible strategy for getting the EMU back on track needs to address the balance-of-payments crisis as well as the sovereign debt and banking crises.

My study uses a new statistical approach for causal inference in observational studies—the synthetic control method (Abadie, Diamond, and Hainmueller 2010, 2011, 2015; Abadie and Gardeazabal 2003)—to investigate the effect of the EMU on the current account balances of individual member states. The method constructs counterfactuals, or ‘synthetic control units’, which show what would have happened to the current account balances of member states had they not joined the EMU. The synthetic control units are constructed as a weighted average of OECD countries outside of the EMU. The difference between the actual current account balances of member states and their synthetic counterparts provides an estimate of the causal effect of the EMU on the current account balances.

The synthetic control method has previously been used to assess the economic benefits of the EU (Campos, Coricelli, and Moretti 2014), the impact of the Stability and Growth Pact on government debt in euro area countries (Koehler and König 2015) and the effect of the EMU on GDP per capita (Fernández and Perea 2015) and real exchange rates (El-Shagi, Lindner, and Schweinitz 2016). To the best of my knowledge, this is the first time this approach has been used to study the effect of the EMU on current account balances. The synthetic control method has several advantages over traditional cross-country regressions and comparative case studies. First, the counterfactuals-based approach allows me to directly estimate the *causal* effect of the EMU on current account balances. Second, the control units are created using a transparent and data-driven procedure, which is often not the case in comparative case studies (Abadie, Diamond, and Hainmueller 2015, 2). Lastly, the method avoids the model-dependent extrapolation that is common in regression-based analyses (Abadie, Diamond, and Hainmueller 2015, 3; King and Zeng 2006).

The rest of the paper is organised as follows. Section 2.2 reviews the theoretical and empirical literature on the EMU and current account balances. Section 2.3 sets out the synthetic control methodology. Section 2.4 presents the results of the synthetic control analysis. Section 2.5 tests the internal validity of the results by carrying out a number of placebo and robustness checks. The final section provides some concluding remarks.

2.2 Literature review: The EMU and current account balances

A rich literature on the macroeconomic effects of the EMU has emerged since the euro was introduced in 1999. Previous studies have investigated the effect of the EMU on a whole range of economic indicators, such as trade (Baldwin 2006; Baldwin et al. 2008; Bun and Klaassen 2007; Micco, Stein, and Ordoñez 2003), foreign direct investment (Petroulas 2007; De Sousa and Lochard 2011), cross-border banking (Blank and Buch 2007; Coeurdacier and Martin 2009; Spiegel 2009), real exchange rates (El-Shagi, Lindner, and Schweinitz 2016), GDP per capita (Fernández and Perea 2015), and wage growth and unemployment (Grüner 2010; Mikosch and Sturm 2012). Mongelli and Vega (2006) provide an overview of the early literature on the effects of the EMU on economic performance, financial structures and product and labour market institutions.

A large number of scholars have also studied the effect of the EMU on current account balances. Starting with the theoretical side, the literature has identified three main channels through which the EMU contributed to current account divergence among member states. The first is the competitiveness channel. The EMU fixed exchange rates between member states and removed the ability of countries to devalue to restore external competitiveness. It is also well documented that the wage-setting institutions of EMU member states vary greatly in their capacity to restrain wage growth, particularly in sheltered sectors (Hancké 2013; Johnston, Hancké, and Pant 2014). The divergence in real unit labour costs among member states under EMU therefore led to differences in the price competitiveness

of their products on world markets and the emergence of current account imbalances between the north and south of the currency union (Hall 2012, 2014; Iversen, Soskice, and Hope 2016).

The second channel is the financial integration channel. The EMU furthered integration in banking and capital markets and dramatically reduced the borrowing costs for the less-creditworthy member states in the south. The delegation of monetary policy to the ECB—a credible independent inflation-targeting central bank—upon joining the EMU, gave the southern European economies credibility in financial markets and the ability to borrow externally (with little pressure for adjustment) (as highlighted by Iversen, Soskice and Hope (2016) and discussed further in Section 4.4 of Chapter 4 of the thesis). This increased capital flows from the north to the south, leading the former to accumulate current account surpluses and the latter to accumulate current account deficits (Bertola et al. 2013; Hale and Obstfeld 2016). Current account imbalances fuelled by cross-border borrowing can be viewed as benign if they reflect a reallocation of resources from high-income countries with abundant capital to low-income countries with better growth prospects and investment opportunities (Blanchard and Giavazzi 2002). However, they can be a cause for concern if the capital is channelled into sectors that do not improve the productive capacity of the economy (such as real estate) or if they delay the pace of necessary but politically costly structural reforms (Fernandez-Villaverde, Garicano, and Santos 2013; Lane 2012).

The final channel is the fiscal deficit channel. The Stability and Growth Pact (SGP) was introduced alongside the EMU. It set out the restrictions on the deficits and debt that member state governments could accumulate. However, its weak enforcement mechanisms and the lack of constraints on fiscal policy during upswings led to both expansionary fiscal stances in boom times and the return of politically-motivated fiscal boosts in election years (Buti and Van Den Noord 2004; Efthyvoulou 2012; Mink and De Haan 2006). The threat of politically costly reprimands and fines that came with the SGP also increased the incentives of politicians to underplay the size of budget deficits in official forecasts, especially in

the lead up to elections (Brück and Stephan 2006). Fiscal policy shocks can lead to an appreciation of the real exchange rate if they raise the demand for non-tradable goods relative to tradable goods, which then worsens the current account balance (Abbas et al. 2011). This crowding out of net exports is compounded if the central bank reacts to the fiscal stimulus by raising the real interest rate (to keep inflation at target) (Carlin and Soskice 2015). (The adjustment of a small member of a common currency area to a fiscal stimulus is set out in more detail in Section 4.4 of Chapter 4 of the thesis.)

Ample empirical evidence has been found to support the three channels highlighted by the theoretical literature. Arghyrou and Chortareas (2008) and Belke and Dreger (2013) investigate the effect of differences in external competitiveness on the current account balances of EMU member states and find a significant negative relationship between real exchange rates and current account balances. Schmitz and von Hagen (2011) and Hale and Obstfeld (2016) find evidence that the EMU significantly increased capital flows from the relatively richer northern member states to the relatively poorer southern member states. There are also a number of empirical studies that find that the EMU led to an increase in expansionary and electorally-motivated fiscal policy (Buti and Van Den Noord 2004; Efthyvoulou 2012; Mink and De Haan 2006), as well as a rise in overly optimistic budget deficit forecasts aimed at misleading electorates, especially in the run up to elections (Brück and Stephan 2006). In turn, there is also robust evidence that fiscal policy expansions in EMU countries result in a deterioration in the trade balance (Beetsma and Giuliodori 2010; Bénétrix and Lane 2010).

In contrast to the large body of literature that the EMU drove the current account imbalances between member states, some recent contributions find that factors external to the EMU also played an important role. Chen, Milesi-Ferretti and Tressel (2013) and Guerrieri and Esposito (2013) find evidence of several external trade shocks—the sharp rise in oil prices, the emergence of China as a major exporter of low-value added manufactured goods and the movement of continental European production chains to Central and Eastern European

countries—that affected the northern and southern EMU member states differently during the 2000s, and hence contributed to the current account imbalances.

The empirical literature on the EMU’s current account imbalances is plentiful but currently fails to get to the bottom of the extent to which the EMU was responsible. The synthetic control method used in this paper is uniquely suited for addressing this gap in the literature as it allows me to estimate how much of the current account balance changes were caused by the EMU and how much were driven by external factors.

2.3 Methodology: The synthetic control approach

The synthetic control method provides a rigorous quantitative framework for carrying out comparative case studies in political science (Abadie, Diamond, and Hainmueller 2010, 2011, 2015; Abadie and Gardeazabal 2003). The method uses data driven procedures to construct a control unit from a pool of potential control units, such that the “synthetic control” unit best “approximates the most relevant characteristics of the unit(s) exposed to the event of interest” (Abadie, Diamond, and Hainmueller 2010, 494). The approach is a significant improvement on other procedures for selecting control countries in comparative case studies, which often rely too heavily on researchers’ subjective measures of affinity between countries (Abadie, Diamond, and Hainmueller 2010, 493). The rigorous, quantitative way in which the control unit is chosen gives us more confidence the results can be interpreted as the causal effect of the event of interest.

In my case the event of interest is the introduction of the EMU. The countries that joined the EMU adopted the euro, but they also saw other institutional changes, such as the ceding of control of monetary policy to the ECB and the introduction of the SGP, which restricted member state governments’ control over macroeconomic policy. This study uses the synthetic control methodology to produce counterfactual current account balances for individual member states showing what would have happened had they not joined the EMU. It then looks at the difference

between the actual and counterfactual series to quantify the causal effect of joining the EMU.

I start by formally setting out how the synthetic control is constructed. I follow the methodology set out in Abadie, Diamond and Hainmueller (2015). At this stage I describe the process in general for a *country of interest*. I will discuss which EMU member states have been selected for my study, and why, in Section 2.4. I have a sample of $J+1$ countries, where unit $j=1$ is the country of interest, and units $j=2$ to $j=J+1$ are the potential control units. More specifically in this study, $j=1$ is an EMU member state and $j=2$ to $j=16$ are fifteen OECD economies that did not join the single currency. The fifteen potential control units are referred to as the ‘donor pool’ and are discussed in more detail at the start of the next section. I initially assume that I have a balanced panel dataset, which varies across $J+1$ countries and T time periods. In addition, T is split into two times periods, T_0 , representing the pre-EMU period, and T_1 , representing the post-EMU period. In my case, I have data from 1980-2010 and the EMU was introduced at the start of 1999, so T_0 runs from 1980-1998 and T_1 runs from 1999-2010. The pre-EMU and post-EMU periods differ only for Greece, which joined the EMU at the start of 2001.

The aim of the synthetic control method is to create a control unit that best replicates the pre-EMU characteristics of the country of interest, but did not experience the event being tested (i.e. did not join the EMU). As there is no one country that exactly resembles the country of interest, but did not join the EMU, it will be more accurate to use a weighted average of a number of non-EMU countries from the donor pool. The synthetic control method is the approach used to find these weights, which I shall term $W = (w_2, \dots, w_{J+1})'$, where $0 \leq w_j \leq 1$ for $j = 2, \dots, J+1$ and $w_2 + \dots + w_{J+1} = 1$. Hence W is the $(J \times 1)$ vector of country weights that are used to construct the synthetic control unit. The synthetic control unit can then be compared to the country of interest in the outcome variable (current account balance as a % of GDP) in the post-EMU period to estimate the causal effect of joining the EMU.

Following Mill's Method of Difference, Abadie, Diamond and Hainmueller (2015, 3) suggest that the country weights should be selected such that the pre-EMU characteristics of the synthetic control unit best match those of the country of interest. In this application, only those characteristics that influence the current account balance should be relevant to selecting the optimal weights, W^* . I therefore define X_C as a $(k \times 1)$ vector of pre-EMU current account balance predictors for the country of interest. These 'predictors' are macroeconomic variables that are known to influence the current account balance. The predictors will be discussed in more detail in the next section. I then aim to match these as well as possible to a matrix of pre-EMU current account balance predictors for the donor pool. I define this as X_{DP} , which is a $(k \times J)$ matrix. The vector $X_C - X_{DP}W$ then defines the difference between the country of interest and each country in the donor pool for each of the pre-EMU current account predictors. The vector of optimal weights, W^* , is defined by:

$$W^* = \underset{\bar{w}}{\operatorname{argmin}} [X_C - X_{DP}W]'v[X_C - X_{DP}W], \quad (1)$$

where v is a $(k \times k)$ matrix showing the relative importance of each current account balance predictor in minimising the equation.

It is clear that v will have a large effect on W^* . It is therefore important that those current account balance predictors that have the most power in determining the current account balance of the country of interest should be given the most weight. I use the technique proposed by Abadie and Gardeazabal (2003, 128) for selecting v , which chooses the current account balance predictor weights such that the resulting synthetic control unit best reproduces the trajectory of the current account balance of the country of interest in the years before the introduction of the EMU. More formally, v^* is defined by:

$$v^* = \underset{v \in V}{\operatorname{argmin}} [Z_C - Z_{DP}W^*(v)]'[Z_C - Z_{DP}W^*(v)], \quad (2)$$

where V is a set of all non-negative diagonal $(k \times k)$ matrices, Z_C is a $(T_0 \times 1)$ vector of pre-EMU current account balances for the country of interest and Z_{DP} is a $(T_0 \times J)$ matrix of pre-EMU current account balances for the donor pool. The equation is subject to the constraint that $v^* = 1$, such that the optimal weights for the synthetic control are given by $W^* = W(v^*)$.

The last step in the process is to retrieve the treatment effect (i.e. the effect of the EMU on the current account balance of the country of interest). I define Y_C as a $(T_1 \times 1)$ vector of post-EMU current account balances for my country of interest and Y_{DP} as a $(T_1 \times J)$ matrix of post-EMU current account balances for the donor pool. The effect of the EMU is simply the difference between the actual current account balance of the country of interest and that of the synthetic control unit in the post-EMU period. The effect of the EMU is therefore defined as $Y_C - Y_C^*$, where $Y_C^* = W^* Y_{DP}$.³

The central testable assumptions of the synthetic control method are that the synthetic control unit matches the country of interest well on current account balance predictors and that it can closely replicate the trajectory of the country of interest in the outcome variable (i.e. the current account balance) in the pre-EMU period. Unlike the closely related difference-in-difference method, however, you do not also need to assume that the effect of unobserved factors on the current account balance are constant over time. Put another way, the model allows for time-varying confounders at the country level. The generalisation does come with a price; however, as it means assuming linear relationships between outcomes in the post- and predictors in the pre-EMU period.

³ The synthetic control analysis in this paper is a partial rather than a general equilibrium empirical model, which means that it does not take into account the knock-on effects on the donor pool countries of a country of interest not joining the EMU. The synthetic control method cannot be undertaken without this simplification because it relies on the Stable Unit Treatment Value Assumption (SUTVA) to make causal inferences, which assumes that there are no interferences between units (Rubin 1980).

Abadie, Diamond and Hainmueller (2015, 4) state “if the number of preintervention periods in the data is large, matching on preintervention outcomes helps control for unobserved factors and for the heterogeneity of the effect of the observed and unobserved factors on the outcome of interest”. In other words, the country of interest and its synthetic counterpart could only produce similar trajectories in current account balances over the long pre-EMU period if they were “alike in both observed and unobserved” current account balance predictors (Abadie, Diamond, and Hainmueller 2015, 4). Therefore, if the pre-EMU trends in current account balances for the country of interest and its synthetic control unit are close enough before the introduction of the EMU, and I assume there are no confounding factors that emerge during the post-EMU period and affect my country of interest differently from those in donor pool, I can put any deviation after the EMU is introduced down to the EMU itself.

Member states made a decision to join the EMU, whereas some countries in the donor pool (e.g. Denmark, Sweden and the UK) had the option to join but chose not to. This can pose a problem when estimating the effect of the EMU using statistical methods. In an ideal world, some countries would have randomly joined the EMU and others would not have, mitigating any potential biases in estimating its effect. This is clearly not what happened. The synthetic control methodology sidesteps the issues associated with member states ‘selecting into’ the EMU, however, because it does not require exogenous assignment to treatment; it only assumes that the time-point of adoption is exogenous. The synthetic control units are constructed to match my countries of interest as closely as possible on observed and unobserved factors that affect the current account balance in the pre-EMU period. This means that, for member states, any factors that might have influenced their decision to join the EMU and their current account balance (i.e. potential sources of selection bias) are taken into account when constructing the synthetic control units.

2.4 Empirical analysis and results

Data

The data sample used for the study is an annual country-level panel dataset that covers the period from 1980-2010. The EMU was introduced in 1999, which gives a pre-EMU sample running from 1980-1998 and covering 19 years. The post-EMU period runs for 12 years from 1999. The only exception is Greece, which joined the EMU at the start of 2001; the pre-EMU period for Greece ends in 2000 and the post-EMU period begins in 2001.

The post-EMU period ends in 2010, which is the beginning of the euro crisis (the bailouts started from mid-2010 onwards). This allows me to assess the effect of the EMU on current account balances during the successful first decade of the single currency as well as during the global financial crisis. The time period fits with the main aim of the paper, which is to assess the effects of the EMU on current account balances in the run up to the euro crisis. However, there is also an important methodological reason for ending the post-EMU period in 2010. The euro crisis represents a large structural event that affected the current account balances of individual OECD economies to varying degrees. While it is plausible that the global financial crisis affected all OECD economies, it is clear that some of the donor pool, such as countries with close trade relationships with EMU countries or large holdings of EMU sovereign bonds, were more exposed to the euro crisis than others. The euro crisis therefore represents an asymmetric shock to OECD current account balances and including the years after 2010 in the analysis would risk confounding my estimates of the EMU's effect.

The donor pool for the synthetic control analysis is composed of 15 OECD countries that did not join the EMU: Australia, Canada, Chile, Denmark, Hungary, Israel, Japan, Korea, Mexico, New Zealand, Poland, Sweden, Turkey, the UK and

the US.⁴ The donor pool only includes OECD countries, as “it is important to restrict the donor pool to units with outcomes that are thought to be driven by the structural process as for the unit representing the case of interest” (Abadie, Diamond, and Hainmueller 2015, 3). The countries of interest in my study are all OECD members, making them economically and politically comparable to the donor pool. The non-EMU OECD countries are therefore a suitable control group for the study. Following El-Shagi, Lindner and Schweinitz (2016), the donor pool comprises both high- and middle-income countries to increase the likelihood that all the current account predictors of the countries of interest can be well matched.⁵ This is particularly important given that some EMU member states, notably Greece, Portugal and Spain, had considerably lower living standards than the high-income non-EMU OECD countries upon joining the single currency.

In order to guard against confounding the estimates of EMU’s effect, countries were not included in the donor pool if they were “subject to structural shocks in the outcome variable during the sample period of the study” (Abadie, Diamond, and Hainmueller 2015, 3). Norway and Switzerland were therefore excluded from the donor pool because they experienced large current account balance shocks during the post-EMU period. Norway’s current account surplus jumped from 5.5% to 14.7% of GDP between 1999 and 2000, driven by an exogenous shock to the oil price. The price of Europe Brent crude oil tripled between January 1999 and September 2000.⁶ Switzerland current account surplus collapsed from 10.8% to 3% of GDP between 2007 and 2008.⁷ This reflected Switzerland’s heavily finance-orientated economy

⁴ Following Abadie, Diamond and Hainmueller (2015), I do not include Iceland in the donor pool due to its small size and unusual economic structure.

⁵ As additional robustness tests, I also carry out the synthetic control analysis with two modified donor pools. The first excludes the five middle-income countries: Chile, Hungary, Mexico, Poland and Turkey. The second adds two non-EMU non-OECD countries that accumulated large current account deficits during the 2000s: Bulgaria and Romania. The results are shown in Figures A.1 and A.2 in Appendix A1. The main results of the paper are robust to using these alternative donor pools.

⁶ Source: US Energy Information Administration.

⁷ Source for Norwegian and Swiss current account balances: IMF World Economic Outlook Database, October 2015.

(much more so than any EMU member state in the study) and the huge losses that the Swiss banking system took on their foreign subsidiaries during the financial crisis (SNB 2009). The dramatic structural shock to the Swiss current account balance in 2008 shows the uniquely high exposure of the Swiss current account balance (among my sample) to a shock in global financial markets, and ultimately their unsuitability as a donor country.

The outcome variable in the analysis is the current account balance (as a per cent of GDP). The current account balance predictors in the analysis are a set of macroeconomic variables that are known to influence the current account balance. They have been selected based on the literature on current account balances and the EMU set out in Section 2.2 and the previous empirical literature on the economic determinants of current account balances (see, for example, Chinn and Prasad 2003; Gruber and Kamin 2007; Schmitz and von Hagen 2011). I account for the competitiveness channel by including measures of the price level of exports (relative to the US) and trade openness (%). I account for the financial integration channel by including measures of total investment (as a % of GDP), domestic credit to the private sector (as a % of GDP), GDP per capita (PPP) and GDP growth (%). These variables cover both the benign catching up scenario where credit flows from rich to poor countries and the credit bubble scenario where capital inflows are channeled into unproductive sectors. I account for the fiscal deficit channel by including measures of public debt (as a % of GDP) and the government primary balance (as a % of GDP). In addition to these variables, I also include a measure of domestic demand growth (%), which Belke, Oeking and Setzer (2015) show is important in explaining exporting dynamics and consequently current account balances in the countries that ran persistent current account deficits in the post-EMU period (France, Greece, Italy, Portugal and Spain).

All current account predictors are available for the entire pre-EMU period (1980-1998), apart from GDP growth (1981-1998), total investment (1984-1998), public debt (1986-1998), government primary balance (1990-1998) and domestic credit to private sector (1991-1998). The current account predictors are averaged over the

pre-EMU period as part of the estimation process (see Section 2.3), so it does not pose a problem for the analysis if they are not available for entire pre-EMU period. The data for the analysis were collected from the IMF, the World Bank and the Penn World Tables (see Table A.1 in Appendix A1 for a full list of definitions and data sources).

Country selection

As mentioned in the Section 2.3, one of the central testable assumptions of the synthetic control method is that the synthetic control unit can closely replicate the pre-EMU current account balance trend of the country of interest. Only in the cases where this assumption holds can I be confident of obtaining causal estimates of the EMU's effect. In order to test whether the assumption holds, I carry out the synthetic control analysis described in Section 2.3 for all the founding EMU member states (except for Luxembourg) and Greece (which joined in 2001).⁸ Table 2.1 reports the mean squared prediction errors (MSPEs) in the pre-EMU period, which measure of closeness of fit (lower numbers indicate a better fit) between the current account balances of the EMU member states and their synthetic control units.

The table shows that the closeness of fit varies widely across countries, ranging from 0.63 in France to 10.04 in Portugal. It is unsurprising that the method does not produce good synthetic control units for all EMU member states; as the method creates a control unit from a convex combination of countries in the donor pool, it is unlikely to work for all countries, especially those that have pre-EMU current account balance trends that are more extreme than the countries in the donor pool.

⁸ The synthetic control analysis was carried out in R using the Synth package. As in Abadie, Diamond and Hainmueller (2015) and El-Shagi, Lindner and Schweinitz (2016), Luxembourg is excluded due to its small size and its unusual economic structure.

Table 2.1. Country selection: Pre-EMU MSPEs between EMU member states and their synthetic control units

	Pre-EMU MSPE
Austria	1.52
Belgium	4.41
Finland	3.87
France	0.63
Germany	3.75
Greece	2.08
Ireland	6.55
Italy	0.87
Netherlands	3.94
Portugal	10.04
Spain	1.19

Source: Author's calculations.

Note: The pre-EMU period runs from 1980-1998 in all countries except Greece, where it runs from 1980-2000. The figures in bold are those under the 2.5 threshold for inclusion in the main synthetic control analysis.

In order to restrict the analysis to the cases where the central assumption holds, I select only those member states where the pre-EMU MSPE is below 2.5 (shown in bold in Table 2.1). Hence the synthetic control analysis in the paper focuses on five countries: Austria, France, Greece, Italy and Spain. This country selection approach is similar to the approach taken by Billmeier and Nannicini (2013), who use a pre-treatment root MSPE threshold as a criterion for deciding which synthetic control results to present graphically in their paper.

The threshold of 2.5 seems a reasonable upper limit on pre-EMU trends closely matching. As we shall see in Figure 2.1, the current account balances of the synthetic control units for the five countries under the threshold closely track their actual current account balances in the pre-EMU period. In addition, the first member state above the threshold (Germany) has a MSPE nearly twice as large as the first member below the threshold (Greece); hence, the closeness of fit in the pre-EMU period worsens considerably once we go beyond the five member states with the lowest MSPEs.

The synthetic control units

The synthetic control analysis involves choosing the country weights (W^*) such that the weighted average of the control units best reproduces the current account balance predictors of the countries of interest in the pre-EMU period. Table 2.2 shows the weight each country in the donor pool takes in the synthetic control units of my five countries of interest. To take one country as an example, we can see that Synthetic Austria is a convex combination of Australia (21%), Hungary (18%), Japan (39%), Korea (1%) and Poland (21%); with all other countries in the donor pool receiving a weight of zero. The country weights are different for each country of interest because they have different values for the current account predictors (and different current account trajectories) in the pre-EMU period.

Table 2.2. Weights for synthetic control units

	Synthetic control weight				
	Synthetic Austria	Synthetic France	Synthetic Greece	Synthetic Italy	Synthetic Spain
Australia	21%	-	30%	-	9%
Canada	-	-	-	15%	-
Chile	-	-	-	-	1%
Denmark	-	15%	-	16%	2%
Hungary	18%	-	-	-	1%
Israel	-	-	-	-	-
Japan	39%	23%	-	6%	11%
Korea	1%	-	-	-	2%
Mexico	-	-	-	16%	37%
New Zealand	-	-	34%	-	-
Poland	21%	-	13%	-	-
Sweden	-	36%	-	48%	1%
Turkey	-	10%	22%	-	-
United Kingdom	-	15%	-	-	36%
United States	-	-	-	-	-

Source: Author's calculations.

Note: Weights rounded to the nearest per cent so may not sum to 100%.

Table 2.3 and Table 2.4 show the current account balance predictor means in the pre-EMU period (1980-1998) for Austria, France, Italy and Spain, and their synthetic counterparts. The far right-hand column of the two tables shows the

predictor means for the full donor pool.⁹ Greece joined the EMU in 2001 so the pre-EMU period is longer for Greece than the other countries of interest. Table 2.5 shows the current account predictor means in the pre-EMU period (1980-2000) for Greece, Synthetic Greece and the full donor pool.

We can see that the countries of interest are much closer to their synthetic counterparts on the majority of current account balance predictors than they are to the full donor pool, hence the synthetic control analysis produces better comparison units for the countries of interest than the simpler approach of averaging over the full set of non-EMU OECD countries in the donor pool. In cases where current account balance predictors do not match closely this likely indicates the predictor receives a small weight in the calculation of the synthetic control unit—i.e. given the other predictors, the predictor does not have substantial power predicting the pre-EMU current account balance trajectory of the country of interest.¹⁰

Tables 2.3 to 2.5 show that there is a weighted average of OECD economies that did not join the EMU that can reproduce the economic attributes that determine the current account balances in my countries of interest before the introduction of the EMU. As discussed earlier, this is one of the central assumptions of the synthetic control methodology. The tables therefore help underpin my confidence that any difference between the countries of interest and their synthetic counterparts in the post-EMU period can be interpreted as the causal effect of the EMU.

⁹ I choose to present data on the donor pool as an unweighted average, rather than as a population-weighted average such as that used in Abadie, Diamond and Hainmueller (2015). The latter approach would unduly weight the averages towards the larger countries in the sample (e.g. the US), which is not appropriate for my study, where the outcome variable is current account balance (as a % of GDP).

¹⁰ The weight each current account predictor takes in the minimisation of Equation (1) is shown in Table A.2 in Appendix A1.

Table 2.3. Current account balance predictor means in the pre-EMU period for Austria, France, their synthetic control units and the full donor pool: 1980-1998

	Austria	Synthetic Austria	France	Synthetic France	Full donor pool
GDP per capita (PPP, current international dollars)	19,236	13,622	18,252	16,871	13,492
Trade openness (%) = merchandise exports and imports as a share of GDP at current PPPs	74%	30%	49%	58%	42%
Domestic absorption growth (constant prices, 2005 \$US, annual percentage change)	2.1%	2.4%	1.9%	2.3%	3.1%
Price level of exports (relative to US prices, price level of US GDP in 2005 = 1)	0.61	0.58	0.61	0.61	0.58
GDP growth (constant prices, annual percentage change)	2.2%	2.4%	2.1%	2.7%	3.3%
Total investment (as a % of GDP)	27%	26%	22%	24%	24%
Public debt (as a % of GDP)	60%	67%	44%	64%	63%
Government primary balance (as a % of GDP)	0.3%	0.6%	-1.0%	0.8%	1.5%
Domestic credit to private sector (as a % of GDP)	93%	104%	85%	107%	73%
Current account balance (as a % of GDP)	-1.0%	-1.0%	0.2%	0.1%	-1.9%

Source: Author's calculations. See Table A.1 in Appendix A1 for a list of sources for the underlying variables.

Note: All variables are averaged for the 1980-1998 period. Except for: GDP growth (1981-1998), total investment (1984-1998), public debt (1986-1998), government primary balance (1990-1998) and domestic credit to private sector (1991-1998). The last column presents the unweighted average for the full donor pool.

Table 2.4. Current account balance predictor means in the pre-EMU period for Italy, Spain, their synthetic control units and the full donor pool: 1980-1998

	Italy	Synthetic Italy	Spain	Synthetic Spain	Full donor pool
GDP per capita (PPP, current international dollars)	18,530	17,083	14,196	13,029	13,492
Trade openness (%) = merchandise exports and imports as a share of GDP at current PPPs	40%	67%	34%	34%	42%
Domestic absorption growth (constant prices, 2005 \$US, annual percentage change)	2.1%	1.9%	2.8%	2.8%	3.1%
Price level of exports (relative to US prices, price level of US GDP in 2005 = 1)	0.59	0.61	0.59	0.59	0.58
GDP growth (constant prices, annual percentage change)	1.9%	2.4%	2.7%	2.8%	3.3%
Total investment (as a % of GDP)	21%	22%	23%	23%	24%
Public debt (as a % of GDP)	105%	69%	52%	52%	63%
Government primary balance (as a % of GDP)	2.9%	2.0%	-0.3%	1.3%	1.5%
Domestic credit to private sector (as a % of GDP)	55%	83%	75%	78%	73%
Current account balance (as a % of GDP)	-0.5%	-0.7%	-1.3%	-1.3%	-1.9%

Source: Author's calculations. See Table A.1 in Appendix A1 for a list of sources for the underlying variables.

Note: All variables are averaged for the 1980-1998 period. Except for: GDP growth (1981-1998), total investment (1984-1998), public debt (1986-1998), government primary balance (1990-1998) and domestic credit to private sector (1991-1998). The last column presents the unweighted average for the full donor pool.

Table 2.5. Current account balance predictor means in the pre-EMU period for Greece, Synthetic Greece and the full donor pool: 1980-2000

	Greece	Synthetic Greece	Full donor pool
GDP per capita (PPP, current international dollars)	13,796	13,298	14,218
Trade openness (%) = merchandise exports and imports as a share of GDP at current PPPs	32%	33%	43%
Domestic absorption growth (constant prices, 2005 \$US, annual percentage change)	2.0%	3.2%	3.2%
Price level of exports (relative to US prices, price level of US GDP in 2005 = 1)	0.53	0.55	0.58
GDP growth (constant prices, annual percentage change)	1.6%	3.2%	3.4%
Total investment (as a % of GDP)	26%	24%	24%
Public debt (as a % of GDP)	82%	42%	62%
Government primary balance (as a % of GDP)	1.7%	1.6%	1.8%
Domestic credit to private sector (as a % of GDP)	32%	61%	75%
Current account balance (as a % of GDP)	-3.4%	-3.2%	-1.9%

Source: Author's calculations. See Table A.1 in Appendix A1 for list of sources for the underlying variables.

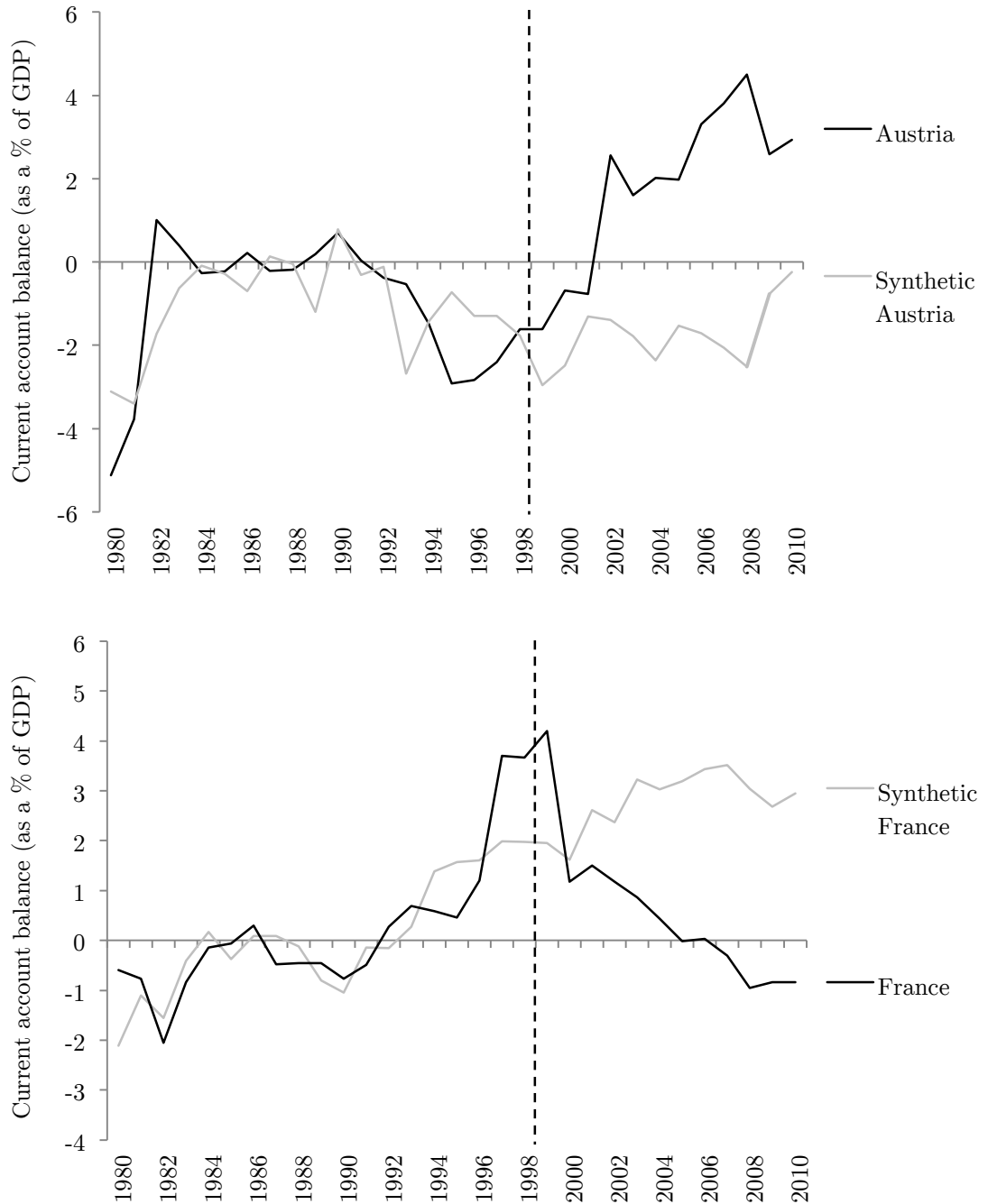
Note: All variables are averaged for the 1980-2000 period. Except for: GDP growth (1981-2000), total investment (1984-2000), public debt (1986-2000), government primary balance (1990-2000) and domestic credit to private sector (1991-2000). The last column presents the unweighted average for the full donor pool.

Empirical results

Figure 2.1 shows the evolution of current account balances in my countries of interest and their synthetic counterparts between 1980 and 2010. The first thing to note is that the evolution of current account balances in the actual countries and their synthetic controls match closely before the introduction of the EMU. This

satisfies the other central assumption of the method, that the synthetic controls can closely track the movement of the actual data over the long pre-EMU period.

Figure 2.1. Trends in current account balances (as a % of GDP) between 1980 and 2010: Austria, France, Greece, Italy and Spain vs. their synthetic control units.







Source: IMF World Economic Outlook Database October 2015; Author's calculations.

Note: The vertical dotted lines show when countries joined the EMU. All countries joined in 1999 except Greece, which joined in 2001.

In all five countries the trajectory of the country and its synthetic control unit diverge significantly after the EMU is introduced. In Austria, the actual current account moved dramatically into surplus in the post-EMU period, whereas Synthetic Austria remained in deficit. In the other four countries, actual current account balances deteriorated much more than the current account balances of the synthetic control units in the post-EMU period. Although the results do not cover all the EMU member states, they do provide strong empirical support for the hypothesis that the introduction of the EMU caused the current account balances of member states to diverge.

The causal effect of the EMU on current account balances is calculated as the gap between each country and their synthetic counterpart in the post-EMU period. Table 2.6 shows that the EMU had a significant negative effect on the current account balances of France, Greece, Italy and Spain. The average gap in the pre-EMU period was close to zero for all four countries but the post-EMU average gaps ranged between -2.3 percentage points in France and -5.0 percentage points in Greece. The opposite held in Austria, where the average post-EMU gap was 3.6

percentage points. The results imply that the EMU improved the current account position of Austria and worsened the current account position of France, Greece, Italy and Spain.

Table 2.6. Average current balance gaps (in percentage points of GDP) between Austria, France, Greece, Italy and Spain, and their synthetic control units in the pre- and post-EMU periods

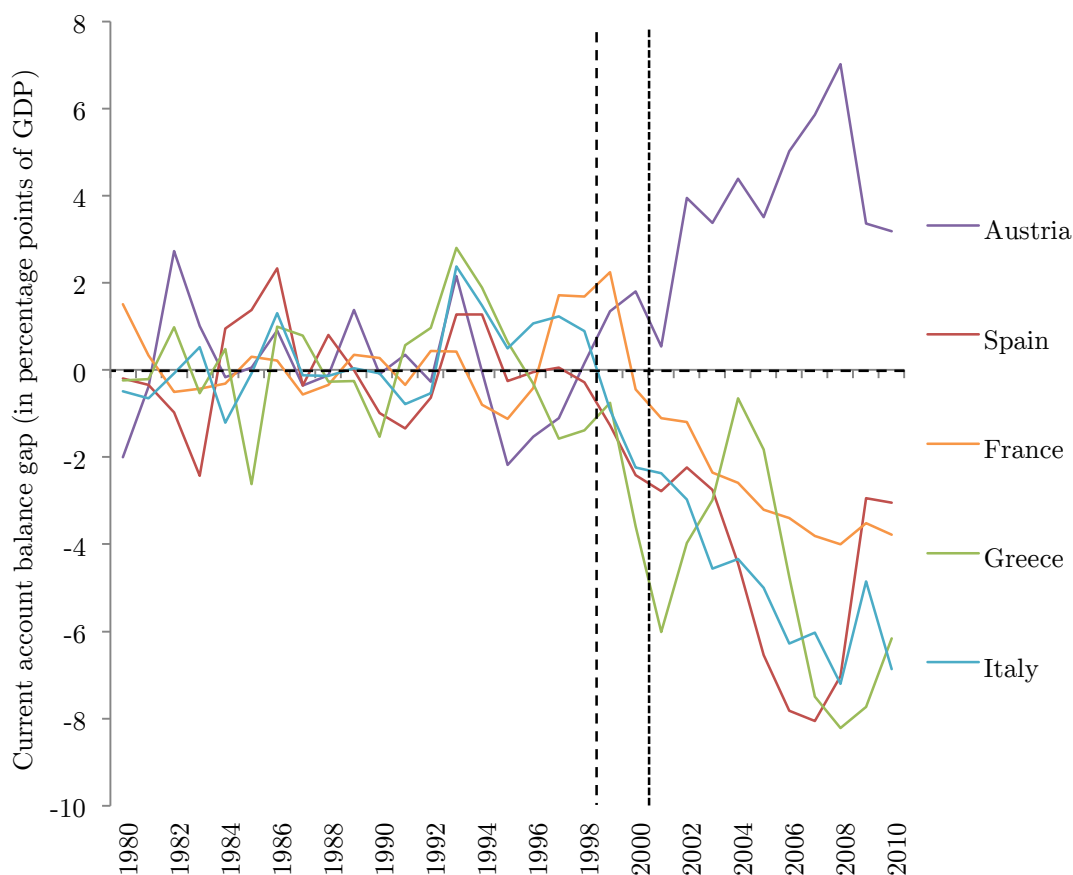
	Average current account balance gap (in percentage points of GDP)				
	Austria	France	Greece	Italy	Spain
Pre-EMU	0.0	0.1	-0.2	0.3	0.0
Post-EMU	3.6	-2.3	-5.0	-4.5	-4.3

Source: Author's calculations.

Note: The pre-EMU period runs from 1980-1998 for all countries except Greece, where it runs from 1980-2000. The post-EMU period runs from the year after the end of the pre-EMU period until 2010.

The causal effect of the EMU is plotted over time in Figure 2.2. The figure shows that current account balance gaps grew over time during the first decade of the EMU, apart from a brief period in the early 2000s in Greece, and to a lesser extent Spain, that likely reflected the slowdown of these economies during the global slump of the early 2000s. The effect of the EMU peaks in Austria, Spain and Greece in 2007-08, just on the eve of the global financial crisis. The current account balance gaps in these countries then fell back (toward zero) as a result of the crisis. Italy and France's current account balance gaps were much less affected by the global financial crisis.

Figure 2.2. Current account balance gaps (in percentage points of GDP) between Austria, France, Greece, Italy and Spain and their synthetic control units: 1980 to 2010



Source: Author's calculations.

Note: The vertical dotted lines show when countries joined the EMU. All countries joined in 1999 except Greece, which joined in 2001.

The synthetic control analysis cannot directly test the relative importance of the channels (or mechanisms) identified in the literature review in Section 2.2 in driving the current account imbalances but the results do provide some insights. There is a clear difference in the size of current account balance gaps (and underlying deficits) in the southern European countries at the onset of the global financial crisis; gaps (and deficits) were significantly larger in Greece and Spain than France and Italy (see Figure 2.1 and Figure 2.2). In addition, Greece and Spain had much less sustainable external debt positions (Fernandez-Villaverde, Garicano, and Santos 2013) and experienced bigger falls in their current account gaps (and underlying deficits) when the global financial crisis hit (see Figure 2.1 and Figure 2.2). This fits

with the financial integration channel playing a larger role in the Greece and Spain than elsewhere. Lane and Milesi-Ferretti (2010, 2012) show that abnormally large current account deficits, such as those fuelled by excessive domestic credit expansion, were associated with sharp current account reversals during the global financial crisis. The large pressure for external adjustment in Greece and Spain after the crisis hit was at least partly driven by financial markets suddenly no longer viewing these countries as credible borrowers—i.e. a *sudden stop* in capital inflows (Lane 2012). The financial integration channel clearly intersected with the fiscal deficits channel in Greece, where the government grossly mismanaged the public finances and borrowed excessively on international debt markets (Featherstone 2011; Katsimi and Moutos 2010).

The competitiveness channel is likely to have affected all five of the countries. Greece, Italy and Spain do not possess the wage bargaining institutions to restrain wage growth and once they joined the EMU they could no longer devalue to regain competitiveness. In contrast, Austria belongs to the group of coordinated market economies (CMEs) in northern Europe that have coordinated wage bargaining that ties wage growth in the sheltered sector to that in the export sector (Johnston and Hancké 2009; Johnston, Hancké, and Pant 2014). France sits somewhere in between; it can to some extent limit wage growth through state-imposed wage coordination (Johnston, Hancké, and Pant 2014), but it is much less export-orientated than the northern European CMEs and often grouped with the southern European economies as a mixed market economy in the varieties of capitalism literature (Hall 2014; Iversen, Soskice, and Hope 2016). It is well documented, however, that France saw its cost competitiveness vis-à-vis Germany (its biggest export competitor) deteriorate during the 2000s (Bouchoucha 2015; Kierzenkowski 2009). The introduction of the EMU in a set of countries with different wage-setting institutions led to a divergence in real unit labour costs and consequently current account balances (Carlin 2013; De Grauwe 2013; Johnston, Hancké, and Pant 2014). The north-south competitiveness differential is likely to take time to correct because wages are downwardly rigid and can often only be adjusted gradually (Bertola et al.

2013), and because efforts to improve relative competitiveness in the south are slowed by continued wage restraint in the north (Brancaccio 2012). This could be one potential reason why the current account balance gaps in Italy and France, where the competitiveness channel is likely to have been relatively more important, were largely unaffected during the global financial crisis.

The main results of the synthetic control analysis provide ample empirical evidence that the EMU drove the accumulation of current account deficits in the southern European economies prior to the euro crisis. While only one northern European surplus country is directly tested in my analysis, I believe the Austrian result implies that the EMU also drove the imbalances across the northern Europe surplus economies. The northern European CMEs share distinct political-economic institutions and wage bargaining systems and are driven strategically by export-orientation (Hall 2014; Iversen, Soskice, and Hope 2016); and like Austria, the other northern CMEs saw their real units labour costs and current account balances diverge from those of the southern European economies during the 2000s (Carlin 2013; De Grauwe 2013). Hence, the main results of the study provide empirical evidence that the EMU caused the current account imbalances not just in my countries of interest but across the euro area as a whole.

2.5 Placebo and robustness tests

The results presented so far suggest that the EMU drove the current account imbalances between member states in the run-up to the euro crisis. It is important to carry out further tests, however, before we can be confident in the credibility of the findings of the synthetic control analysis. This section reports the results of a selection of placebo and robustness checks—mirroring those carried out in Abadie, Diamond, and Hainmueller (2015)—to test the internal validity of my results. As an additional robustness test, I also re-estimate the main results using a panel difference-in-differences design.

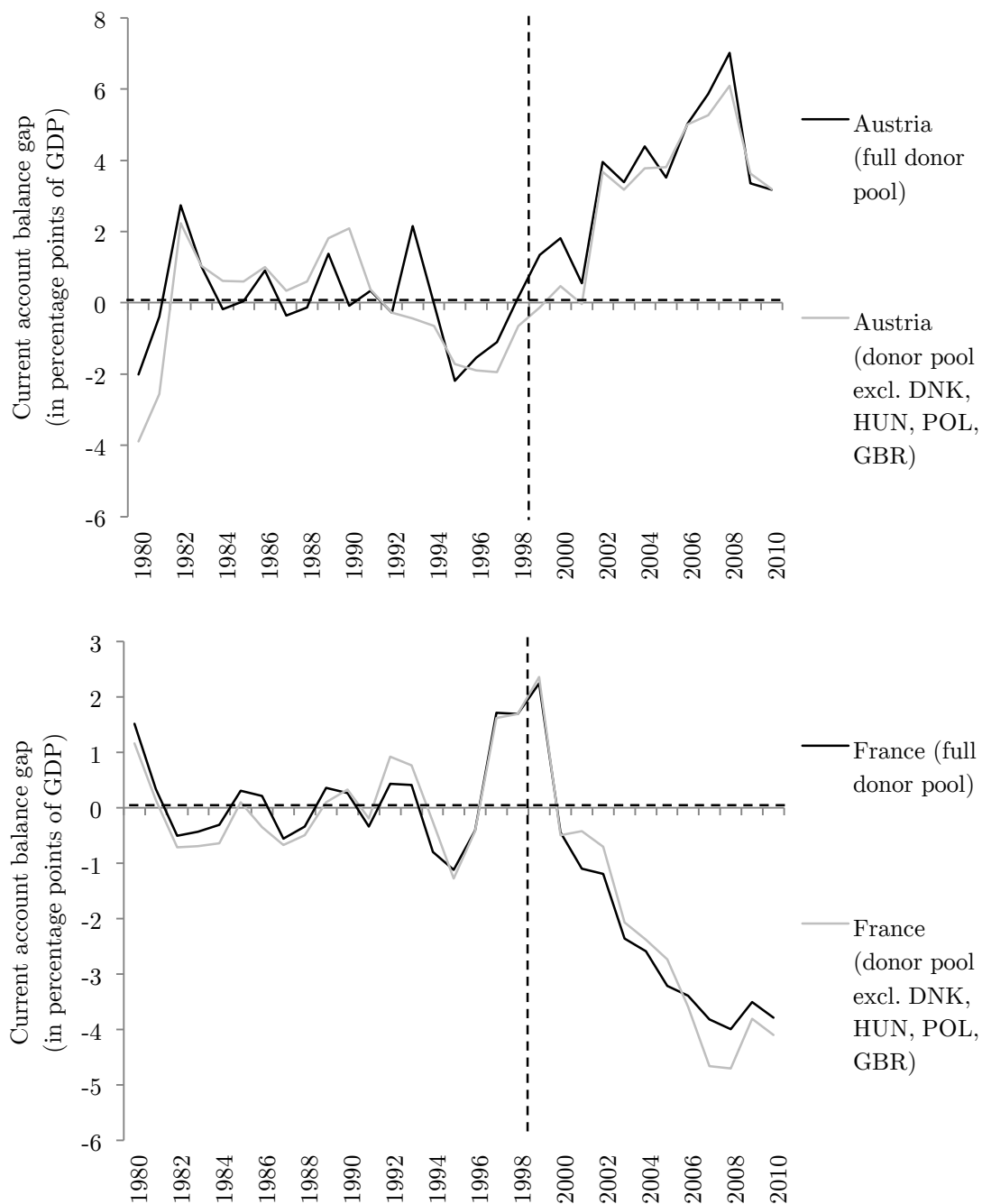
Spillovers robustness test

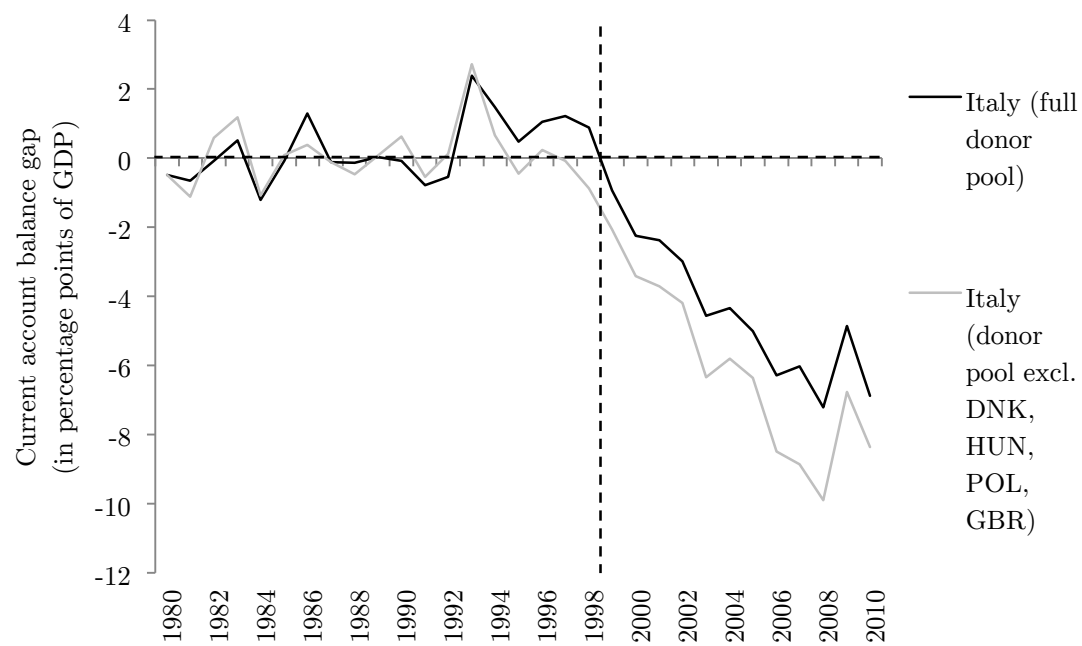
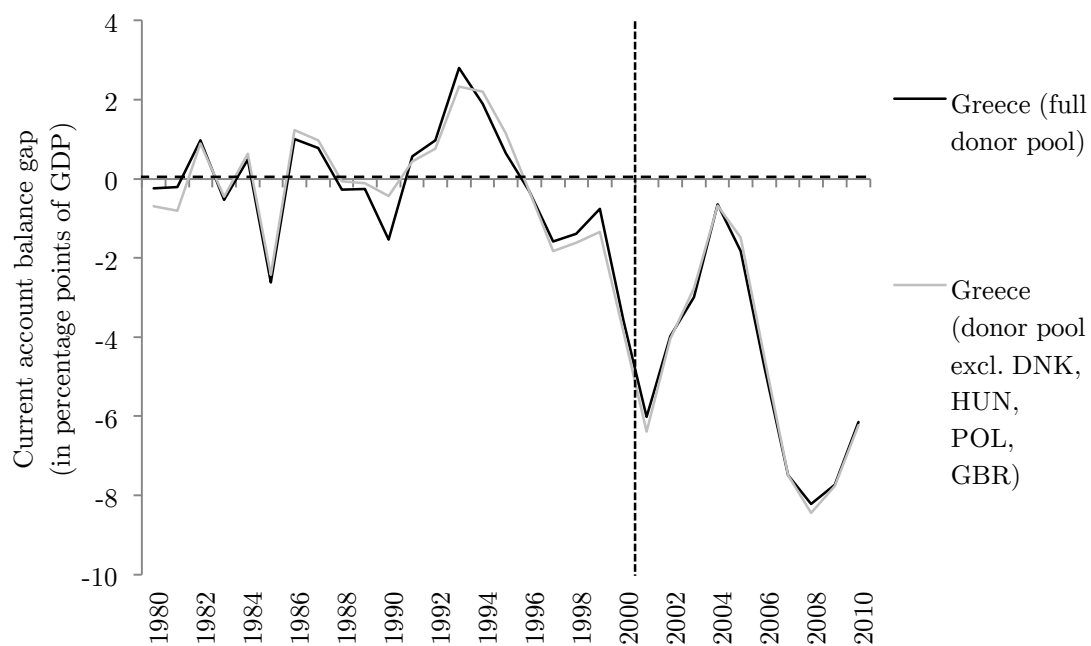
One potential bias in this study could be if there were spillovers to the current account balances of the countries in the donor pool from the introduction of the single currency. For example, if the EMU altered patterns of trade outside of the euro area. The presence of spillovers would violate the Stable Unit Treatment Value Assumption (SUTVA), which assumes that there are no interferences between units (Rubin 1980). SUTVA violations should be small in my case because by design the countries that form the synthetic control were not part of the EMU, and therefore did not have their exchange rates irrevocably fixed to the EMU members states during the post-EMU period. In addition, as the control countries were outside the EMU, their transactions costs from trade and their currency risk on cross-border banking flows were not reduced in the same way as my countries of interest by the introduction of the single currency.

It is, however, difficult to rule out spillovers completely in countries that traded a lot with EMU member states during the post-EMU period. It is theoretically unclear in which direction spillovers would bias my results, especially as the donor pool contains both current account surplus and deficit countries, but in order to allay any fears they may be driving the results of the synthetic control analysis, we re-run the analysis excluding the four countries that traded the most with the euro area during the post-EMU period. This results in the removal of two middle-income countries, Hungary and Poland, and two high-income countries, Denmark and the UK, from the donor pool.¹¹ We limit the removal to four countries because we need to ensure the donor pool is still sufficiently large to produce good synthetic control units. Figure 2.3 shows that the main results are robust to the removal. In fact, the estimated effect of the EMU in Italy and Spain is slightly larger without these countries in the donor pool, suggesting that if spillovers are present, they are actually leading to an underestimation of the EMU's effect in these two countries.

¹¹ The donor pool countries were ranked according to the average proportion of total trade (exports + imports) that occurred with euro area countries over the post-EMU period (1999-2010). Source: IMF Direction of Trade Statistics, December 2015.

Figure 2.3. Current account balance gaps (in percentage points of GDP) between Austria, France, Greece, Italy and Spain, and their synthetic control units, with full donor pool and donor pool excluding Denmark, Hungary, Poland and the UK: 1980 to 2010







Source: Author's calculations.

Note: The vertical dotted lines show when countries joined the EMU. All countries joined in 1999 except Greece, which joined in 2001.

In-time placebos

The next set of tests is the in-time placebos, which reassigns the event of interest (i.e. the introduction of the EMU) to a period prior to when it actually occurred. A large EMU effect could undermine the credibility of the main results. In my study, the pre-EMU period for Austria, France, Italy and Spain runs for 19 years; hence I reassign the EMU to 1990 for these countries, which is the middle of the period and nine years before the euro was actually introduced. As Greece joined the EMU in 2001, their pre-EMU period runs for two more years. I therefore reassign the introduction of the EMU to 1991 for the Greek test.

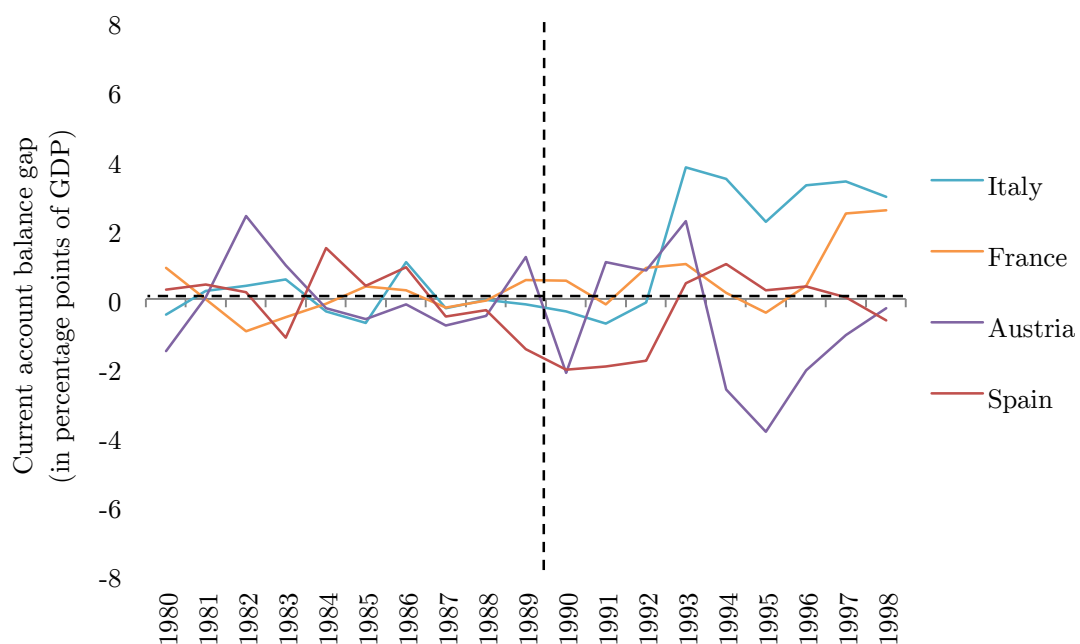
The next step is to carry out exactly the same synthetic control analysis as before but using the altered time periods.¹² Figure 2.4 and Figure 2.5 show that the current account balance gaps for all countries except Italy are small in both the pre- and post-euro periods and fluctuate around zero, indicating the placebo introduction

¹² The only change in the specification in Austria, France, Italy and Spain is that the government primary balance and domestic credit to the private sector are dropped as predictors because no data is available during the 1980-1989 period. As the government primary balance is available from 1990, only domestic credit to the private sector is dropped in the Greek analysis.

of the EMU has no significant effect on current account balances. In Italy, the placebo shows a positive current account balance gap opening up prior to the actual introduction of the EMU. However, this does not undermine the main results, because Italy was a deficit country during 2000s, hence to the extent to which these pre-EMU effects were present, they would likely lead to an underestimation of the EMU effect in Italy in the main results.

Taken together, the results of the in-time placebos suggest that the current account balance gaps in the main results are driven by the introduction of the EMU and not the inability of the synthetic control units to replicate actual current account balances.

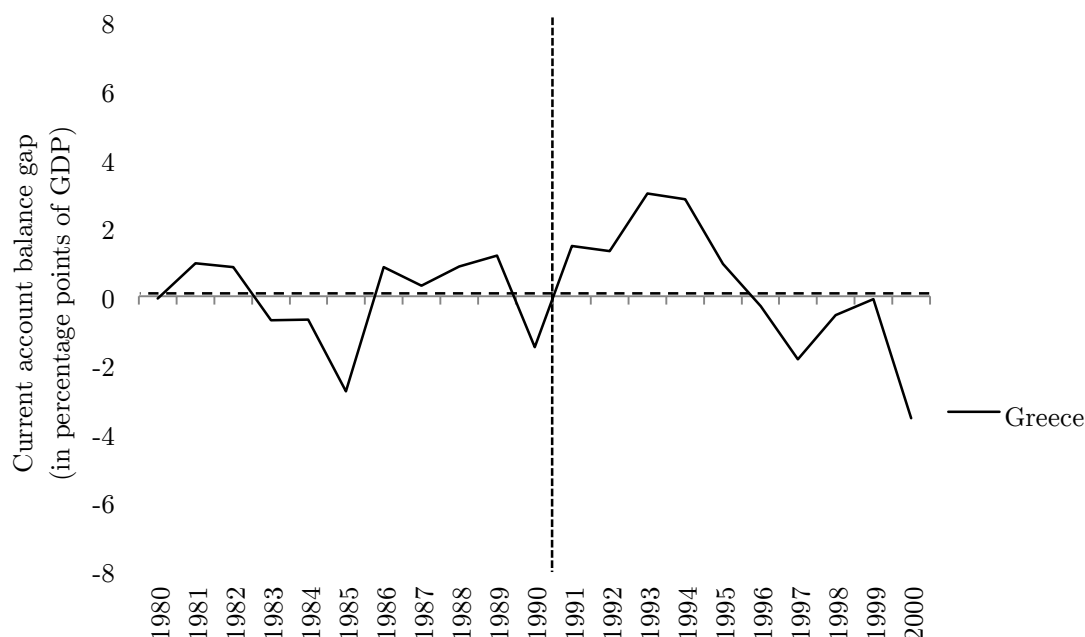
Figure 2.4. Placebo EMU introduction in 1990: Current account balance gaps (in percentage points of GDP) between Austria, France, Italy and Spain, and their synthetic control units: 1980 to 1998



Source: Author's calculations.

Note: Vertical dotted line marks the date of the placebo EMU introduction (1990).

Figure 2.5. Placebo EMU introduction in 1991: Current account balance gap (in percentage points of GDP) between Greece and Synthetic Greece: 1980 to 2000



Source: Author's calculations.

Note: Vertical dotted line marks the date of the placebo EMU introduction (1991).

It is evident that the eventual EMU member states knew about the currency union well in advance of 1999, and that the member state governments pursued restrictive macroeconomic policies during the 1990s in order to achieve the Maastricht convergence criteria (a set of targets for macroeconomic indicators) required to join the single currency. The in-time placebo tests, however, help to dispel fears of anticipatory effects invalidating the results of the synthetic control analysis, because they show that the EMU had no significant effect on the current account balances of my countries of interest (excluding Italy) before the introduction of the EMU. One potential reason for this could be that the 1990s saw macroeconomic management in advanced economies shift towards independent inflation-targeting central banking, hence the non-euro OECD countries that make up the synthetic control units were pursuing similarly tight macroeconomic policies to my countries of interest during latter part of the pre-EMU period. Additionally, many countries in the donor pool were also pursuing restrictive fiscal policies during the 1990s to reduce the

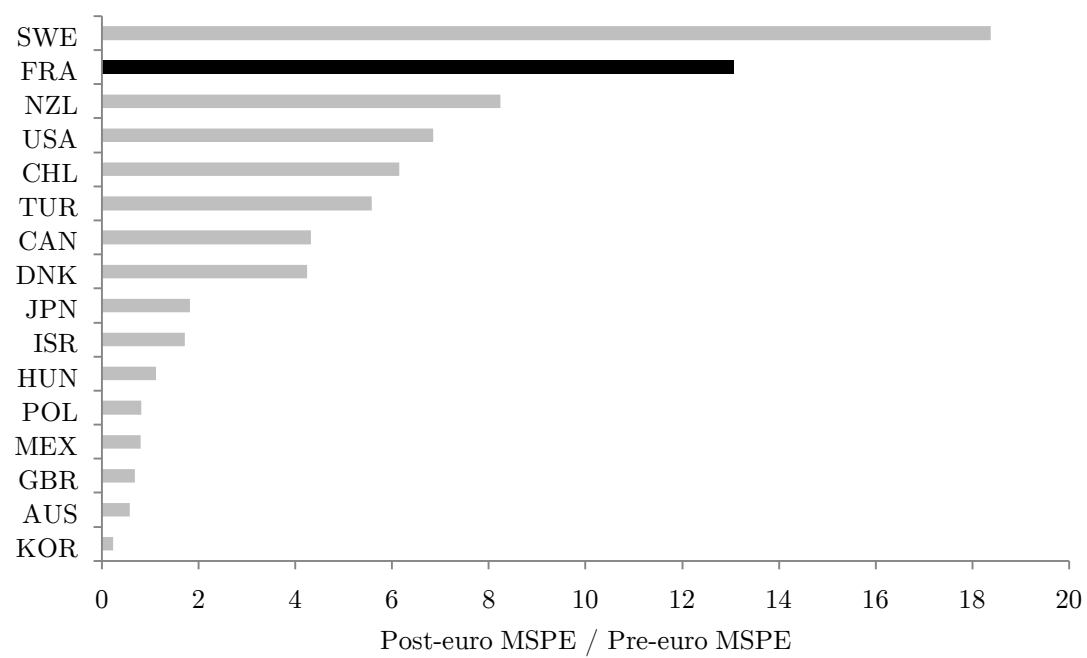
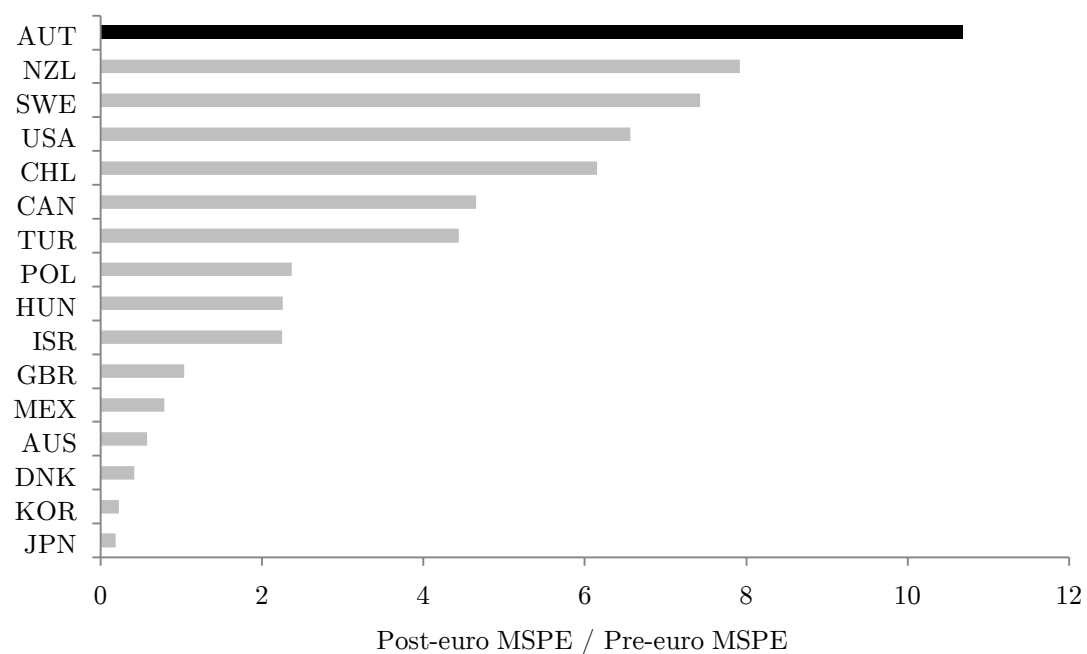
government deficits (and debt) that built up during the economic downturn of the early 1990s (as discussed further in Section 4.6 of Chapter 4 of the thesis).

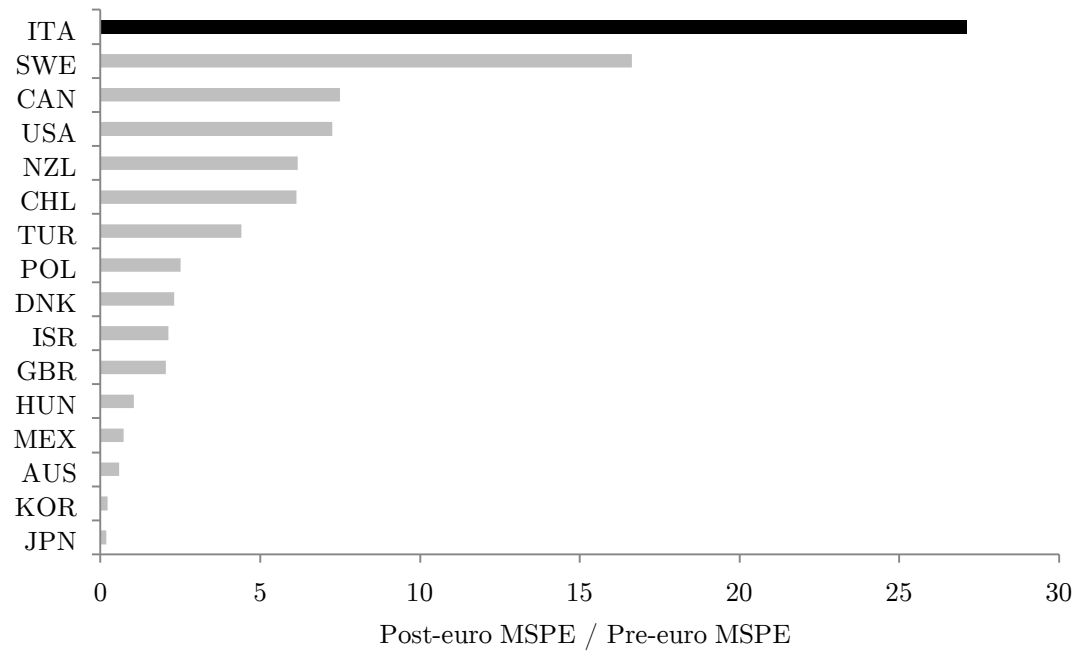
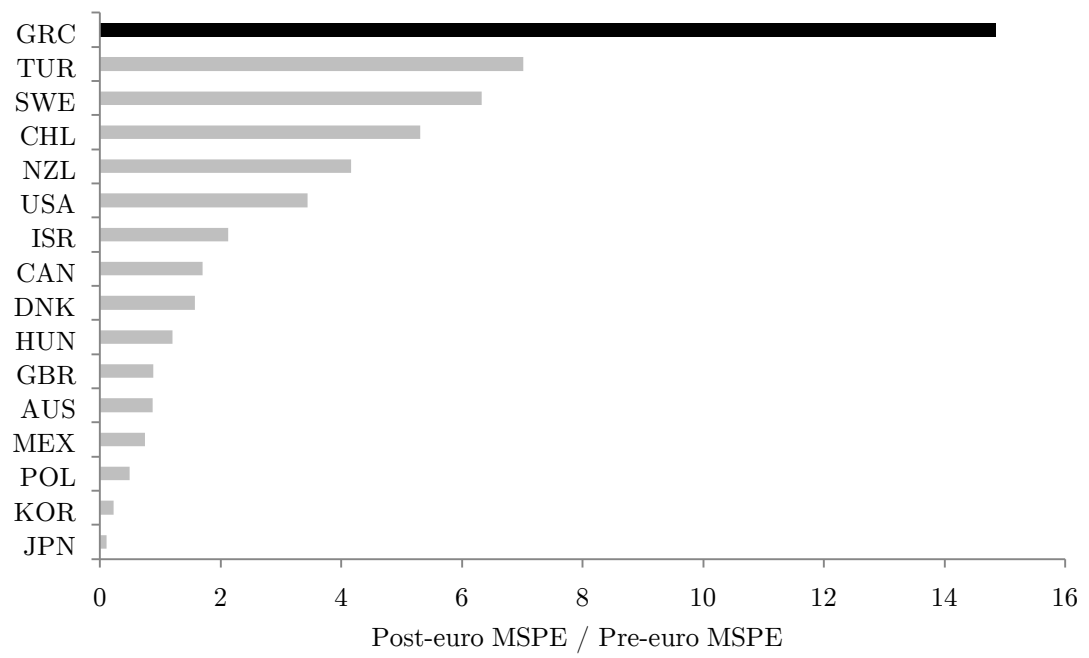
Across-country placebos

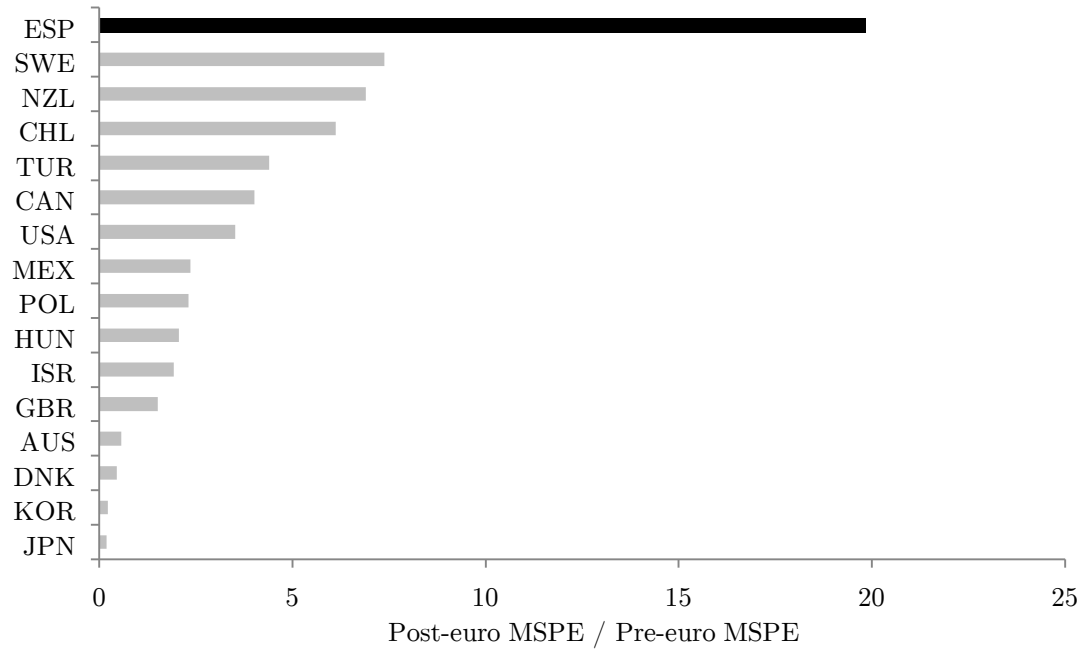
The second type of placebo study I carry out is an across-country placebo. This reassigns the introduction of the EMU to countries in the donor pool one at a time, providing a distribution of placebo effects (i.e. the effect of adopting the single currency) for OECD countries in my sample that did not participate in the EMU. If my baseline results are credible, then the effect of the EMU should be significantly larger for my countries of interest than countries in the donor pool. The across-country placebo must be carried out separately for the five countries in my study. For each country of interest, the synthetic control method must be carried out 15 times, each time reassigning the event of interest to a different country in the donor pool (and dropping the relevant country of interest into the donor pool).

According to Abadie, Diamond, and Hainmueller (2015), the results of the across-country placebo are best interpreted by comparing ratios of the post-EMU mean squared prediction error (MSPE) to the pre-EMU MSPE, as shown in Figure 2.6. The MSPE is a measure of the closeness of fit between a country's actual current account balance and that of its synthetic control. The MSPE ratio is higher when the effect of the EMU on the current account balance is larger. However, the measure also takes into account how well the synthetic control for each country can approximate the pre-EMU trend in current account balances. A large current account balance gap in the post-EMU period is not strong evidence of the EMU having a large effect if the synthetic control unit does not tightly match the current account balance of the country of interest in the pre-EMU period. Put another way, a high post-EMU MSPE is not suggestive of the EMU having a sizeable effect on the current account balance when the pre-EMU MSPE is also sizeable.

Figure 2.6. Ratio of post-EMU MSPE to pre-EMU MSPE: Austria and donor pool, France and donor pool, Greece and donor pool, Italy and donor pool, and Spain and donor pool







Source: Author's calculations.

Note: The pre-EMU period runs from 1980-1998 for all countries except Greece, where it runs from 1980-2000. The post-EMU period runs from the year after the end of the pre-EMU period until 2010.

Austria, Greece, Italy and Spain have by far the largest post- to pre-EMU MSPE ratio of the 16 countries in their respective samples. We can use the distribution of ratios to compute a p-value (as in Abadie, Diamond and Hainmueller 2015, 11). If the null hypothesis (that the EMU has no effect) was true, the probability of finding a ratio as large as the one observed for Austria, Greece, Italy and Spain would be just 1/16 or 0.0625. The MSPE ratio in France is the second highest in the sample to Sweden, which means the French p-value is 2/16 or 0.125. However, Synthetic Sweden is overwhelmingly dependent on France (it receives a 79% weight in the synthetic control) and hence the Swedish result would not be robust to the type of test carried out in the next subsection.

I can use the p-values calculated for my countries of interest and Fisher's (1932) combining function to calculate a combined p-value across my five independent studies.¹³ The joint null hypothesis is that all of the separate null

¹³ The combined test statistic is calculated as $-2 \sum_{i=1}^k \ln(p_i)$, which has a χ^2 distribution with $2k$ degrees of freedom, where k is the number of independent tests being combined.

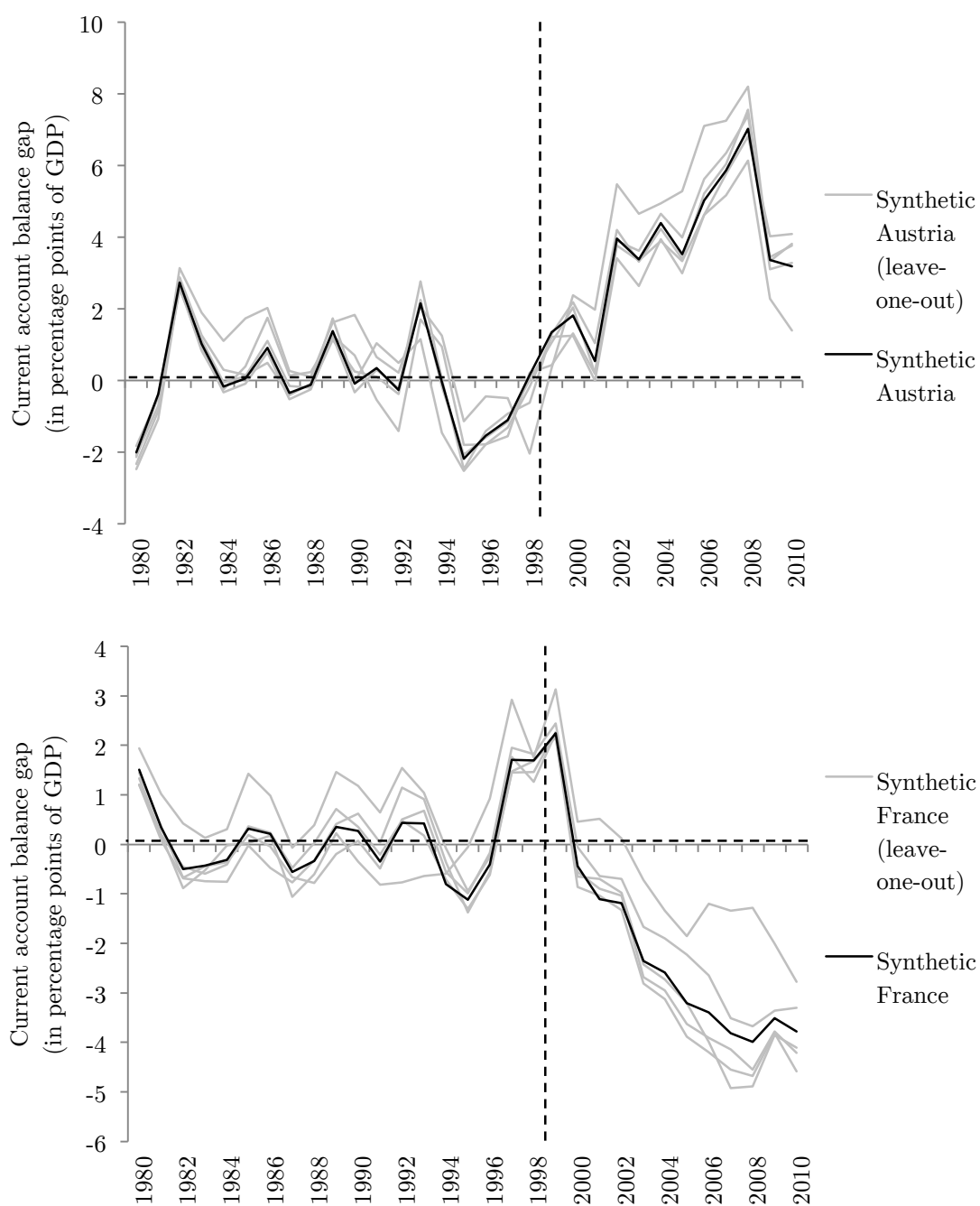
hypotheses are true (i.e. that the EMU has no effect on current account balances in all five countries). The overall p-value from my synthetic control analyses is 0.00120, which is highly statistically significant at any conventional level. Taken together, the p-values from my synthetic control analysis therefore suggest that the main results of the study are very unlikely to have been driven by chance.

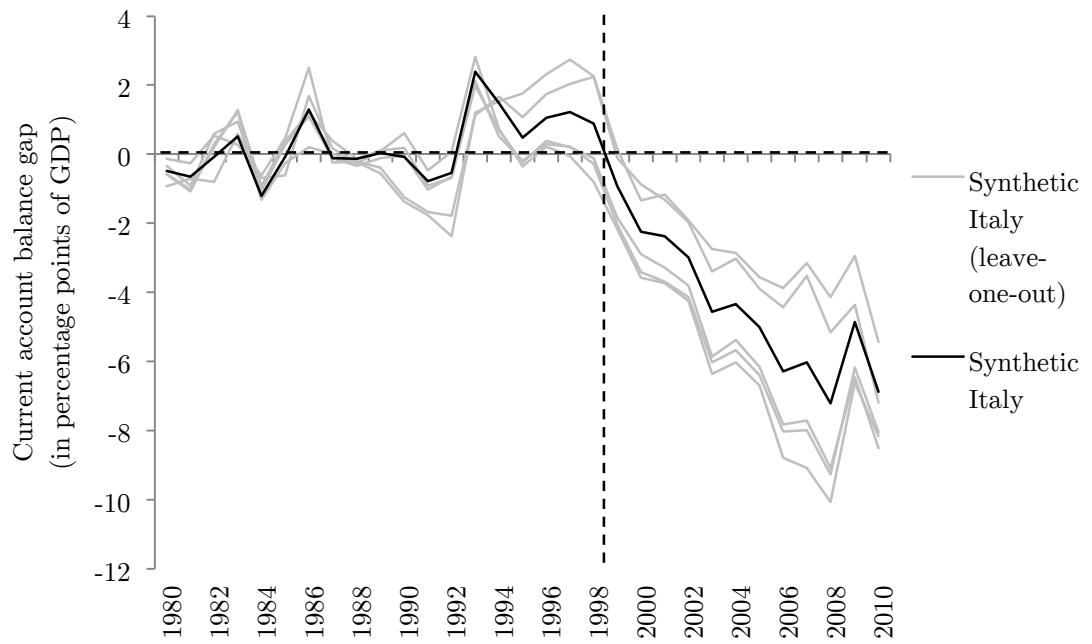
Leave-one-out robustness test

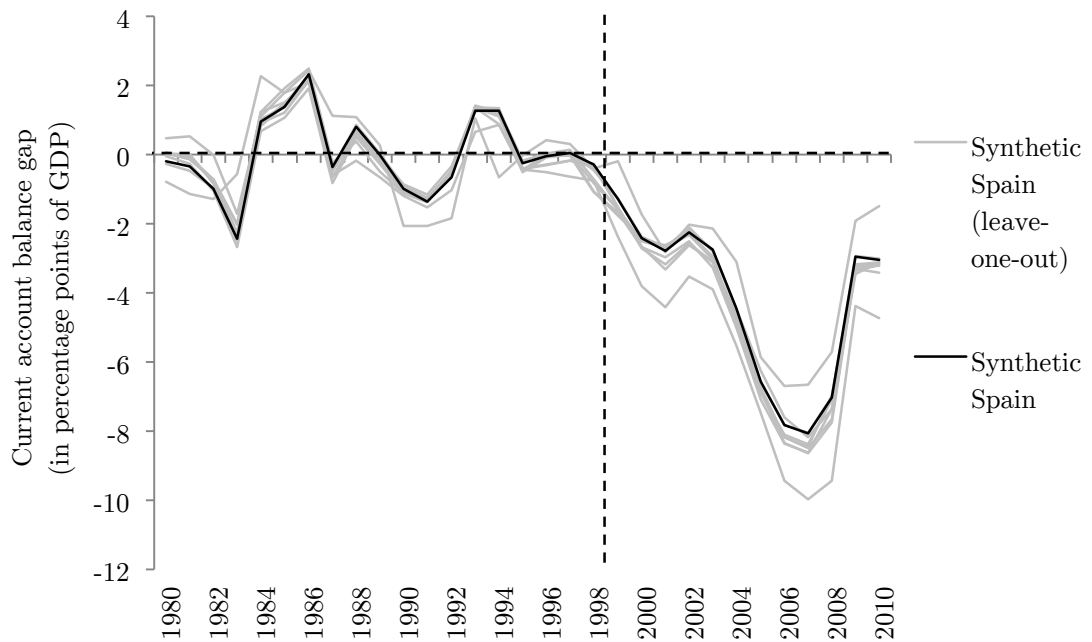
The leave-one-out robustness test is to assess whether the baseline results are sensitive to the removal of any one country from the synthetic control units. This is to avoid the case where the results are driven by one country. Carrying out the robustness test for a country of interest involves re-running the synthetic control analysis a number of times, each time leaving out one of the countries that make up the synthetic control unit (Abadie, Diamond, and Hainmueller 2015). For example, Synthetic Austria is made up of Australia, Hungary, Japan, Korea and Poland. The test involves removing each of these five countries in turn from the donor pool and re-calculating the synthetic control analysis. The results of the test are shown in Figure 2.7.

We can see that the main results of the synthetic control analysis are robust to the removal of any individual country from the synthetic control units. In other words, the current account balance gaps are very similar between the synthetic control units and the leave-one-out synthetic control units. The French and Italian tests do show some variation in the size of the current account balance gaps but the main qualitative result still holds up; the EMU led to a significant deterioration in current account balances in both countries. Taken together, the leave-one-out robustness tests provide evidence that one particular country is not driving the main results of my study.

Figure 2.7. Robustness test: Leave-one-out distribution of the gaps (in percentage points of GDP) between Austria, France, Greece, Italy and Spain, and their synthetic control units: 1980 to 2010







Source: Author's calculations.

Note: The vertical dotted lines show when countries joined the EMU. All countries joined in 1999 except Greece, which joined in 2001.

Panel difference-in-differences results

The final robustness test in the paper is to re-estimate the results using a panel difference-in-differences design. If the results are comparable to those of the synthetic control analysis, it adds further credibility to the main results of my study. I estimate two models using the same dataset as the synthetic control analysis. The dataset includes my five countries of interest and the fifteen donor pool countries and covers 1980-2010. In both models the dependent variable is current account balance (as a % of GDP) and the independent variables of interest are an EMU dummy, which is one for my five countries of interest from 1999-2010 and zero otherwise, and an interaction term, which interacts an Austria dummy (1 for Austria and zero otherwise) and the EMU dummy. The interaction is included because the synthetic control results show that the EMU effect in Austria (large and positive) was very different from the other four countries of interest (large and negative). Model 1 then includes both country and year fixed effects; and Model 2 further adds the full set of current account predictors (covariates) used in the synthetic control analysis. I use two-way clustered standard errors to account for

dependencies between observations both within countries and within time periods.

Table 2.7 reports the results of the panel difference-in-differences estimation.

Table 2.7. The effect of the EMU on current account imbalances: Panel difference-in-differences estimates

Model	(1)	(2)
EMU	-3.50 ** (1.52) [0.021]	-2.69 ** (1.07) [0.011]
Austria * EMU	5.43 *** (1.51) [0.000]	2.28 ** (1.12) [0.041]
Observations	620	593
R -squared	0.15	0.36
Country fixed effects	✓	✓
Year fixed effects	✓	✓
Covariates	✗	✓

Source: Author's calculations.

Note: This table shows the coefficients from panel difference-in-differences regressions. The two-way clustered standard errors are shown in parentheses and the p-values are shown in brackets; *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$. The dependent variable is current account balance (as a % of GDP). The standard errors are two-way clustered by country and year.

The results show that the EMU exerted a statistically significant negative effect on the current account balances of the five EMU member states in the sample. The statistically significant interaction term shows a large countervailing EMU effect in Austria. The coefficients in Model 1 are of a comparable size to those in the synthetic control analysis (see Table 2.6). The coefficients in Model 2 are somewhat smaller but are still statistically significant and have the expected signs. The results of both models therefore corroborate the main findings of the synthetic control analysis.

2.6 Conclusion

The European sovereign debt crisis put severe economic and political strain on the EMU and prompted a reassessment of the EMU's supposedly successful first decade. This turned the spotlight onto the substantial macroeconomic imbalances that emerged between member states after the introduction of the euro, and the divergence in current account balances in particular.

This paper investigates the extent to which the introduction of the EMU was responsible for the current account imbalances that arose between member states. More specifically, I use macroeconomic data from OECD countries and a counterfactuals-based approach—the synthetic control method—to estimate the causal effect of the EMU on the current account balances of individual member states. This paper contributes to the empirical literature on the effect of EMU on current account balances, which has yet to come to a consensus about whether the imbalances were caused by the EMU (Belke and Dreger 2013; Campa and Gavilan 2011; Schmitz and von Hagen 2011) or by factors external to the currency union (Chen, Milesi-Ferretti, and Tressel 2013; Guerrieri and Esposito 2013). The synthetic control approach is ideally suited to fill this gap in the literature as it shows us what would have happened to the current account balances of member states had they not joined the EMU.

The results of the study show that the introduction of the single currency caused a significant deterioration in the current account balances of France, Greece, Italy and Spain, and significantly improved the current account position of Austria. The similarity of political-economic institutions across the northern European CMEs, as well as comparable trends in real exchange rates and current account balances during the 2000s, suggests that the Austrian result is also likely to hold in the other northern European CMEs. In other words, the EMU is likely to have caused the accumulation of current account surpluses across the northern European CMEs. The main results of my study therefore imply that the EMU drove the current account imbalances not just in my countries of interest but across the euro area as a whole.

Policymakers in the euro area have started to pay more attention to external imbalances in the wake of the euro crisis. The European Commission's Macroeconomic Imbalances Procedure (MIP) aims to identify and correct macroeconomic imbalances, including those in the current account.¹⁴ However, the results of my study provide reason to be skeptical about whether the MIP will succeed in achieving its goals. I find the EMU drove the imbalances, and hence changes to the EMU's institutional framework, and not just better monitoring of external balances, may be required to avoid the imbalances reemerging in the future. In addition, my results suggest that policy intervention, such as, for example, fiscal devaluation (see Bertola et al. 2013) is likely to be necessary to close the competitiveness gap that opened up between the north and south during the 2000s, especially given continued wage moderation in the north.

This paper makes a valuable contribution to the large body of empirical literature on the macroeconomic effects of the EMU by using the synthetic control methodology to provide causal evidence that the EMU drove the euro area's current account imbalances in the run up to the euro crisis. However, it is important to acknowledge the limitations of my synthetic control analysis, as this helps to identify important areas for future research. First, while the results suggest that the EMU's effect on current account balances operated through multiple channels (see Section 2.4), the synthetic control analysis does not explicitly test the causal mechanisms. It is clear that we still require a better understanding of the underlying mechanisms if the next generation of euro area policymaking is to successfully safeguard the EMU from dangerous external imbalances. The methodology is also unable to produce good synthetic control units for all member states (see Section 2.4). It is therefore crucial that future research provides rigorous empirical evidence on the effect of the EMU on the current account balances of the surplus economies other than Austria; especially Germany, which built up a huge current account

¹⁴ For more information on the Macroeconomic Imbalances Procedure see: http://ec.europa.eu/economy_finance/economic_governance/macroeconomic_imbalance_procedure/index_en.htm

surplus and lent heavily to southern Europe during the 2000s. Lastly, the analysis does not include the years beyond 2010 due to the high risk of confounding the estimates of the EMU's effect (see Section 2.4). A quick look at the post-2010 data shows that the burden of adjustment to the euro area's current account imbalances has fallen squarely on the shoulders of the deficit countries in the south. Exploring the role of the EMU in the distinct pattern of current account adjustment since the euro crisis is likely to be another fruitful avenue for future research.

The comparative political economy of growth models in advanced democracies

ABSTRACT

This paper argues that growth models in advanced democracies are dependent upon both varieties of capitalism and the logic of political competition. It demonstrates empirically that the coordinated market economies with consensus political systems pursued *export-led* growth models during the Great Moderation and liberal market economies with majoritarian political systems pursued *consumption-led* growth models. The paper uses the growth models lens to develop a new approach to comparative political economy that incorporates both the supply side (political-economic institutions) and the demand side (demand drivers of economic growth and government demand-side policies) of the economy. The approach emphasises the strong influence that political systems have on the long-term electoral viability of different growth models. The approach helps to explain one of the major empirical phenomena of the Great Moderation: the dramatic divergence in real exchange rates and current account balances among advanced democracies. It also allows me to provide fresh insights on important on-going debates in comparative political economy surrounding the roles of both income inequality and credit expansion in post-Fordist growth.

3.1 Introduction

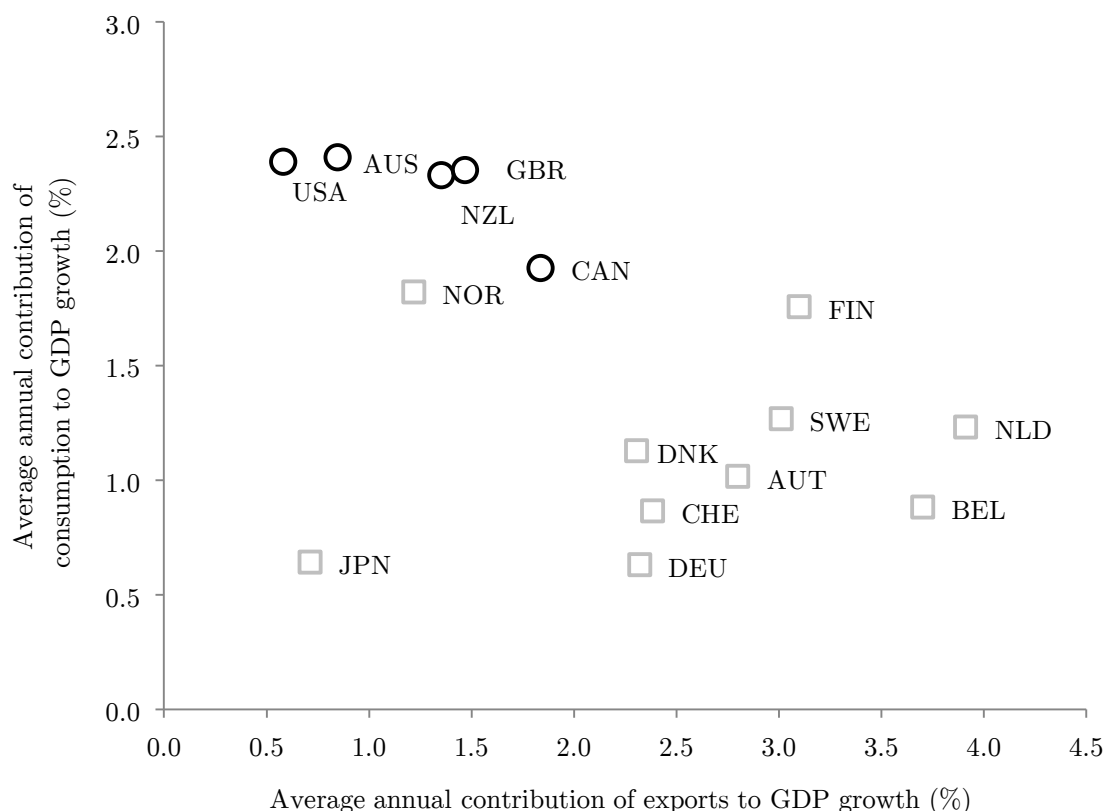
In the Fordist era of mass production and consumption that characterised the advanced democracies from the end of the Second World War until the late 1970s, economic growth was underpinned by rapid growth in both wages and productivity (Glyn 2007). The dominant growth model in advanced democracies during the Fordist era was the *wage-led* growth model, in which household consumption and investment were the primary drivers of demand (Baccaro and Pontusson 2016).¹⁵ The wage-led growth model collapsed along with the Fordist system in the late 1970s under the combined weight of short-term upheaval (industrial conflict and stagflation) and longer-term structural trends (deindustrialisation and declining union membership and strength) (Hope and Soskice 2016). The post-Fordist era that followed has been characterised by a number of secular trends in the global economy such as globalisation, deindustrialisation, the information and communications technology (ICT) revolution, and financialisation (Hall 2015; Wren 2013b). Governments and firms in advanced democracies have had to respond to the challenges and opportunities created by these trends. At the top of their list of challenges was to find a replacement for the wage-led growth model, one that could deliver prosperity in the highly globalised and interconnected post-Fordist world.

Baccaro and Pontusson (2016) find that advanced democracies have pursued one of two growth models in the post-Fordist era: *export-led* or *consumption-led*. A central claim of their growth models approach to comparative political economy (CPE) is that growth models are not dependent of varieties of capitalism. They see their approach as a demand side alternative to the supply-side dominated varieties of capitalism literature. Figure 3.1 shows the contributions of consumption and exports to GDP growth in fifteen advanced democracies during the Great

¹⁵ Table B.1 in Appendix B1 shows the large average annual contributions of consumption to GDP growth across advanced democracies during the 1960s and 1970s.

Moderation—the long period of reduced macroeconomic volatility and low inflation that preceded the global financial crisis in 2008-09.¹⁶

Figure 3.1. Average annual contributions of consumption and exports to GDP growth, 1994-2007



Source: European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update).

Note: See Appendix B2 for a guide on how to calculate annual contributions to GDP growth and more information on the data source for the figure. The markers in the figure correspond to varieties of capitalism. The grey squares are CMEs and the black circles are LMEs.

In line with Baccaro and Pontusson (2016), the figure shows that advanced democracies pursued different growth models during the Great Moderation. The countries in the top left-hand corner pursued *consumption-led* growth models and the countries in the bottom right-hand corner pursued *export-led* growth models. What is also clear from the figure is that growth models were closely correlated with varieties of capitalism. The black circles in the figure are the liberal market economies (LMEs), which were predominantly consumption-led, and the grey

¹⁶ The term Great Moderation was first introduced by Stock and Watson (2002).

squares are the coordinated market economies (CMEs), which were predominantly export-led. This provides strong evidence against Baccaro and Pontusson's (2016) argument that post-Fordist growth models cannot be delineated along varieties of capitalism lines.¹⁷

This paper argues that you need to incorporate both the supply and demand sides of the economy, as well as political systems, in order to understand the trajectories of advanced democracies during the Great Moderation. The complementary political-economic institutions at the heart of varieties of capitalism represent the supply side and the demand drivers of growth and the demand-side policies of governments represent the demand side. Political systems play a key role in holding everything together through their influence on the long-term electoral viability of different growth models.

The paper does not seek to test specific causal hypotheses but rather to use theory and empirical evidence to illuminate the complex set of interrelationships between growth models, varieties of capitalism, politics and policy in advanced democracies. The growth models approach I develop helps to explain one of the major empirical phenomena of the Great Moderation: the dramatic divergence in real exchange rates and current account balances among advanced democracies. It also provides a fresh perspective on important on-going debates in CPE surrounding the roles of both income inequality and credit expansion in post-Fordist growth.

The main tenets of the new approach to CPE developed in this paper and the key findings of the empirical analysis are:

Varieties of capitalism, political systems, and growth models are deeply intertwined. Post-Fordist growth models are rooted in political-economic institutions; the CMEs are driven strategically by export-led growth and the LMEs are driven strategically by consumption-led growth. Despite institutional and structural change in the CMEs during an era of deindustrialisation, coordinated capitalism has ultimately remained resilient, and the CMEs continue to be firmly export-led. The consensus political

¹⁷ See Hope and Soskice (2016) and Martin (2016) for further critical discussion of Baccaro and Pontusson (2016).

systems of the CMEs and the majoritarian political systems of the LMEs are complementary to their growth models and provide a strong electoral incentive for parties on both sides of the partisan divide to pursue policies that support the national growth model.

Divergent growth models helped fuel macroeconomic imbalances. The mutually reinforcing growth models of the CMEs and the LMEs were a major contributor to the dangerous current account imbalances that emerged among advanced democracies during the Great Moderation. Government demand-side policies, such as fiscal policy and the encouragement (or mitigation) of credit expansion, supported growth models and further contributed to the imbalances. The move to independent inflation-targeting central banking and the opening of financial markets, paradoxically, gave governments in advanced democracies more discretion to pursue demand-side policies over this period.

Income inequality only affected growth models at the margin. The Kaleckian ideas brought into CPE by Baccaro and Pontusson (2016) suggest that a more equal distribution of income will result in higher household consumption. Contrary to these ideas, I find that the highly inegalitarian LMEs were the most consumption-led during the Great Moderation. This is not to say that, *ceteris paribus*, redistribution from rich to poor will not boost consumption but rather that other factors related to varieties of capitalism, such as wage coordination, are more important than the income distribution in driving growth models. Within the export-led CMEs, however, the distribution of income did have some second-order effects on growth models. The more egalitarian Nordic CMEs had a higher contribution of consumption to growth than the less egalitarian continental European CMEs (and Japan).

Credit expansion was central to the LMEs' consumption-led growth model. The rapid growth in credit in the LMEs, which was encouraged by their governments, helped to prop up consumption directly, through consumer credit, and indirectly, through its effect on house prices. While often overlooked, the Nordic CMEs and the

Netherlands also saw rapid credit expansion during the Great Moderation. This did not undermine their export-led growth models, however, because it was centred on housing and had a much smaller effect on consumption than the expansion of credit in the LMEs.

The remainder of the paper is organised as follows. Section 3.2 takes an in-depth look at the links between varieties of capitalism and growth models. Section 3.3 investigates the role of political systems, electoral politics and government demand-side policies in growth models. Section 3.4 focuses on the relationship between growth models, income inequality and redistribution. Section 3.5 focuses on the relationship between growth models, credit and housing. The final section provides some concluding remarks.

3.2 Varieties of capitalism and growth models during the Great Moderation

The growth models pursued by advanced democracies during the Great Moderation were correlated with Hall and Soskice's (2001) varieties of capitalism (as shown in Figure 3.1). However, correlation does not imply causation, and it is necessary to provide some theory as to why this clustering occurs. The link between varieties of capitalism and growth models is currently underdeveloped in the CPE literature. This section aims to fill that gap.

The varieties of capitalism approach

Hall and Soskice's (2001) varieties of capitalism approach to comparative political economy puts the firm at centre stage. The framework identifies five spheres—industrial relations, skill formation, corporate governance, inter-firm relations and employer–employee relations—in which firms must solve coordination problems by developing relationships with other actors in the economy. A central pillar of the varieties of capitalism approach is that firms resolve these coordination problems in distinctive ways in different nation states. The two ideal types of political economy

identified are liberal market economies (LMEs), where firms coordinate primarily via market mechanisms and hierarchies, and coordinated market economies (CMEs), where firms coordinate primarily via non-market relationships and resolve many of their problems through strategic interaction.

The political-economic institutions that underpin each variety of capitalism are complementary to one another, so no actor has an incentive to deviate from the status quo. A key consequence of LMEs and CMEs having distinct institutional frameworks is that they possess comparative advantages in different activities. LMEs specialise in high-technology manufacturing and services, as flexible labour and capital markets mean firms are well equipped to pursue strategies based on radical innovation. In contrast, in CMEs with long-term relationships between actors, specific-skilled workforces and patient capital, firms are better placed to pursue strategies based on incremental innovation, and therefore CMEs tend to specialise in more traditional manufacturing industries such as capital goods (Hall and Soskice 2001; Soskice 1999).

The sample of advanced democracies analysed in the paper comprises the ten CMEs identified by Hall and Soskice (2001), as well as five of the six LMEs.¹⁸ The CME group consists of Austria, Belgium, Denmark, Finland, Germany, Japan, the Netherlands, Norway, Switzerland, and Sweden; and the LME group consists of Australia, Canada, New Zealand, the United Kingdom, and the United States. The

¹⁸ Ireland is excluded from the LME group on the grounds that it is a big outlier when it comes to growth; its average GDP growth rate over the sample period was 7.4%, which was nearly twice as high as the next fastest growing economy Finland, which saw average growth of 4% (Source: European Commission AMECO Database, 03/05/2016 update). Ireland's institutional configuration also differed from the textbook LME case. Its wage bargaining was more centralised, which along with high levels of inward FDI helped exports make a much bigger contribution to growth than in the other LMEs, particularly in the 1990s (Barnes and Wren 2012). The mixed market economies (MMEs) of southern Europe (France, Greece, Italy, Portugal and Spain) are also excluded from the analysis as they lack institutional coherence and (partly as a consequence) did not possess a consistent growth model during the Great Moderation. In addition, the paper focuses on advanced democracies and a number of the MMEs were much less developed than the LMEs and CMEs at the start of the sample period. The average GDP per capita of Greece, Portugal and Spain was \$11,521 in 1994, compared to \$25,955 for the fifteen countries analysed in the paper (Source: IMF World Economic Outlook Database, April 2016).

large varieties of capitalism, macroeconomic policy, and welfare state literatures in CPE focus on these countries (or a very similar set of countries) (e.g. Esping-Andersen 1990; Iversen 2005; Martin and Swank 2012; Pontusson 2005; Thelen 2014; Wren 2013b). Thus, to be able to build on and develop the theoretical insights in the existing literature, I need to examine the same set of cases (countries) (Gerring 2011).

Growth models during the Great Moderation

The nascent comparative political economy literature on growth models defines a nation's growth model by the relative contributions that the different components of aggregate demand—consumption, investment, government spending and net exports (exports minus imports)—make to overall GDP growth (Baccaro and Pontusson 2016; Hope and Soskice 2016).

GDP growth could in theory be driven by any of the four components of aggregate demand that contribute positively to growth—consumption, investment, government spending and exports. However, as in Baccaro and Pontusson (2016), I focus on the two dominant demand drivers of the post-Fordist era: consumption and exports. The other two components of aggregate demand played an important supporting role but were not the main engines of growth in advanced democracies during the Great Moderation. Government spending growth reflects the stance of fiscal policy, which I argue in Section 3.3 was typically chosen to reinforce national growth models during the Great Moderation—i.e. fiscal policy was more restrictive in export-led CMEs than it was in the consumption-led LMEs. Investment-led growth was more associated with fast-growing emerging economies building up their infrastructure and production capacities than with advanced democracies. For example, investment (gross fixed capital formation) accounted for 22% of GDP on average across the fifteen countries in the sample between 1994 and 2007, whereas it accounted for 35% of GDP in China over the same period.¹⁹

¹⁹ Source: OECD Annual National Accounts (data accessed June 2016).

Table 3.1 shows the average annual contributions of consumption and exports to GDP growth in the fifteen advanced democracies in the sample between 1994 and 2007, as well as their average GDP growth rate.²⁰ The average annual contributions reflect both the importance of consumption and exports to GDP (their weights in GDP) and how quickly they are expanding (their growth rates).²¹ I focus on the period from 1994 to 2007, which is referred to throughout as the *Great Moderation*. I choose to start in 1994, as this is when the advanced democracies had fully emerged from the economic downturns of the early 1990s, which were particularly acute and long lasting in Sweden and Finland. The reason for concentrating on the Great Moderation is twofold. First, the period coincided with two major changes in the macroeconomic regimes of advanced democracies—the introduction of inflation-targeting central banking and the opening of financial markets—that underpinned post-Fordist growth models (see Section 3.3). Second, it was the period when growth models became particularly entrenched and persistent macroeconomic imbalances emerged among advanced democracies (as will be discussed later in the section).

The countries in the table are divided into LMEs and CMEs. We can see that consumption typically made a larger contribution to GDP growth in the LMEs and exports typically made a larger contribution to GDP growth in the CMEs. I therefore define the LMEs' growth model as *consumption-led* and the CMEs' growth model as *export-led*.

²⁰ The paper concentrates on exports and not *net* exports because exports and imports have very different drivers, and because the CMEs are specifically geared towards export promotion. However, Figure B.1 in Appendix B1 shows that the same patterns emerge for growth models if we replace the contribution of exports to GDP growth with the contribution of net exports to GDP growth.

²¹ Appendix B2 shows how annual contributions to GDP growth are calculated and provides more information on the data source.

Table 3.1. LMEs vs. CMEs: Average annual contributions of consumption and exports to GDP growth, and the average annual GDP growth rate, 1994-2007

	Average annual contribution of consumption to GDP growth (%) 1994-2007	Average annual contribution of exports to GDP growth (%) 1994-2007	Average annual GDP growth (%) 1994-2007
Liberal market economies			
Australia	2.4	0.8	3.7
Canada	1.9	1.8	3.2
New Zealand	2.3	1.4	3.6
United Kingdom	2.4	1.5	3.0
United States	2.4	0.6	3.2
Average	2.3	1.2	3.4
Coordinated market economies			
Austria	1.0	2.8	2.6
Belgium	0.9	3.7	2.5
Denmark	1.1	2.3	2.5
Finland	1.8	3.1	4.0
Germany	0.6	2.3	1.7
Japan	0.6	0.7	1.2
Netherlands	1.2	3.9	3.0
Norway	1.8	1.2	3.1
Sweden	1.3	3.0	3.4
Switzerland	0.9	2.4	2.1
Average	1.1	2.5	2.6

Source: European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update).

Note: See Appendix B2 for a guide on how to calculate annual contributions to GDP growth and more information on the data source for the figure.

We can see from the table that there was significant variation in the contribution of consumption to GDP growth within the export-led CMEs. Consumption tended to make a larger contribution to economic growth in the Nordic CMEs (Denmark, Finland, Norway, and Sweden) than it did in the continental European CMEs (Austria, Belgium, Germany, the Netherlands, and Switzerland) or Japan. The reasons for this *within* CME variation will be explored further in Sections 3.4 and 3.5. The right-hand side of the table shows that average GDP growth in the LMEs

outstripped that in the CMEs over the Great Moderation, although the fast-growing Nordic CMEs had comparable GDP growth rates to the LMEs.

The only two countries that do not fit well into the growth models dichotomy are Norway and Japan. The Norwegian economy is unique among the CMEs because it is a major oil exporter. Oil prices rose sharply during the 2000s; the price of Brent crude oil went from \$28 in January 2000 to \$133 in July 2008.²² The IMF (2013, 10) report that Norway experienced a “striking loss of market share for non-oil exports” during this period due to rapid expansion of the oil and gas sectors, which has indirectly burdened the more traditional and lower productivity, non-oil manufacturing sectors with rising wage costs. This helps explain Norway’s more consumption-led growth model during the Great Moderation. I would argue that the Norway should still be considered an export-led economy, however, because the contribution of exports to growth was similar to the other CMEs over the broader post-Fordist era.²³

The Japanese economy performed considerably worse than the Norwegian economy on both the consumption and export dimensions during the Great Moderation (see Table 3.1). The 1990s are often referred to as the Japanese economy’s “lost decade” (Hayashi and Prescott 2002), as the economy collapsed into an extended period of weak domestic demand and anaemic growth following the bursting of a huge stock market and property bubble (Callen and Ostry 2003; Koo 2009). Exports suffered over this period due to short-term shocks, such as the Asian financial crisis and the bursting of the dotcom bubble, and longer-term trends, such as Japanese exporters being slow to exploit rapidly rising demand from emerging economies (e.g. the BRICs) and rising competition from firms in emerging and newly

²² Source: US. Energy Information Administration, Crude Oil Prices: Brent - Europe [DCOILBRENTU], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/DCOILBRENTU>, 22 July 2016.

²³ Table B.2 in Appendix B1 shows that the average annual contribution of exports to GDP growth in Norway was equal to or higher than all of the LMEs over the 1980 to 2007 period. The case becomes even stronger if we remove the 2002 to 2007 period of particularly poor export performance; Norway was the country with the third biggest contribution of exports to GDP growth in the sample (after the Netherlands and Belgium) over the 1980 to 2001 period (Source: European Commission AMECO Database, 03/05/2016 update).

industrialised economies with lower labour costs and increasingly innovative products (e.g. Samsung in South Korea) (Kazuhiko 2015).

Unlike Norway, I would argue that Japan has not pursued an export-led growth model during the post-Fordist era, despite often being characterised in that way in the varieties of capitalism literature (e.g. Iversen and Soskice 2012).²⁴ In contrast to the other CMEs, the improvement in the current account balance (see Table 3.3) and the sizeable contribution of *net* exports to GDP growth (see Figure B.1 in Appendix B1) over the Great Moderation reflect the weakness of import demand rather than strong export performance. Japan is therefore the one major exception within the CME camp and would make an interesting case study for future research.

One last point to note from Table 3.1 is that consumption made a very low contribution to GDP growth in Germany during the Great Moderation, on a par with that in struggling Japan. This has to be understood within the wider historical context, however, as the German economy experienced a major structural shock when East and West Germany reunified in 1990. The post-reunification boom caused inflationary pressure to build and the Bundesbank responded by aggressively raising interest rates (Clarida and Gertler 1997). This led to an appreciation of the nominal exchange rate, which was detrimental to the economically and politically important German export sector. The low consumption growth in Germany compared to the other European CMEs during the Great Moderation therefore has to be seen (at least partly) as a consequence of German firm's restraining wages in order to counteract the one-off loss of competitiveness associated with reunification (Dustmann et al. 2014; Hope and Soskice 2016).

²⁴ We can see from Table B.2 in Appendix B1 that exports made a smaller contribution to growth than consumption in Japan between 1980 and 2007. In addition, even when the Japanese economy was growing extremely fast during the last two decades of the Fordist era, it was consumption driving economic expansion rather than exports. As shown in Table B.1 in Appendix B1, the average annual contribution of consumption to GDP growth was 4.4% between 1961 and 1979, compared to just 0.7% for exports.

The CMEs and export-led growth

Recent literature in the varieties of capitalism tradition has recast the CMEs as export-led economies (Hope and Soskice 2016; Iversen and Soskice 2010, 2012; Iversen, Soskice, and Hope 2016). The organisation of the political economy and the institutional apparatus in the CMEs are both geared towards the export sector, which directly and indirectly provides a large proportion of the high-value added employment, economic growth and tax revenue. Cooperative workforces with co-specific skills support long-term export viability, along with patient capital and the ability to hold down wage costs and safeguard external competitiveness through coordinated wage bargaining. The institutional framework of CMEs and export sector success are mutually reinforcing. The size and profitability of the export sector is essential to underpin the technology transfer and innovation systems, the extensive system of vocational training (encompassing technical universities and tertiary professional qualifications), a dense network of business associations and a myriad of companies that provide intermediate inputs and services to the export sector (Hope and Soskice 2016; Iversen and Soskice 2012; Iversen, Soskice, and Hope 2016).

The welfare states in the CMEs are also deeply complementary to the skill specificity at the centre of the export-led growth model. For workers to commit to extensive investment in firm- or industry-specific skills at the start of their careers, often foregoing significant earnings while doing so, they require guarantees of employment protection, unemployment protection and wage protection in the future (Estevez-Abe, Iversen, and Soskice 2001; Iversen 2005; Soskice 2007). While the continental European CMEs' Christian Democratic welfare states are more purely insurance based and the Nordic CMEs' Social Democratic welfare states are more universalistic, service-based, and redistributive, both offer strong insurance systems for regular (permanent) employees (Esping-Andersen 1990; Hope and Soskice 2016; Iversen and Stephens 2008).

The real exchange rate (both price and cost competitiveness) has a substantial influence on the demand for exports (Carlin, Glyn, and Van Reenen 2001; Madsen 2008), and consequently the main actors in CMEs—firms, unions, business associations and the government—are very concerned to avoid excessive wage growth that could undermine external competitiveness. The first column of Table 3.2 shows that the CMEs have a considerably higher degree of coordination in wage setting than the LMEs. This reflects the organisation of the political economy and the supporting institutions, as well as the growth model. Coordinated unions and business organisations cooperate to restrain real wages in the CMEs, which in turn promotes export-led growth. Wage restraint not only helps improve competitiveness but also ensures that newly trained workers with specialist skills in high-end export sectors are absorbed into firms, thus supporting a high-skills equilibrium based on exporting (Iversen and Soskice 2010, 2012). Wage restraint is generally reinforced by conservative monetary and fiscal policy in CMEs, which helps to discipline large and well-organised wage and price setters (Iversen and Soskice 2012; Soskice 2007; Soskice and Iversen 2000). The role of government demand-side policies in growth models will be discussed in more depth in Section 3.3.

It is important to note that Carlin, Glyn and Van Reenen (2001) and Madsen (2008) both find strong empirical evidence real exchange rates are not the only factor influencing export performance. Taken together, they also highlight technological progress, innovative activity, human capital accumulation and the structure of corporate governance as significant drivers of export performance. This suggests that wage restraint alone is not sufficient to pursue an export-led growth model—it is just one piece in the wider jigsaw of coordinated capitalism.

Table 3.2. LMEs vs. CMEs: Average wage coordination, trade openness and household savings rate, 1994-2007

	Average coordination of wage setting (1-5 scale) 1994-2007	Average trade openness (% of GDP) 1994-2007	Average net household saving (as a percentage of households' net disposable income) 1998-2007
Liberal market economies			
Australia	2.0	40.0	1.7
Canada	1.0	72.7	2.8
New Zealand	1.0	59.7	-2.5
United Kingdom	1.0	53.4	2.4
United States	1.0	23.7	4.4
Average	1.2	49.9	1.7
Coordinated market economies			
Austria	4.0	83.3	10.3
Belgium	4.8	131.6	10.2
Denmark	3.9	80.1	-2.5
Finland	4.4	70.7	1.9
Germany	3.7	58.8	9.8
Japan	4.3	22.2	4.1
Netherlands	4.0	117.5	6.6
Norway	4.1	70.8	5.2
Sweden	3.7	77.6	5.7
Switzerland	3.0	92.1	15.0
Average	4.0	80.5	6.6

Source: J. Visser, ICTWSS Database. Version 5.0. Amsterdam: Amsterdam Institute for Advanced Labour Studies AIAS. October 2015. Open access database at: www.uva-aias.net/208; OECD Annual National Accounts (data accessed June 2016); OECD National Accounts at a Glance, June 2016.

Note: The coordination of wage setting measure is variable 'Coord' from the ICTWSS Database. It measures the degree of wage coordination (regardless of the level it occurs at). Higher values indicate a greater degree of coordination. Trade openness = (exports + imports) as a % of GDP (all in current prices). Net household savings data is only available from 1998 onwards so the average runs from 1998-2007.

The LMEs and consumption-led growth

The liberal market economies were consumption-led during the Great Moderation. They relied on the expansion of domestic demand to drive growth, in part enabled by the expansion of credit to households. The key features of the organisation of the

political economy in the LMEs—decentralised wage bargaining, flexible and fluid labour markets, and education systems with a focus on general skills (especially at the tertiary level)—underpinned two major shifts in the economic structure. First, the high capacity for radical innovation saw the LMEs experience rapid growth in high-end knowledge-intensive services, such as finance, professional services, media and software development (Barnes and Wren 2012). Second, the removal in the 1980s of protections on low-income workers and the associated fall in prices facilitated an expansion of low productivity, relatively price and income elastic, and largely non-traded service sectors such as personal services, restaurants and hotels, and retail (Iversen and Wren 1998; Wren, Fodor, and Theodoropoulou 2013). The latter expansion in particular meant that the LMEs have been less successful than the CMEs in safeguarding their external competitiveness, and their output and employment is typically more concentrated in non-traded sectors (Iversen and Soskice 2010). Barnes and Wren (2012) show that employment in low productivity, non-traded services is positively correlated with private indebtedness in advanced economies. This supports the argument that credit expansion was central to propping up consumption of both goods and services in the LMEs during the 1990s and 2000s.

The general skills education system in the LMEs equips workers with skills that are highly transferable across firms and industries. Hence, the median voter in the LMEs does not demand an extensive system of social protections (Soskice 2007). In fact they are more likely to view the welfare state as redistribution to low-income households, and have been shown to be less supportive of welfare state expenditures than the median voter in the CMEs (Iversen and Soskice 2001). In combination with low employment protection, the liberal welfare state supports the flexible labour markets at the centre of the LMEs' consumption-led growth model.

The behaviour of households is obviously crucial to explaining the more prominent role that consumption plays in growth in the LMEs. The third column of Table 3.2 shows the net savings rates of households in advanced economies. We can see that households in the LMEs typically save less (and spend more) of their

disposable income, which is a key reason the LMEs are more consumption-led. The difference is starkest between the LMEs and the continental European CMEs (especially Austria, Belgium, Germany and Switzerland), which is likely to be partly driven by greater precautionary saving in the latter set of economies (Iversen and Soskice 2012). In addition to their demand for social insurance, workers with specific skills have a strong incentive to build up a buffer of private savings to help insure themselves against periods of unemployment. This motive is particularly pertinent in CMEs where the welfare state is going through a period of realignment or retrenchment and the future capacity of the state to insure against fluctuations is uncertain (Soskice 2007); for example, the extensive Hartz reforms undertaken in Germany from 2003 (Carlin and Soskice 2009). Household savings rates in the Nordic CMEs are closer to those in the LMEs, which in large part reflects the build-up of household indebtedness that took place in these economies during the Great Moderation. The role of credit in the growth models of the LMEs and the Nordic CMEs will be discussed in more detail in Section 3.5.

The degree of trade openness is another notable difference between the LMEs and the CMEs that influences their growth models. The second column of Table 3.2 shows that the CMEs generally trade more with the global economy than the LMEs (relative to GDP). This affects growth models in a very mechanical way because the weight of exports and imports in GDP is larger (and consumption smaller) in more open economies. This helps to explain why the CMEs are less consumption-led. Trade openness can also aid us in trying to unpack the Japanese puzzle. Japan was the most closed economy in the entire sample during the Great Moderation, which helps explain why exports made such a small contribution to GDP growth over this period. The average population of Japan was close to 127 million persons between 1994 and 2007, which means it possesses a huge internal market to fuel economic expansion.²⁵

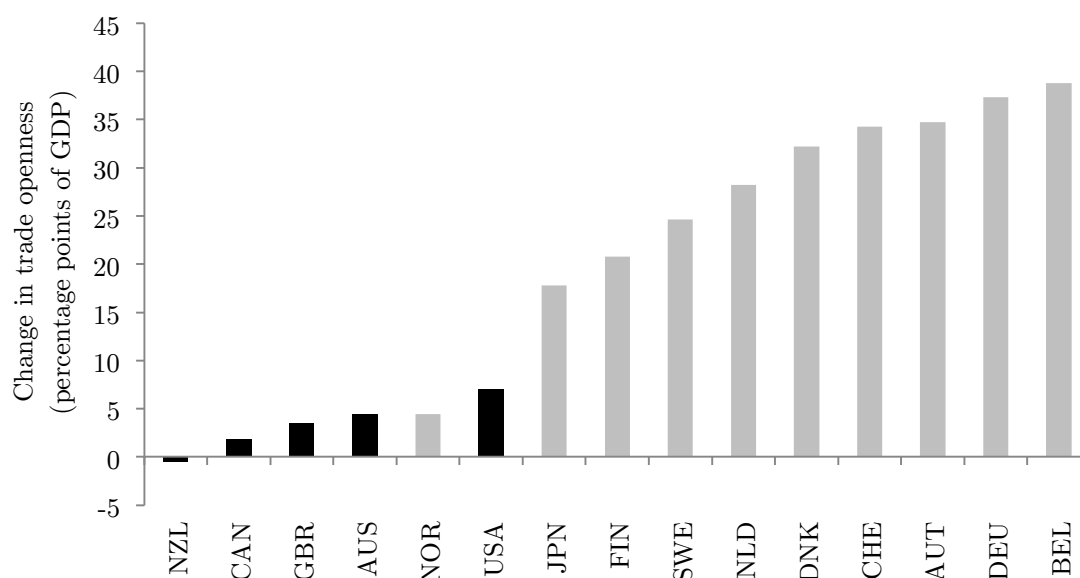
²⁵ Source: OECD Historical Population Data and Projections (1950-2050).

Trade openness is not exogenous, however, it is determined by characteristics of the national political economy including varieties of capitalism and growth models. One noticeable feature of the CMEs is that eight of the ten economies are small open economies (only Germany and Japan are not); in fact seven of the eight (only Finland is missing) were included in Katzenstein's (1985) seminal book *Small States in World Markets*. The size of these economies mean they lack the internal markets to gain the economies of scale that are crucial to the functioning of an advanced economy. They must therefore seek their economies of scale and specialisation by focusing on export markets, as well as importing a wider range of goods than larger economies (Katzenstein 1985).

The evolution of trade openness over the Great Moderation was also deeply rooted in varieties of capitalism. Figure 3.2 shows the change in trade openness between 1994 and 2007. There is a clear divide between the CMEs, where trade openness increased dramatically, and the LMEs, where it changed much less.²⁶ The jump in openness speaks to both the export orientation of the CMEs' production regimes, as well as their increasing reliance on imported goods. These trends help entrench the export-led growth model by boosting the share of exports in GDP.

²⁶ Norway is the one exception, which is likely to do with its unique position among the CMEs as a major oil exporter (as discussed earlier in Section 3.2).

Figure 3.2. Change in trade openness, 1994-2007



Source: OECD Annual National Accounts (data accessed June 2016).

Note: Trade openness = (exports + imports) as a % of GDP (all in current prices). The colours of the columns correspond to varieties of capitalism. The grey columns are CMEs and the black columns are LMEs.

Growth models and external imbalances

The most obvious macroeconomic consequence of advanced democracies pursuing different growth models during the Great Moderation was the build-up of current account imbalances between the LMEs and the CMEs. The current account balance is defined as the trade balance (exports minus imports) plus net profit receipts and interest from abroad (Carlin and Soskice 2015). It tracks the net flow of goods, services and investment income into an economy. A current account deficit signals a country is a net borrower from the rest of the world, and persistent deficits indicate the accumulation of external debt.

Export-led CMEs were typically in trade surplus and consumption-led LMEs were typically in trade deficit during the Great Moderation, as shown by the average annual contributions of net exports to GDP growth in Figure B.1 in Appendix B1. This reflects both the export prowess of the CMEs and the tendency of the consumption-driven LMEs to import more goods and services than they export.

Table 3.3 shows the current account balances of the LMEs and the CMEs during the Great Moderation. The LMEs started the period in deficit and the CMEs started in surplus, showing that growth models also diverged in the earlier part of the post-Fordist era. However, the gap widened significantly between the two groups over the course of the Great Moderation; by 2007 the gap between the average current account balances of the two groups was ten percentage points of GDP.

Table 3.3. LME vs. CMEs: Current account balances, 1994-2007

	Current account balance (as a % of GDP)		
	1994	2007	Change 1994-07
Liberal market economies			
Australia	-4.5	-6.7	-2.2
Canada	-2.4	0.8	3.2
New Zealand	-3.1	-6.8	-3.7
United Kingdom	-0.5	-2.5	-2.0
United States	-1.7	-5.0	-3.3
Average	-2.4	-4.0	-1.6
Coordinated market economies			
Austria	-1.5	3.8	5.3
Belgium	5.3	1.5	-3.8
Denmark	2.0	1.4	-0.7
Finland	1.1	3.8	2.8
Germany	-1.5	6.8	8.2
Japan	2.7	4.9	2.2
Netherlands	4.6	6.0	1.3
Norway	2.9	12.2	9.3
Sweden	1.0	8.9	7.8
Switzerland	5.8	10.8	5.0
Average	2.2	6.0	3.7

Source: IMF World Economic Outlook Database, April 2016.

Many CPE scholars have pointed to different varieties of capitalism and growth models as being a major driver of the current account imbalances, both in global economy (Iversen and Soskice 2012) and within the Eurozone (Hall 2012, 2014; Johnston and Regan 2016). These papers also highlight the central role played by the external imbalances in the global financial crisis and the Eurozone sovereign debt crisis. The imbalances reflected the build up of dangerous credit and asset price

bubbles that left deficit countries exposed to a *sudden stop* in capital inflows and the world economy vulnerable to a financial crisis (Blanchard and Milesi-Ferretti 2012; Lane and Milesi-Ferretti 2012).

The fact that growth models are so deeply ingrained in political-economic institutions and political systems—that are fixed or slow to change—suggests the external imbalances of the pre-crisis period are likely to persist. The immediate post-crisis period provides some evidence in line with this hypothesis. Table B.3 in Appendix B1 shows that the gap in current account balances between the LMEs and the CMEs in 2015 was almost identical to the gap on the eve of the financial crisis in 2007. The analysis in this paper suggests that coordination among countries would be needed to permanently reduce imbalances and governments would need to pursue demand-side policies that run contrary to their growth models. Given that demand-side policies remain firmly in the hands of national governments and there is such a strong electoral incentive to pursue policies that support national growth models, external imbalances among advanced democracies are likely to continue to be a prominent feature of the world economy.

Growth models and institutional change in an era of deindustrialisation

The preceding analysis has shown that the CMEs pursued export-led growth models during the Great Moderation and the LMEs pursued consumption-led growth models. In both cases, the analysis emphasises the importance of political-economic institutions in supporting and perpetuating growth models. This is not to say that institutions were static over the Great Moderation, far from it. The Great Moderation was a period of major structural change in the world economy that profoundly affected advanced democracies and their institutional frameworks. Despite the winds of change forcing institutions to adapt, this subsection argues that national varieties of capitalism and growth models strongly shaped trajectories of change, and ultimately remained resilient. As such, it takes issue with approaches arguing that the LMEs and CMEs are converging on the liberal model of capitalism (Baccaro and Howell 2011; Howell 2003), as well as the argument that the growth

models of advanced democracies can no longer be delineated along varieties of capitalism lines (Baccaro and Pontusson 2016).

Since the collapse of the Fordist production regime in the late 1970s, the advanced economies have faced a number of major secular trends in the global economy, such as globalisation, deindustrialisation, the rise of competition from low-wage emerging economies, financialisation and the information and communications technology (ICT) revolution (Hall 2015; Wren 2013b). These trends have both posed problems and created opportunities for advanced democracies. Iversen and Cusack (2000) argue that deindustrialisation, or more specifically, the technologically induced shift in the employment structure away from manufacturing and towards services, is the trend that generates the greatest risks to advanced democracies. They show that deindustrialisation is more important than globalisation in explaining cross-country differences in the welfare state expansion. Many other CPE scholars also treat deindustrialisation as the central driver of institutional and political change in advanced democracies (Thelen 2014; Wren 2013a). This subsection therefore focuses on how deindustrialisation has affected the political-economic institutions and growth models of the consumption-led LMEs and the export-led CMEs.

To help build up a picture of the relationship between deindustrialisation and varieties of capitalism, Table 3.4 shows the manufacturing sector's share of employment and gross value added (GVA) in 1994 and 2007, as well as the change over the period. In both the CMEs and LMEs, the manufacturing sector's share of employment shrunk over the period, continuing a downward trend stretching back several decades. At the end of the period in 2007, the average share of manufacturing in employment had fallen to 15.1% in the CMEs and just 10% in the LMEs. The picture is notably different for the share of manufacturing in gross value added. While the LMEs saw a similar drop off in GVA as they did in employment, manufacturing's share of GVA held up much better in the CMEs.

Table 3.4. LMEs vs. CMEs: Share of manufacturing in total employment and gross value added, 1994-2007

	Number of persons engaged in manufacturing (as a % of persons engaged in total economy)			Gross value added of manufacturing (as a % of gross value added of total economy)		
	1994	2007	Change 1994-07	1994	2007	Change 1994-07
Liberal market economies						
Australia	13.8	10.0	-3.9	15.1	10.5	-4.6
Canada	13.8	11.2	-2.6	17.1	13.4	-3.7
New Zealand	-	-	-	-	-	-
United Kingdom	14.9	9.3	-5.6	18.6	10.8	-7.8
United States	14.2	9.7	-4.5	17.7	13.3	-4.4
Average	14.2	10.0	-4.1	17.1	12.0	-5.1
Coordinated market economies						
Austria	18.2	15.4	-2.8	19.0	19.9	0.9
Belgium	17.8	13.5	-4.3	19.3	15.9	-3.4
Denmark	17.9	13.7	-4.2	16.9	15.0	-1.9
Finland	18.7	16.9	-1.8	23.1	23.3	0.2
Germany	21.9	18.1	-3.8	22.4	23.1	0.7
Japan	21.1	17.2	-4.0	22.8	20.8	-2.0
Netherlands	13.9	10.3	-3.6	16.3	13.3	-3.0
Norway	-	-	-	-	-	-
Sweden	18.2	15.8	-2.4	20.4	20.0	-0.5
Switzerland	-	-	-	-	-	-
Average	18.5	15.1	-3.4	20.0	18.9	-1.1

Source: EU KLEMs Growth and Productivity Accounts: ISIC Rev. 3 November 2009 Release, updated March 2011 and ISIC Rev. 4 update; O'Mahony and Timmer (2009); WORLD KLEMS / Statistics Canada, July 2012.

Note: No EU KLEMs data is available for New Zealand, Norway and Switzerland.

The less than equivalent drop in manufacturing GVA in the CMEs is likely the result of a combination of factors, such as the use of more capital-intensive production techniques, strong productivity growth in manufacturing and continued movement up the value chain into higher-technology manufactured goods. The table suggests that the CMEs have successfully adapted their production regimes in order to safeguard the contribution of manufactured (mainly tradable) goods to the economy. It is also clear, however, that the proportion of the workforce directly employed in manufacturing has fallen in the CMEs, which inevitably puts stress on

a model of capitalism that is primarily organised for success in traditional manufactured goods industries.

The varieties of capitalism framework has often been criticised for being overly static and rigid and not leaving enough room for the social and political drivers of institutional change (Coates 2005; Howell 2003). This is a misconception. Hall and Soskice (2003, 246) view institutions as “factors that mediate the relations among the core actors of the economy”, meaning that they are “constantly subject to negotiation”. So they expect the institutions of coordinated capitalism to be renegotiated in the face of new challenges and flexible enough to endure periodic economic upheavals. Contrary to Streeck’s (2016) reading of varieties of capitalism then, it does permit for (and even expect) conflict in the political arena and between different actors in the political economy over national institutional structures. As much as power relations and politics may influence the form of institutional change, varieties of capitalism does predict that CMEs will solve their problems through new modes of coordination and strategic interaction.

The response of coordinated capitalism to deindustrialisation provides evidence to support this view of institutional change.²⁷ Table 3.5 shows the strictness of Employment Protection Legislation for temporary and permanent workers in the LMEs and CMEs in 1994 and 2007, as well as the change over the period. A clear divide is evident in the employment protection afforded to permanent workers, who were much better protected in the CMEs in both 1994 and 2007. In terms of temporary workers, employment protection in the LMEs was already very low in 1994 and stayed low despite a small increase in New Zealand. The employment protection of temporary workers in the CMEs starts much higher than that in the LMEs but converges towards the low levels seen in the LMEs in six of the ten CMEs (and is already relatively low by 1994 in the other four CMEs). The reduction between 1994 and 2007 is particularly dramatic in Belgium and Germany. The table provides evidence of the increasing *dualisation* of labour markets in the CMEs, as

²⁷ See Hall and Thelen (2009) for a more formal framework for analysing institutional change within varieties of capitalism.

the labour force bifurcates into *insiders*, who are securely employed, and *outsiders*, who are not (Emmenegger et al. 2012; Rueda 2005).

Table 3.5. LME vs. CMEs: Employment protection for permanent and temporary workers, 1994-2007

	Employment Protection Legislation for permanent workers (0-6 scale)			Employment Protection Legislation for temporary workers (0-6 scale)		
	1994	2007	Change 1994-07	1994	2007	Change 1994-07
Liberal market economies						
Australia	1.2	1.2	0.0	0.9	0.9	0.0
Canada	0.9	0.9	0.0	0.3	0.3	0.0
New Zealand	1.2	1.6	0.3	0.4	1.0	0.6
United Kingdom	1.1	1.3	0.2	0.3	0.4	0.1
United States	0.3	0.3	0.0	0.3	0.3	0.0
Average	0.9	1.0	0.1	0.4	0.6	0.2
Coordinated market economies						
Austria	2.8	2.4	-0.4	1.3	1.3	0.0
Belgium	1.8	1.9	0.0	4.6	2.4	-2.3
Denmark	2.2	2.1	0.0	1.4	1.4	0.0
Finland	2.5	2.2	-0.3	1.3	1.6	0.3
Germany	2.7	2.7	0.0	3.3	1.0	-2.3
Japan	1.7	1.4	-0.3	1.7	0.9	-0.8
Netherlands	2.9	2.9	0.0	1.4	0.9	-0.4
Norway	2.3	2.3	0.0	3.1	3.0	-0.1
Sweden	2.8	2.6	-0.2	1.8	1.4	-0.3
Switzerland	1.6	1.6	0.0	1.1	1.1	0.0
Average	2.3	2.2	-0.1	2.1	1.5	-0.6

Source: OECD Labour Market Statistics (accessed May 2016).

Note: Higher values indicate stricter regulation (i.e. it is harder to hire and fire workers).

The core workers in manufacturing industries in the CMEs are typically on permanent contracts and benefit from strong employment protection, whereas service sector workers, particularly those in low-value added sectors such as personal services, restaurants and retail, are increasingly employed on precarious or atypical contracts. For example, only about 10 per cent of marginal employment (part-time, low-pay work with restricted access to welfare coverage and benefits) in Germany is in manufacturing, while more than 80 per cent is in service sector industries (Hassel

2014). This pattern of dualisation therefore helps to protect the institutional complementarities are the heart of the CME model as core manufacturing workers retain the employment protection and social insurance necessary to support their deep investments in firm-specific skills (Palier and Thelen 2012).

Dualisation is an example institutional drift, where institutions and practices that were developed for the industrial core are strongly protected but are not actively extended to other parts of the economy. The on-going shift of employment from manufacturing to services then liberalises the economy-wide industrial relations system naturally over time without the need for a specific neoliberal offensive (Thelen 2012). The resilience of coordinated institutions and strategic interaction in manufacturing industries in the CMEs in spite of significant liberalisation elsewhere in these economies provides evidence against claims (see, for example, Baccaro and Howell 2011) that industrial relations across advanced economies are being driven by a common neoliberal imperative towards LME-type deregulation.

Aside from the maintenance of coordination and cooperation in the industrial core, the CMEs have adapted to deindustrialisation in very different ways. The Nordic CMEs with Social Democratic welfare states have consistently higher levels of public employment than continental European CMEs with Christian Democratic welfare states (Esping-Andersen 1990; Martin 2016) (see Table 3.9). The right-hand column of Table 3.6 shows that in the latter part of the Great Moderation, the Nordic CMEs also (on average) had a higher proportion of total employment in knowledge-intensive services than the continental European CMEs; a point also emphasised by Wren, Fodor and Theodoropoulou (2013). It is clear, however, that the Netherlands stands apart from the other continental European CMEs when looking at changes in the employment structure. Deindustrialisation has been as acute in the Netherlands as in the LMEs (see Table 3.4) and knowledge-intensive services are as important to employment in the Netherlands as they are in the Nordic CMEs (see Table 3.6).

Table 3.6. Average public expenditure on tertiary education, gross enrolment ratio in tertiary education, and employment share in knowledge-intensive services in the CMEs, 2000-05

	Average public expenditure on tertiary education (as a % of GDP) 2000-05	Average gross enrolment ratio in tertiary education (%) 2000-05	Average employees in knowledge-intensive services (as a % of total employees) 2000-05
Continental European			
Austria	1.4	50.2	33.0
Belgium	1.3	59.6	38.4
Germany*	1.1	52.3	34.6
Netherlands	1.4	56.5	45.1
Switzerland	1.4	42.2	-
Average	1.3	52.2	37.7
Nordic			
Denmark	2.5	67.2	44.3
Finland	2.0	86.7	39.1
Norway	2.1	75.0	-
Sweden	2.0	76.7	45.8
Average	2.2	76.4	43.1
Other			
Japan	0.6	51.6	30.3

* The German data for gross enrolment is missing for the 2000-05 period. The German figure has therefore been estimated by linearly interpolating the available data.

Source: David Brady, Evelyne Huber, and John D. Stephens, Comparative Welfare States Dataset, University of North Carolina and WZB Berlin Social Science Center, 2014 (accessed May 2016); OECD Education Statistics Database (accessed July 2013); UNESCO UIS.Stat Education database, June 2016 release; EU KLEMS Growth and Productivity Accounts, March 2008 and November 2009 releases (accessed April 2012).

Note: No knowledge-intensive services employment data is available for Switzerland or Norway. Public expenditure on tertiary education refers to ISCED levels 5 and 6. The gross enrolment ratio in tertiary education is defined as the number of students enrolled in tertiary education, regardless of age, expressed as a percentage of the population in the 5-year age group starting from the official secondary school graduation age. Knowledge-intensive services covers a number of services subsectors. For a list of subsectors included see Appendix A of the Comparative Welfare States Data Set Codebook available from: <http://www.lisdatacenter.org/wp-content/uploads/CWS-codebook.pdf>

The distinct change in employment structures in the two sets of European CMEs has been powerfully influenced by changes in one sphere of the political economy:

education and training. The Nordic CMEs have moved further away from a model based on vocational training and specific skills than the continental European CMEs. The former set of countries has invested heavily in extensive publicly funded systems of higher education, which provide mainly general skills, whereas higher education (at least in general skills) remains more restricted in the latter set of countries (Ansell and Gingrich 2013). We can see from Table 3.6 that the Nordic CMEs had considerably higher public expenditure on tertiary education and gross enrolment ratios in tertiary education than either the continental European CMEs or Japan during the second half of the Great Moderation.

General skills are highly prized in knowledge-intensive service sectors due to the complementarity in production between new information and communications technologies and university-educated labour (Thelen 2012; Wren, Fodor, and Theodoropoulou 2013). In contrast to specific skills, labour mobility actually encourages the acquisition of general skills by ensuring workers are able to attain the full value of their educational investment on the labour market (Becker 2009). Hence, the liberalisation of the CMEs outside of the industrial core helps to expand employment in low-value added services, through the removal of protections on low-skilled workers, *and* knowledge-intensive services, through incentivising investment in general skills.

The most striking thing about the CMEs during the era of deindustrialisation, given the major differences in how their economic structures have evolved, is that they have all remained so firmly export-led (see Table 3.1). This reflects the continued coordination in the industrial core but also the growing importance of services exports, and knowledge-intensive services exports in particular. Looking back at Table 3.1, however, we can see that the contribution of consumption to GDP did vary across the CMEs during the Great Moderation. The consumption contribution was generally higher in the Nordic CMEs than the continental European CMEs. This variation is partly the result of differences in industrial profiles (e.g. public sector employment) but also differences in institutions (e.g. unions), redistribution and household indebtedness between the two groups of

CMEs. The factors driving the variation in the contribution of consumption to GDP growth within the export-led CMEs will be explored in detail in Sections 3.4 and 3.5. It is worth reiterating, of course, that the contribution of consumption to GDP growth was still considerably lower in the export-led Nordic CMEs during the Great Moderation than it was in the consumption-led LMEs.

The role of varieties of capitalism in growth models is clearly changing, especially in the CMEs where all economies have liberalised to some extent, albeit along different lines (Thelen 2014). In traditional manufacturing industries in the CMEs, coordinated capitalism is still functioning in much the same way as Hall and Soskice (2001) conceptualised at the turn of the century. But outside of the industrial core, export success is not so dependent on the institutional framework associated with coordinated capitalism. In fact, export success in knowledge-intensive services, which is likely to become increasingly important to the CMEs as deindustrialisation rolls on, is premised on tertiary-level general skills education and more flexible labour markets. This is likely to pose the biggest problem for the continental European CMEs, who have been slower to move away from vocational education systems that focus on the acquisition of specific skills and have restricted access to tertiary education in general skills. In these countries, the expansion of knowledge-intensive services risk being held back by an inadequate supply of labour with high-level general skills (Ansell and Gingrich 2013; Wren, Fodor, and Theodoropoulou 2013).

Throughout the Great Moderation—a period of massive adjustment and institutional change—the CMEs continued to be strongly export-led. Their long history of coordination (Crouch 1993; Iversen and Soskice 2009; Thelen 2004) and distinct negotiated political systems (as discussed in the following section) suggest that the CMEs will continue to be built around export sector competitiveness and success in the future, even if less of the economy is coordinated along traditional lines.

3.3 The role of political systems, electoral politics, and government demand-side policies in growth models

Governments in advanced democracies support national growth models, and advanced sectors in particular, because they want to be re-elected (Iversen and Soskice 2012, 2015b) and they know they will be held (at least partially) accountable for the state of the economy when voters go to the ballot box (Duch and Stevenson 2008; Lewis-Beck and Stegmaier 2000; Nadeau, Lewis-Beck, and Bélanger 2013). In this section, I argue that the interaction of a nation's political system and its political-economic institutions (which vary across varieties of capitalism) exert a strong influence over the long-term electoral viability of different growth models. I show how national political systems provide incentives for governments in advanced democracies to pursue certain growth models and provide evidence that governments pursued demand-side policies that supported national growth models during the Great Moderation.

Political systems and electoral politics

The LMEs and the CMEs have distinct political systems. In Lijphart's (1984) widely used typology, the LMEs have *majoritarian* political systems and the CMEs have *consensus* political systems (Soskice 2007).²⁸ Majoritarian democracies have plurality electoral systems (that usually produce single-party governments), leadership parties (where the leader exerts considerable control over policy and decision-making), and government control of public policymaking. Consensus democracies have PR electoral systems (that usually produce coalition governments), representative parties (where different interest groups within the party negotiate out policy positions and collectively make decisions), and public policymaking that incorporates

²⁸ Along the executives-parties dimension of consensus democracy (the dimension shown to most influence macroeconomic outcomes and democratic quality) all ten of the CMEs come out as more consensus-based than (any of) the five LMEs (Lijphart 2012).

other actors (such as labour unions and business associations) in the economy through effective committee systems (Soskice 2007).²⁹

Representative parties and the inclusion of interest groups in the policymaking process provide unions and business associations with the opportunity to help shape the political economy in the CMEs (Martin and Swank 2012). This is particularly important for underpinning the export-led growth model in the long-term, which requires broad cross-class agreement on institutions such as a strong welfare state, coordinated wage setting, the vocational training system, and employment protection for core workers. This is not to say that the different actors in the political economy have the same ideal set of policies and institutions in these areas but the organisation of the CMEs provides a platform for these disagreements to be negotiated out between different interest groups, both inside and outside of the political system. Representative parties also ensure that the long-term interests of different groups are safeguarded, particularly those workers who have made substantial investments in specific skills (Soskice 2007).

In majoritarian systems, the scope for long-term interest groups involvement in policymaking is greatly diminished, because parties focus much more on the concerns of the median voter in systems where winning elections is a prerequisite for governing. The danger of short-sighted governments not protecting the interests of workers with specific skills poses little problem in the LMEs, however, where the consumption-led growth model is supported by a strong general skills education system and highly flexible labour markets (Soskice 2007).

A label that is often applied to the political economy of the CMEs is ‘corporatist’, which broadly refers to a system of coordinated and cooperative management of the national economy that includes unions, employers and the state in policymaking (Siaroff 1999). However, there is no consensus on the definition of corporatism in political science, and the extent to which CMEs such as Japan and Switzerland are

²⁹ Table B.4 in Appendix B1 provides empirical evidence that the LMEs have majoritarian electoral systems and the CMEs have PR electoral systems. It also shows that electoral outcomes were typically more proportional in the CMEs than the LMEs during the Great Moderation.

corporatist is often subject to disagreement (Siaroff 1999). In order to address these inconsistencies, Siaroff (1999, 176) creates an “alternative summary measure of *economic integration*” (analogous to corporatism) that is defined as:³⁰

a long term co-operative pattern of shared economic management involving the social partners and existing at various levels such as plant-level management, sectoral wage bargaining, and joint shaping of national policies in competitiveness-related matters (education, social policy, etc.)

On this measure, all ten CMEs come out as more integrated (i.e. corporatist) than any of the five LMEs in the mid-1990s (Siaroff 1999). Siaroff (1999, 177) identifies export competitiveness and success as key features of the “ideal type” of corporatism. Likewise, Katzenstein (1985, 2003) picked out corporatist structures as a defining feature of the Europe’s highly open *small states* (all CMEs), and the source of their ability to learn and adapt to the fast-changing conditions of global capitalism. The consensus political systems of the CMEs help facilitate the corporatism that is essential to a long-term growth strategy based on high-value added exports.

Electoral politics also strengthens the relationship between varieties of capitalism and growth models. There is a voluminous body of work that finds that voters hold governments accountable for economic performance; ‘economic voters’ reward incumbent parties at the ballot box in good economic times and punish them in bad economic times (Duch and Stevenson 2008; Lewis-Beck and Stegmaier 2000; Nadeau, Lewis-Beck, and Bélanger 2013). These studies do, however, show significant variation in the extent of economic voting across advanced democracies. Powell and Whitten (1993) provide empirical evidence that political context needs to be taken into account to explain the cross-country differences. They introduce the concept of *clarity of responsibility*, whereby the extent to which voters punish or reward incumbent governments for the state of the economy varies depending on how easily voters can assign responsibility to the government for economic policies, and management of the economy more generally. Many subsequent studies have found

³⁰ This excerpt is taken from Siaroff (1999, 189).

strong evidence that greater clarity of responsibility leads to more economic voting (Anderson 2000; Nadeau, Niemi, and Yoshinaka 2002; Whitten and Palmer 1999).

The presence of economic voters gives governments in both the LMEs and the CMEs a strong incentive to pursue national growth models, because supporting advanced sectors is key to spurring innovation and growth (Iversen and Soskice 2015b). However, clarity of responsibility is typically higher in majoritarian political systems that produce strong single-party governments than in consensus political systems that produce frequent coalition governments (Lijphart 1984; Powell and Whitten 1993). This further reinforces the consumption-led growth model of the LMEs by providing governments in LMEs with a clear electoral incentive to pursue policies that stimulate domestic demand and boost economic growth in the short term.

Electoral politics in the CMEs and the LMEs is also affected by the characteristics of the political system in another way. Rogowski and Kayser (2002) and Chang et al. (2011) adapt an existing model of regulation to show that majoritarian electoral systems systematically privilege consumers over producers and PR electoral systems systematically privilege producers over consumers. The intuition being that consumers provide votes whereas producers provide money and votes (or just money), and that politicians will respond more to voters (consumers) under majoritarian electoral rules because a small change in vote share can result in a large change in seat share. In a single-member district (majoritarian) electoral system, where only one candidate is elected to parliament from each constituency, a few votes either way can make a big difference to the composition of parliament, and consequently who governs. The authors test their model using OECD data on real prices and show that, all else equal, prices are systematically lower in countries with majoritarian electoral systems (Chang et al. 2011; Chang, Kayser, and Rogowski 2008; Rogowski and Kayser 2002).

At first this finding may appear at odds with the CMEs' export-led growth model, given that the CMEs generally have PR electoral systems.³¹ While producers in the non-traded sector clearly benefit from higher prices, producers in the traded sector do not want to risk undermining competitiveness. However, in relatively open economies (such as the CMEs), the regulation limiting competition and raising prices is typically restricted to the non-traded sector of the economy (or the non-traded component of tradable goods) (Chang, Kayser, and Rogowski 2008), and the traded sector is largely unaffected. For example, the German (mostly non-tradable) services sector is more regulated and has higher barriers to entry than its innovative and globally competitive (mostly tradable) manufacturing sector (OECD 2014). The combination of comparatively high non-traded prices and internationally competitive tradables prices in the CMEs is also highlighted by Iversen and Soskice (2010), but in their model it is wage compression and not differences in regulation that is driving this outcome.

Chang, Kayser and Rogowski (2008) do not suggest that their findings imply majoritarian electoral systems lead to more favourable outcomes. They note that the disadvantages of higher prices need to be weighed up against the more advantageous outcomes PR systems produce such as lower inequality and higher wages. The importance of the work of Rogowski and Kayser (and their co-authors) to growth models is that governments in the CMEs have electoral incentives to privilege the interests of producers and governments in the LMEs have electoral incentives to privilege the interests of consumers.

In sum, this subsection argues that political systems and electoral politics both help to entrench the dichotomy in growth models between the LMEs and the CMEs. Governments in the export-led CMEs with consensus political systems are more able to take a long-term perspective on the economy and prioritise *competitiveness*, as they are under less electoral pressure to deliver short-term economic growth. The unions and business associations that help craft economic policy in CMEs are also

³¹ See Table B.4 in Appendix B1.

deeply concerned with competitiveness. In contrast, governments in consumption-led LMEs with majoritarian political systems have more to lose from poor short-term performance and need to appeal to the median voter to be elected, so are more likely to prioritise *consumer spending* over long-run competitiveness.

The theory developed in this subsection fits well with the behaviour of governments in advanced democracies during the Great Moderation. One clear example of that is the economic strategy of the New Labour government in power in the United Kingdom from 1997 until 2010. According to Lee (2008, 20), the Labour party under Gordon Brown and Tony Blair emerged as “champion of the City rather than manufacturing, and of predominantly consumer rather than producer interests”.³² In the next subsection, I show how governments in advanced democracies have a number of policy levers at their disposal, and how they can use these levers to act on their electoral incentive to support national growth models.

Government demand-side policies

Governments on both sides of the partisan divide in advanced democracies are acutely aware of the importance of supporting the advanced sectors in which they possess a comparative advantage, as they provide important sources of political support, high-value added employment and tax revenue (Iversen and Soskice 2012). As already discussed, this gives governments strong incentives to champion insurance-based welfare arrangements for sectors in which high-skill workers and companies have co-invested in the acquisition of specific skills (Iversen and Soskice 2015b). Another way that governments can support national growth models is through demand-side policies. Demand-side policies are policies aimed at affecting domestic demand, such as monetary policy, fiscal policy, and the encouragement (or mitigation) of credit expansion.³³

Soskice (2007) and Iversen and Soskice (2012) set out a framework and provide supporting empirical evidence for the relationship between macroeconomic policies

³² This quote also appeared in Barnes and Wren (2012).

³³ The terms credit encouragement and credit mitigation are borrowed from Fuller (2015).

and varieties of capitalism. The cornerstone of these contributions is that fiscal and monetary policies are complementary to the organisation of the political economy, and hence further reinforce growth models. In the CMEs, wage restraint is used to ensure that exports remain competitive. This wage restraint is underwritten by conservative monetary policy, which acts to discipline large unions in wage setting (Soskice and Iversen 2000). In countries with a small number of large unions, each union is aware that their wage settlements influence the aggregate price level. If the central bank is conservative—i.e. it responds to above target inflation by aggressively raising interest rates—then large unions know that excess wage increases are likely to lead to higher interest rates and an appreciation of the real exchange rate. The latter pushes up the price of exports and reduces their competitiveness on world markets. As unions care about both the wages and employment of their members, this gives them a clear incentive to moderate their wage demands. Hence, non-accommodating monetary policy anchors wage restraint and shores up the export-led growth model.

The incentives for wage restraint that arise from tight monetary policy would be undermined without a similarly restrictive fiscal policy. Hence, the two go hand in hand in export-led CMEs where wages are bargained at an intermediate level. Note that a non-accommodating macroeconomic regime does not support wage restraint when wage setting is completely decentralised (because workers do not take into account the effect of their wage settlements on aggregate inflation) or completely centralised (because a single union can fully internalise the effect of their wage settlement on aggregate inflation). As a result of the severe crises of the early 1990s in the Nordic countries, their systems of centralised wage bargaining broke down. In line with Iversen and Soskice’s theory, the move to more intermediate level bargaining in the 1990s coincided with a shift towards more restrictive monetary and fiscal policies (Dølvik, Andersen, and Vartiainen 2015; Iversen 1996; Iversen and Soskice 2012).

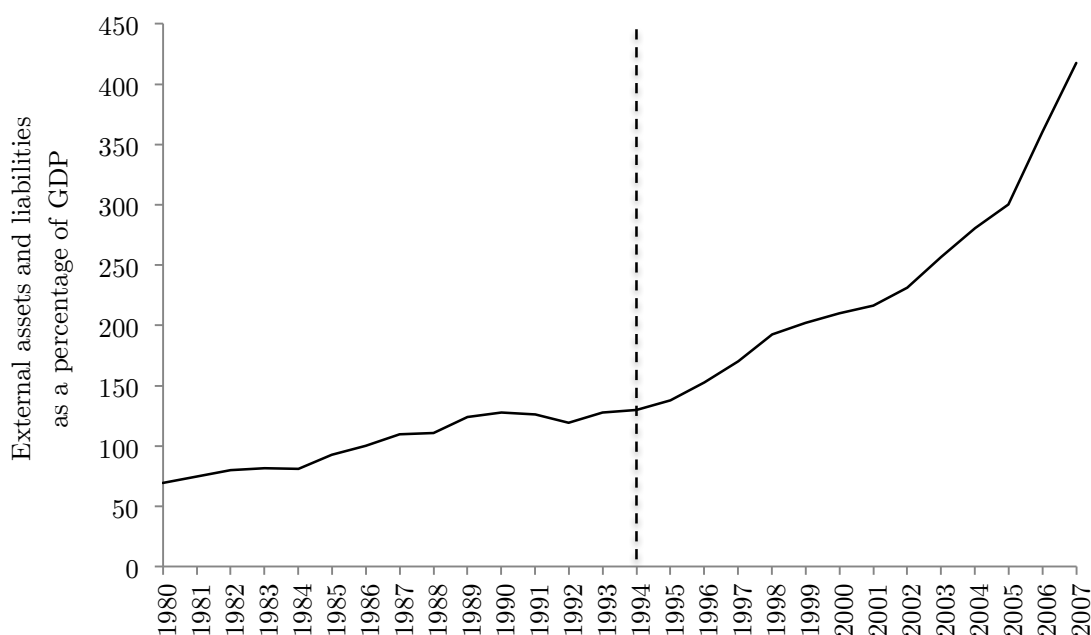
The influence of government demand-side policies on growth models is not limited to their support (or not) of wage restraint. As highlighted in the

introduction, two important changes took place in the advanced economies in the early stages of the Great Moderation.

First, monetary policy was taken out of the hands of national governments with the move to independent central banking. New Zealand pioneered the shift to greater independence from political interference in 1989 and others followed suit throughout the course of the 1990s (for example, the UK in 1997 and Sweden in 1999). These central banks began inflation targeting—adjusting short-term interest rates to influence private sector borrowing and savings behaviour with the objective of keeping output at equilibrium and inflation at target—and took a largely benign view of asset price bubbles and macroeconomic imbalances (Carlin and Soskice 2015).

Second, the late 1980s and early 1990s saw a move to financial market liberalisation and openness among advanced economies. In the European Union, this move was a key proposal in the Delors report of 1989, which was an important stepping-stone towards the establishment of the single European currency in 1999 (Iversen, Soskice, and Hope 2016). Figure 3.3 shows the financial globalisation of the advanced democracies between 1980 and 2007. We can see that financial globalisation proceeded at a much faster pace after 1994, and expanded remarkably quickly from 2005-07.

Figure 3.3. Financial globalisation of fifteen advanced democracies, 1980-2007



Source: Author's calculations using updated and extended version of dataset constructed by Lane and Milesi-Ferretti (2007).

Note: The financial globalisation measure is the combined external assets and liabilities of the 15 advanced democracies in the sample divided by their combined GDP.

These two major changes, seemingly *paradoxically*, granted governments in advanced democracies more discretion to use demand-side policies to influence the medium-term trajectory of the economy and support the national growth model. The move to independent inflation-targeting central banking coincided with a rapid reduction in inflation—the average inflation in the fifteen countries in the sample fell from 4.9% in 1990 to 1.8% in 1994 and stayed low thereafter, averaging just 1.7% between 1994 and 2007.³⁴ With inflation under control and inflation expectations closely anchored to target, governments could pursue policies that altered domestic demand, safe in the knowledge that the central bank would step in and stabilise inflation if it moved away from target.

Fiscal policy is one avenue that governments in advanced democracies can use to affect domestic demand in the era of independent central banking, but it is not the only one. A loosening of financial regulation that makes it easier for consumers to

³⁴ Source: OECD Key Short-Term Economic Indicators (accessed June 2016).

borrow, such as increasing loan-to-value ratios or making home equity loans more easily obtainable, is likely to result in a boost to household consumption. Gross and Souleles (2002) provide empirical evidence that increasing credit limits in the United States led to an immediate rise in debt and consumption, especially in households close to the limit.

The opening of financial markets helped to facilitate cross-border borrowing and lending during the Great Moderation and allowed some countries to pursue growth models that required foreign borrowing and persistent current account deficits (without coming under pressure for external adjustment). Governments in advanced democracies would not have been able to pursue growth models of this nature without being viewed as credible by financial markets. The two institutional changes also helped to enhance credibility and were consequently a critical *enabler* for governments to pursue policies that stimulated domestic demand during the Great Moderation (as discussed further in Section 4.4 of Chapter 4 of the thesis). Lastly, the dramatic fall in interest rates that accompanied these two major changes greatly increased the ability of countries (and individual consumers) to borrow.

In a simple open economy modern macroeconomic model, of the type developed by Carlin and Soskice (2015) and set out in full in Section 4.4 of Chapter 4 of the thesis, it is possible to show how government demand-side policies can affect the medium-run equilibrium of the economy. In a small open economy with an inflation-targeting central bank, a boost in fiscal policy (or any other policy that boosts domestic demand) will result in an increase in aggregate demand that pushes up output and inflation. The forward-looking central bank then steps in to push up the real interest rate and put the economy back on the path back to equilibrium output and target inflation. However, the forward-looking foreign exchange market sees that real interest rates are going to be kept above world real interest rates for some time and the exchange rate appreciates as the foreign exchange market takes advantage of the arbitrage opportunity. Once the economy returns to equilibrium, the real interest rate has returned to the world real interest rate, and the increase in government spending has been completely offset by the reduction in net exports that

occurs as a result of the exchange rate appreciation. While inflation returns to target and output returns to equilibrium, the shock leaves the economy with an appreciated real exchange rate and trade and current account deficits (assuming they started in balance). In the event of a reduction in government spending (or any other policy that reduces domestic demand), the exact opposite chain of events takes place and the economy is left with a depreciated real exchange rate and trade and current account surpluses (assuming they started in balance).

The lack of attention policymakers paid to current account imbalances in the pre-crisis period and the willingness of the current account surplus countries (the CMEs) to finance the deficits of the current account deficit countries (the LMEs) meant that governments could effectively choose the real exchange rate they desired. The preferences of governments over the level of the exchange rate are deeply intertwined with their political systems, varieties of capitalism, and growth models.

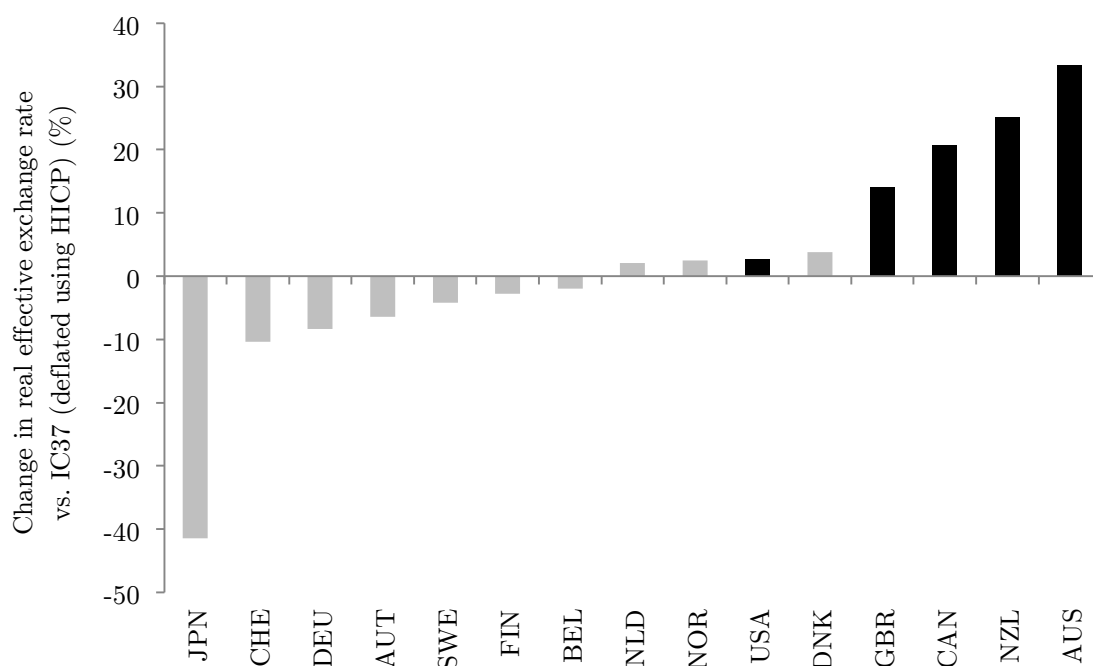
Not all actors in the economy want the same exchange rate; some prefer an appreciated exchange rate and others prefer a depreciated exchange rate. Individuals or consumers will typically prefer an appreciated real exchange rate because it boosts their purchasing power (real wages) by reducing the cost of imported goods (Walter 2014). The same holds for sheltered sector firms, especially those that use imported inputs. On the other hand, firms in tradable industries will typically prefer a depreciated real exchange rate because it improves their competitiveness (Frieden 1991, 2015). Forbes (2002) examines 12 major depreciations between 1997 and 2000 using firm-level data from over 13,500 companies from around the world and finds that firms with high export exposure have significantly improved performance (on a range of measures) following a depreciation.

The trade-off between competitiveness and purchasing power shows that the level of the exchange rate has distributive consequences in the domestic economy. The distributional conflict is not along class lines, however, but rather between the traded and non-traded sectors of the economy (Broz and Frieden 2001). Governments in the export-led CMEs are likely to prefer a depreciated exchange rate, as the tradables sector is the main engine of economic growth. This is

reinforced by consensus political systems that give powerful traded sector unions and employers associations a seat at the policymaking table (Soskice 2007) and PR electoral systems that privilege the interests of producers (Chang et al. 2011; Rogowski and Kayser 2002). In contrast, governments in the LMEs are likely to prefer an appreciated real exchange rate, as high-value added services and non-tradables are the main drivers of economic growth. This preference is strengthened by majoritarian political systems that cater policy to the concerns of the median voter (Soskice 2007) and majoritarian electoral systems that privilege the interests of consumers (Chang et al. 2011; Rogowski and Kayser 2002).

Figure 3.4 shows the distinct pattern of change in real exchange rates in advanced economies over the Great Moderation. It is clear to see that real exchange rates, which take into account nominal exchange rates and relative price levels, depreciated in the CMEs and appreciated in the LMEs. Put another way, price competitiveness improved in the export-led economies and deteriorated in the consumption-led economies, whereas purchasing power decreased in the export-led economies and increased in the consumption-led economies. It is worth noting that the real exchange rate appreciated less in the United States than the other LMEs, which is likely to be related to the relatively loose monetary policy in the United States following the bursting of the dotcom bubble and the 9/11 terrorist attacks, as well as the dollar's privileged position as a global reserve currency (Obstfeld and Rogoff 2009).

Figure 3.4. Change in real effective exchange rate (price competitiveness), 1994-2007



Source: European Commission, Economic and Financial Affairs, Price and Cost Competitiveness - Data Section (22 April 2016).

Note: IC37 includes the EU28 plus Australia, Canada, Japan, Mexico, New Zealand, Norway, Switzerland, Turkey and the United States. The colours of the columns correspond to varieties of capitalism. The grey columns are CMEs and the black columns are LMEs.

The divergence in real exchange rates was partly driven by government demand-side policies, particularly during the latter part of the Great Moderation. In the 1990s, both the LMEs and the CMEs sought to consolidate their public finances after the recessions of the early 1990s. In Europe, countries in line to join the single currency also had to meet the strict convergence criteria set out in the Maastricht Treaty, which included limits on both public deficits and debt. However, in the 2000s (prior to the crisis), when governments had more scope for fiscal expansion, the fiscal stance of the LMEs loosened considerably more than the fiscal stance of the CMEs. The change in the cyclically adjusted government primary balance (as a % of potential GDP) is often used to measure discretionary changes in fiscal policy, because it removes the government's net debt interest payments and corrects for the position of the economy in the business cycle. In fact, Alesina and Ardagna (1998, 2010) and Alesina, Perotti and Tavares (1998) define episodes of fiscal adjustment (consolidation) and fiscal stimulus based on large changes the cyclically adjusted

government primary balance. The average change in the cyclically adjusted government primary balance between 2000 and 2007 was -3.1 percentage points in the LMEs, compared to just -1.4 percentage points in the CMEs.³⁵ The LMEs also supported domestic demand, and consumption especially, by loosening credit conditions, which will be discussed in more detail in Section 3.5.

We know that growth models were largely invariant to partisanship, because the CMEs were export-led and the LMEs were consumption-led over the long post-Fordist period from 1980-2007 (see Table B.2 in Appendix B1). The discussion in this subsection also implies that partisanship has little influence on government demand-side policies in advanced democracies, as governments of both partisan stripes will pursue policies that support the national growth model. This argument is in line with the empirical evidence. Clark's (2003) comprehensive statistical study of the relationship between politics and the macroeconomy in open advanced democracies finds little evidence that macroeconomic policies or performance are affected by partisanship. The argument is also in line with Iversen and Soskice's (2015b) theory that support for advanced sectors of the economy is a valence issue for voters, whereas redistribution is a partisan issue. While partisanship does not alter the overall growth model, which is deeply ingrained in political and economic institutions, it can influence the distribution of income. The distribution of income can in turn have second-order effects on growth models, as will be discussed in more detail in the next section.

3.4 Growth models, income inequality and redistribution

The pervasive rise in earnings and household income inequality across the OECD economies has been one of the major macroeconomic trends of the post-Fordist era (Kenworthy and Pontusson 2005; OECD 2008, 2011a). This marked a sharp reversal from the post-war Golden Age, where rapid economic growth coincided with falling income inequality in advanced democracies (Piketty 2014). The Great Moderation

³⁵ Source: OECD Economic Outlook, No. 99, June 2016.

was also a period of robust economic growth, albeit at lower rates than the Golden Age, but the gains that accrued went disproportionately to those higher up the income distribution.³⁶

The left-hand side of Table 3.7 shows the net Gini coefficient (i.e. post tax-and-transfer) in 1994 and 2007, as well as the change over the period. A higher value indicates a more unequal distribution of disposable income among households. The table contrasts the LMEs with three different groupings of CMEs: the continental European CMEs, the Nordic CMEs and the other CMEs (Japan). As other CPE scholars have argued, these CME groupings help us to better understand patterns of inequality and redistribution in the post-Fordist era (Iversen and Soskice 2015a, 2015b; Pontusson 2005), and their relationship with growth models (Hope and Soskice 2016; Martin 2016).

A few things stand out from the left-hand side of table. First, disposable income inequality rose in all countries bar Austria over the period (and it only fell marginally in Austria). Income inequality in advanced democracies has been strongly affected by the changes in the employment structure during the era of deindustrialisation (see Section 3.2), especially at the top end, where wages of workers with tertiary (general skills) education have skyrocketed due to their complementarity with new information and communications technologies (Autor, Katz, and Krueger 1998; Goos and Manning 2007; Wren, Fodor, and Theodoropoulou 2013). Second, inequality rose more in the LMEs, the Nordic CMEs and Japan than it did in the continental European CMEs. Third, there is a clear ordering of the groups along the inequality dimension, with the LMEs being the most unequal and the Nordic CMEs the most egalitarian, with the continental European CMEs and Japan somewhere in the middle.

³⁶ Comparing the average GDP growth rates of the advanced democracies during the latter part of the Golden Age (Table B.1 in Appendix B1) to those in the Great Moderation (Table 3.1), we can see that growth rates in the earlier period were considerably higher.

Table 3.7. LMEs vs. different groups of CMEs: Disposable income inequality and relative redistribution, 1994-2007

	Net (post tax-and-transfer) Gini coefficient for household income (0-100 scale)			Relative redistribution (0-100 scale)		
	Change			Change		
	1994	2007	1994-07	1994	2007	1994-07
Liberal market economies						
Australia	28.4	31.8	3.4	32.9	34.1	1.2
Canada	28.4	31.5	3.1	36.7	32.8	-3.9
New Zealand	32.2	32.6	0.3	30.6	28.0	-2.5
United Kingdom	33.9	35.7	1.8	36.2	32.9	-3.4
United States	35.4	37.8	2.4	26.9	22.7	-4.2
Average	31.7	33.9	2.2	32.7	30.1	-2.6
Continental European CMEs						
Austria	28.1	27.9	-0.1	36.7	34.1	-2.6
Belgium	25.1	25.6	0.5	46.2	41.0	-5.2
Germany	27.0	28.8	1.8	41.0	43.3	2.3
Netherlands	25.9	27.3	1.5	44.6	41.2	-3.4
Switzerland	28.9	31.5	2.6	24.1	31.4	7.2
Average	27.0	28.2	1.2	38.5	38.2	-0.3
Nordic CMEs						
Denmark	22.2	23.8	1.6	49.2	45.4	-3.8
Finland	21.0	26.4	5.3	56.1	43.6	-12.5
Norway	24.1	24.4	0.3	42.2	44.3	2.1
Sweden	21.7	24.6	2.9	54.2	48.4	-5.8
Average	22.2	24.8	2.5	50.4	45.4	-5.0
Other CMEs						
Japan	26.8	30.3	3.5	30.1	34.1	4.0

Source: David Brady, Evelyne Huber, and John D. Stephens, Comparative Welfare States Dataset, University of North Carolina and WZB Berlin Social Science Center, 2014 (accessed May 2016); Solt, Frederick. 2014. "The Standardized World Income Inequality Database". Working paper. SWIID Version 5, October 2014

Note: A higher Gini coefficient indicates a more unequal distribution of disposable income among households. Relative redistribution is market-income inequality minus net-income inequality divided by market income inequality multiplied by 100 (household income, whole population). A higher value indicates more redistribution.

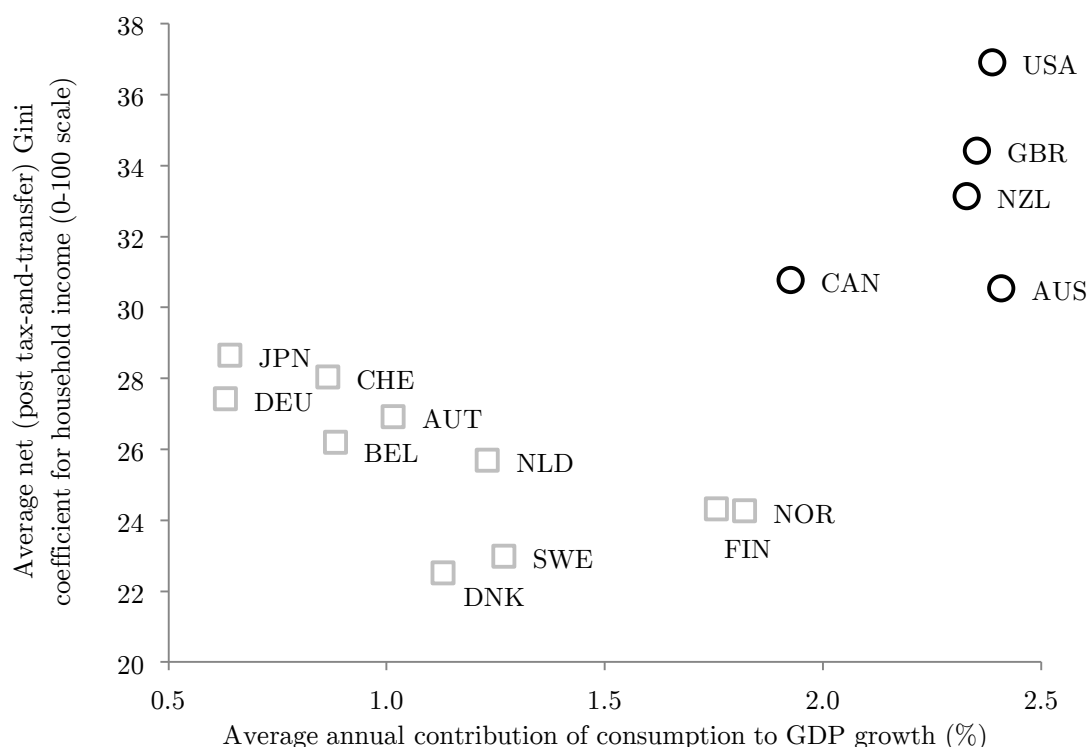
The right-hand side of the table shows that there is also still a clear ranking when it comes to government redistribution, which runs exactly opposite to the ranking in disposable income inequality. The Nordic CMEs are by far the most redistributive

and the LMEs the least, with the continental European CMEs and Japan somewhere in the middle. We can see that in ten out of the fifteen advanced democracies the tax and transfer system became less redistributive over the course of the Great Moderation, which contributed to the rise in disposable income inequality in these countries.

The link between the distribution of income and growth models has not been given much attention by scholars of CPE. The one exception is Baccaro and Pontusson (2016), who see growth models as being closely associated, as both cause and effect, with distributive conflict. Borrowing from the ideas of the late Polish economist Michał Kalecki (1944), Baccaro and Pontusson (2016) argue that a redistribution of income from rich to poor will raise consumption and aggregate demand because the poor spend more of their income than the rich. This arises because households lower down the income distribution have a higher marginal propensity to consume than households higher up the income distribution (Carroll, Slacalek, and Tokuoka 2014; Jappelli and Pistaferri 2014).

Baccaro and Pontusson's (2016) argument might lead us to expect that the contribution of consumption to GDP growth would be larger in countries with more equal disposable income distributions. This is not the case when we look across the advanced democracies. Figure 3.5 shows that the highly inegalitarian LMEs are considerably more consumption-led than the more egalitarian CMEs during the Great Moderation. This is not to say that, *ceteris paribus*, redistribution from rich to poor will not boost consumption but rather that other factors related to varieties of capitalism are more important than the income distribution in driving growth models. The degree of coordination of wage setting is one such factor. The greater level of wage coordination in the CMEs underpins the export-led growth model by safeguarding external competitiveness and pricing newly trained workers with specialist skills into employment in high-end export sectors (Iversen and Soskice 2010, 2012) (as discussed in detail in Section 3.2). We saw in Tables 3.1 and 3.2 that the CMEs typically have more coordinated wage setting and more export-led growth models.

Figure 3.5. Average disposable income inequality and the average annual contribution of consumption to GDP growth, 1994-2007



Source: David Brady, Evelyne Huber, and John D. Stephens, Comparative Welfare States Dataset, University of North Carolina and WZB Berlin Social Science Center, 2014 (accessed May 2016); Solt, Frederick. 2014. "The Standardized World Income Inequality Database". Working paper. SWIID Version 5, October 2014; European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update).

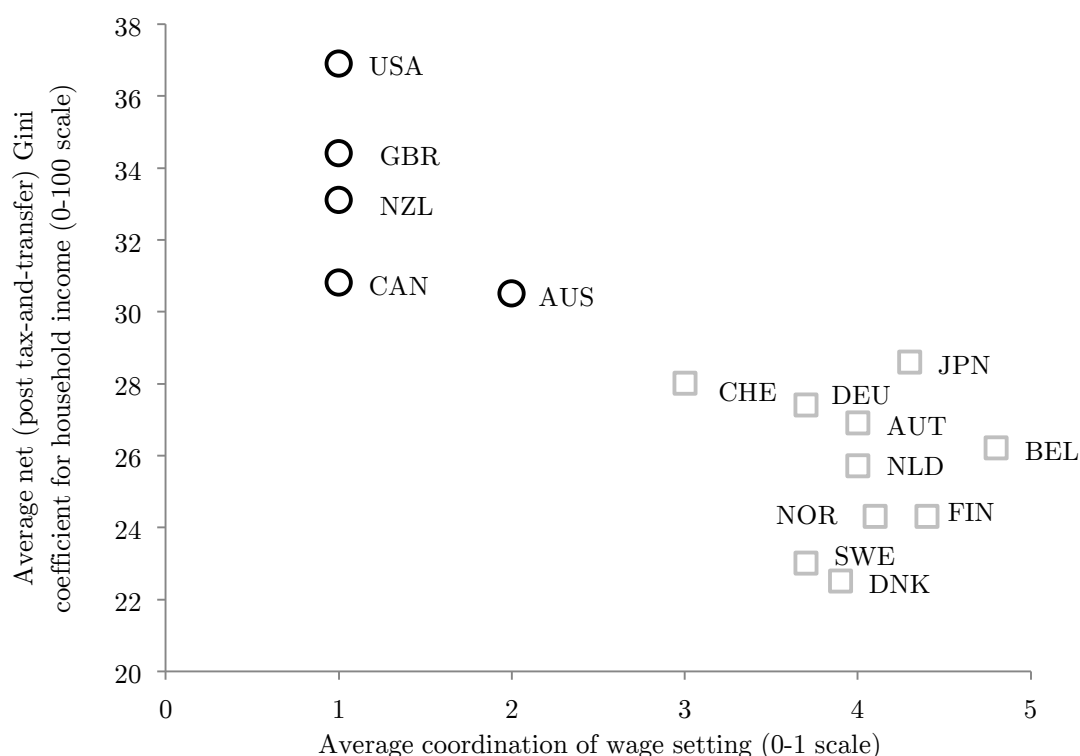
Note: A higher Gini coefficient indicates a more unequal distribution of disposable income among households. The markers correspond to varieties of capitalism. The grey squares are CMEs and the black circles are LMEs.

Figure 3.6 shows the relationship between coordinated wage setting and disposable income inequality. The CMEs group together as countries with coordinated wage setting and more egalitarian income distributions. Rueda and Pontusson (2000) provide empirical evidence that bargaining centralisation reduces wage inequality.³⁷ They find that the egalitarian effect of centralisation is more than three times greater in the CMEs than the LMEs. This suggests that the complementary

³⁷ Recent work by Barth and Moene (2016) has also found evidence that wage equality increases the generosity of the welfare state via its effect on political competition, which further reinforces the relationship between wage coordination and disposable income inequality in the CMEs.

institutions of coordinated capitalism, such as long-term cooperation between unions and employers' associations and strong vocational training systems, help to support bargaining centralisation and egalitarian labour market outcomes, as well as the export-led growth model.

Figure 3.6. Average disposable income inequality and coordination of wage setting, 1994-2007



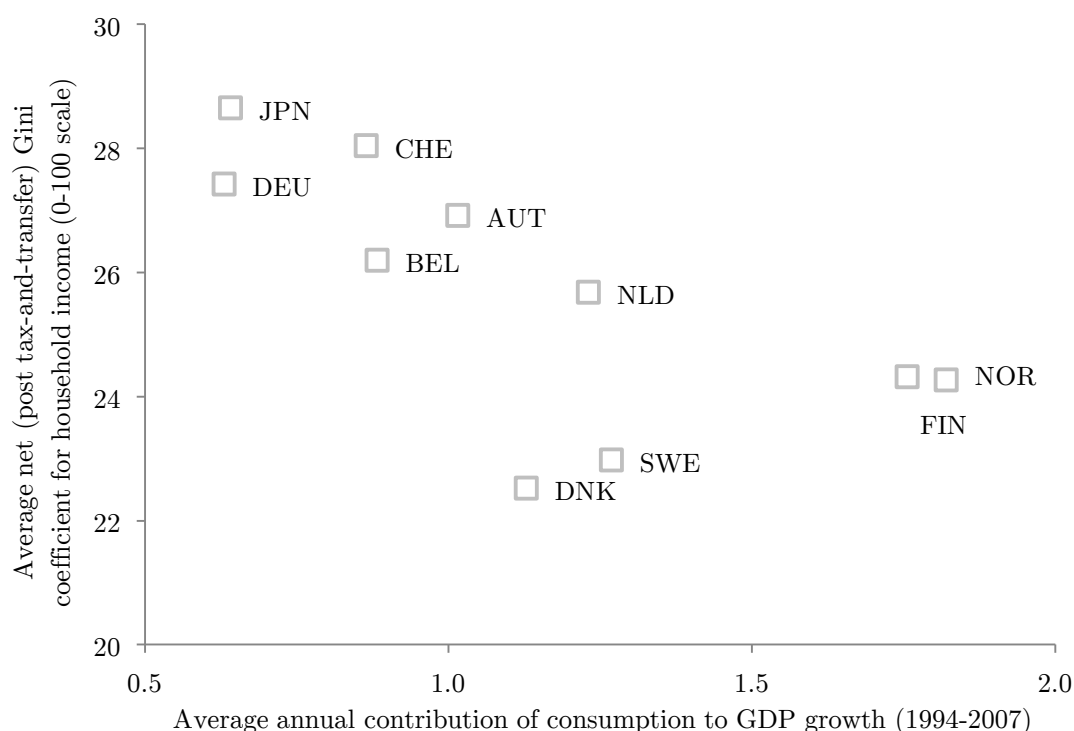
Source: David Brady, Evelyne Huber, and John D. Stephens, Comparative Welfare States Dataset, University of North Carolina and WZB Berlin Social Science Center, 2014 (accessed May 2016); Solt, Frederick. 2014. "The Standardized World Income Inequality Database". Working paper. SWIID Version 5, October 2014; J. Visser, ICTWSS Data base. version 5.0. Amsterdam: Amsterdam Institute for Advanced Labour Studies AIAS. October 2015. Open access database at: www.uva-aias.net/208.

Note: A higher Gini coefficient indicates a more unequal distribution of disposable income among households. The coordination of wage setting measure is variable 'Coord' from the ICTWSS Database. It measures the degree of wage coordination (regardless of the level it occurs at). Higher values indicate a greater degree of coordination. The markers correspond to varieties of capitalism. The grey squares are CMEs and the black circles are LMEs.

Across varieties of capitalism, the Kaleckian mechanism highlighted by Baccaro and Pontusson's (2016) does not appear to be exerting a major influence on growth models. If we just concentrate on the CMEs, however, the picture takes on a

different complexion. Figure 3.7 removes the LMEs from Figure 3.5 and zooms in on the relationship between disposable income inequality and the contribution of consumption to GDP growth for the CMEs. There is a clear negative correlation; the more egalitarian CMEs are typically more consumption-led. There is also a geographical split with the Nordic CMEs typically more consumption-led than the continental European CMEs and Japan.

Figure 3.7. Average disposable income inequality and the average annual contribution of consumption to GDP growth in the CMEs, 1994-2007



Source: David Brady, Evelyne Huber, and John D. Stephens, Comparative Welfare States Dataset, University of North Carolina and WZB Berlin Social Science Center, 2014 (accessed May 2016); Solt, Frederick. 2014. "The Standardized World Income Inequality Database". Working paper. SWIID Version 5, October 2014; European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update).

Note: A higher Gini coefficient indicates a more unequal distribution of disposable income among households.

The in-depth analysis at the heart of Baccaro and Pontusson (2016) focuses on four countries and only two of them are CMEs: Sweden (a Nordic CME) and Germany (a continental European CME). Their argument for Sweden being more consumption-led than Germany (as we can see it is from Figure 3.7) goes beyond the

fact that Sweden is more egalitarian (as is also clear from Figure 3.7). They posit that Sweden was more able to combine solid consumption growth with rapid export growth because it moved into less price sensitive export markets, specifically high-technology manufactured goods and high-ICT services. This means that the Swedish export-led growth model doesn't require the repression of wages and household consumption that the German export-led growth model does to remain internationally competitive. In other words, because demand for Swedish exports is relatively insensitive to price increases, wage restraint is less important for underpinning export success in Sweden than in Germany. Their argument suggests that earnings inequality at the low-end of the income distribution is central to Germany's export-led growth model.

Baccaro and Pontusson's (2016) argument for the difference in growth models between Germany and Sweden has already been critiqued on several grounds; most pertinently that there is little consensus in the empirical literature that German exports are more price sensitive than Swedish exports or that high-ICT services exports are relatively price insensitive (Hope and Soskice 2016). How does their argument fair if we extend it to the wider sample of CMEs? It is beyond the scope of this paper to use econometric analysis to estimate and compare the price sensitivity of the exports of the individual CMEs, although that clearly remains an important area for future research. However, we can look at the export profiles of the CMEs. If Baccaro and Pontusson's argument holds water, we would expect to see high-tech manufactures and high-ICT services making up a greater proportion of total exports in the (more consumption-led) Nordic CMEs than the continental European CMEs.

Table 3.8 shows the importance of high-skill and technology intensive manufactures (as defined by UNCTAD) and high-ICT services (as defined by Wren (2013a)) to total exports. Due to data availability the table just shows a snapshot in 2005, but this corresponds to the latter part of the Great Moderation when Baccaro and Pontusson (2016) suggest the German growth model based on price sensitive exports became particularly ingrained. In a straight comparison between Germany

and Sweden, we can see that high-ICT services were more important to Swedish exports, which lines up with their hypothesis. We can also see that high-tech manufactures made up a bigger proportion of exports in Germany than in Sweden, which does not line up with their hypothesis. Hence, there is mixed evidence for their hypothesis even when looking solely at the two CMEs in their analysis.

Table 3.8. The importance of high-skill and technology intensive manufactures and high-ICT services to total exports in the CMEs, 2005

	High-skill and technology intensive manufactures (as a % of total exports)	High-ICT services (as a % of total exports)
	2005	2005
Continental European		
Austria	13.5	9.6
Belgium	29.4	6.8
Germany	24.6	6.0
Netherlands	29.5	8.9
Switzerland	38.2	14.2
Average	27.0	9.1
Nordic		
Denmark	14.6	6.7
Finland	24.7	12.3
Norway	4.4	7.0
Sweden	19.1	12.8
Average	15.7	9.7
Other		
Japan	27.8	4.9

Source: Author's calculations using United Nations UNCTADstat database (accessed September 2016).

Note: All underlying exports data are in \$US (current prices, current exchange rates). Data on high-skill and technology manufactures exports are directly available from UNCTAD. For a list of manufacturing subsectors included in the high-skill and technology manufactures see: http://unctadstat.unctad.org/EN/Classifications/DimSicRev3Products_Tdr_Hierarchy.pdf. High-ICT services covers the following sectors: communications; insurance; financial services; computer and information; and other business services. Sectors chosen by author from UNCTADstat data to match as closely as possible Wren's (2013a, 13) "dynamic service sectors", which are "ICT intensive and are characterized by relatively high rates of productivity growth and increasing international tradedness".

The remainder of Table 3.8 shows that their hypothesis also holds up badly when extended to the broader pool of CMEs. On average the continental European CMEs, which typically saw a lower contribution of consumption to GDP growth, had much higher high-tech export profiles in manufactured goods than the Nordic CMEs, and the two groups had similar export profiles in high-ICT services. Switzerland especially stands out. It had one of the lowest contributions of consumption to GDP growth across all the CMEs but had the most high-end export profile in both manufactured goods and services. High-tech manufactures also made up a bigger proportion of Japanese exports than they did in any of the Nordic CMEs, and Japan had an exceptionally low contribution of consumption to GDP growth during the Great Moderation. The key takeaway from the table is that there seems to be no systematic relationship among CMEs between the contribution of consumption to GDP growth during the Great Moderation and importance of high-end goods and services to total exports.

Returning to Figure 3.7, we can see that the Nordic CMEs are more egalitarian than their continental European counterparts (and Japan). If Kaleckian mechanisms were indeed at work in the CMEs, then this is likely to be how, rather than through the export price sensitivity channel emphasised by Baccaro and Pontusson (2016). There are a number of distinctions between the Nordic CMEs and the continental European CMEs (and Japan) that are likely to have helped drive the differences between the two groups in both the distribution of income and the contribution of consumption to GDP growth. Put another way, there are several factors that can help explain the negative correlation between income inequality and the contribution of consumption to GDP growth observed in Figure 3.7.

The first factor is that the Nordic CMEs are more redistributive. Iversen and Soskice (2015a, 2015b) find evidence that the Nordic CMEs have responded to deindustrialisation in a much more inclusive manner than the continental European CMEs. More specifically, spending on labour market outsiders has been much more responsive to labour market shocks in the Nordic CMEs. As labour market outsiders are typically unemployed or in low-paid precarious employment, we would expect

them to have a high marginal propensity to consume, so that any redistribution toward them helps prop up economy-wide consumption.

Iversen and Soskice's (2015a, 2015b) framework finds that the Nordic CMEs are more redistributive than the continental European CMEs because of long-standing differences in party systems. Both sets of countries have PR electoral systems (see Table B.4 in Appendix B1), but the Nordic CMEs have strong independent rightist parties, whereas the continental European CMEs have strong Christian Democratic (or centrist) parties and weak rightist parties. This constellation of parties means that centre-left governments who help safeguard the interests of outsiders are more prevalent in the Nordic CMEs than in the continental European CMEs.

In Section 3.3, I argued that growth models are largely invariant to partisanship. This is because governments of both partisan stripes tend to pursue demand-side policies that support the national growth model—i.e. supporting the advanced sectors of the economy is a valence issue for voters (Iversen and Soskice 2015b). As Iversen and Soskice (2015a, 2015b) show, however, redistribution is still a partisan issue for voters. In this way, partisanship did exert some second-order effects on growth models during the Great Moderation, by influencing the contribution of consumption to GDP growth within the CMEs.

The second factor is that a higher proportion total employment resides in the public sector in the Nordic CMEs than elsewhere, as shown by the first column in Table 3.9. Rueda and Pontusson (2000) and Pontusson (2005) provide empirical evidence that greater public sector employment is associated with more egalitarian wage structures in the CMEs, as government employers are sheltered from product market competition and are ultimately accountable to elected officials. Public sector employment also directly buttresses household consumption by providing well-paid and relatively secure employment for low- and medium-skilled workers (Martin 2016). In addition, a large public sector has played a major role in expanding female labour force participation in the Nordic countries (Iversen and Rosenbluth 2013), which helps insulate household income and consequently consumption from the

business cycle in dual-earner households in which the spouse works in the private sector.

Table 3.9. Average public sector employment and trade union density in the CMEs, 1994-2007

	Average civilian government employment (as a percentage of the working-age population) 1994-2007	Average trade union density (%) 1994-2007
Continental European		
Austria	12.0	37.0
Belgium	10.3	54.0
Germany	7.5	24.6
Netherlands	6.3	22.7
Switzerland	7.9	20.6
Average	8.8	31.8
Nordic		
Denmark	21.8	72.9
Finland	14.1	75.3
Norway	22.6	55.2
Sweden	21.0	79.1
Average	19.9	70.6
Other		
Japan	5.6	21.2

Source: David Brady, Evelyne Huber, and John D. Stephens, Comparative Welfare States Dataset, University of North Carolina and WZB Berlin Social Science Center, 2014 (accessed May 2016); Cusack, Thomas R. 2004. Data on Public Data on Public Employment and Wages for 21 OECD countries, WZB (Berlin Social Research Center), <http://www.wzb.eu/en/persons/thomas-r-cusack?s=5662> [accessed 3 Jul 2011], ILO, LABORSTA (database), <http://laborsta.ilo.org/> [accessed 3 Jun 2013], International Institute for Strategic Studies, The Military Balance (various years); OECD and J.Visser, ICTWSS database (Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2010), version 3.0 (<http://www.uva-aiaa.net/>).

Note: The working-age population are those aged 15-64. Missing values in government employment series for Japan and Switzerland were linearly interpolated before the period average was taken. Trade union density corresponds to the ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners.

The third factor, as shown in the second column of Table 3.9, is that union membership has held up much better in the Nordic CMEs. In fact, Thelen (2014)

finds that the extent to which groups outside of the core manufacturing industries—women, services sector workers, salaried professionals, public sector workers—are represented in the labour movement is one of the key dividing lines between the Nordic and continental European CMEs. Higher union density has been linked to lower wage inequality due to the desire of union members for wage compression and the role of unions in supporting the wages of low- and semi-skilled workers (Pontusson 2005; Rueda and Pontusson 2000). The more solidaristic labour market outcomes in Nordic countries further support consumption.

The relationship between inequality and consumption is complex and ultimately dependent on varieties of capitalism. The complementary institutions of coordinated capitalism simultaneously support the export-led growth model and a more egalitarian distribution of income. The LMEs institutions emphasis on flexibility supports the consumption-led growth model but leads to a more inequitable distribution of income. Kaleckian mechanisms are therefore not driving the differences in growth models among advanced democracies. However, within coordinated capitalism, there is evidence that the more egalitarian Nordic CMEs, which have managed more inclusive growth in the era of deindustrialisation, have seen a higher contribution of consumption to GDP growth than the other CMEs.

One further dividing line between the Nordic and continental European CMEs (that does not alter the distribution of income) is the evolution of household indebtedness. The more rapid credit expansion in the Nordic CMEs during the Great Moderation helped to facilitate household consumption, as we shall see in the following section.

3.5 Growth models, credit and housing

The Great Moderation was characterised by low and stable inflation and low interest rates across advanced democracies, which was partly the result of the shift to inflation-targeting central banking and open financial markets (see Section 3.3). The sole focus of macroeconomic stabilisation policy on inflation and the low cost of

borrowing made for an environment ripe for credit and asset price bubbles to build up unchecked. Table 3.10 shows just that in the household sector.

Table 3.10. LMEs vs. different groups of CMEs: Household indebtedness, 1995-2007

	Household debt (as a percentage of net disposable income)		
	1995	2007	Average annual growth rate (%) 1996-07
Liberal market economies			
Australia	105.5	194.2	5.3
Canada	97.9	145.0	3.3
New Zealand	-	-	-
United Kingdom*	111.2	183.3	5.2
United States	94.5	143.0	3.5
Average	102.3	166.4	4.3
Continental European CMEs			
Austria	65.8	88.6	2.5
Belgium	60.2	87.4	3.2
Germany	97.2	102.6	0.5
Netherlands	147.6	261.4	4.9
Switzerland**	171.1	182.1	0.8
Average	108.4	144.4	2.4
Nordic CMEs			
Denmark	192.5	324.7	4.5
Finland	71.0	114.7	4.2
Norway	123.4	207.2	4.5
Sweden	89.4	157.4	4.8
Average	119.1	201.0	4.5
Other CMEs			
Japan	137.4	133.6	-0.2

* The UK data starts in 1997, hence the data shown in the 1995 column is for 1997 and the average annual growth rate is for the 1998-07 period.

** The Swiss data starts in 1999, hence the data shown in the 1995 column is for 1999 and the average annual growth rate is for the 2000-07 period.

Source: OECD National Account at a Glance, June 2016.

Note: No household indebtedness data is available for New Zealand.

Household indebtedness expanded between 1995 and 2007 (often sharply) in every country in the sample except Japan. The slight fall in indebtedness in Japan likely reflects the severely depressed private sector demand in the country during its lost

decade (see Section 3.2 and Koo (2009)). The comparison across varieties of capitalism and geographical areas in Table 3.10 yields some interesting findings. Financialisation and credit expansion to households have been widely associated with the LMEs' consumption-led growth model (Barnes and Wren 2012; Crouch 2009; Iversen and Soskice 2012). The table reinforces this view, as household indebtedness in the LMEs starts relatively high and rises rapidly over the period. However, the table also shows that the Nordic CMEs and the Netherlands had similarly dramatic growth in household indebtedness and finished the period with even higher household indebtedness than the LMEs (on average).

The CPE literature has been guilty of identifying household debt and credit expansion as a uniquely LME phenomenon (Barnes and Wren 2012; Crouch 2009; Iversen and Soskice 2012). Barnes (2015, 19) is the exception; she presents evidence on household debt trajectories and comes to the conclusion “that the conventional wisdom about household debt in liberal market economies does not differentiate the two ‘varieties’ of advanced capitalist growth”. The evidence presented in Table 3.10 supports her view but just looking at the headline household indebtedness figures cannot tell us the whole story. It cannot tell us anything about what the credit was used for (mortgages or consumer credit), which part of the income distribution it went to or the effect it had on the different components of aggregate demand; all of which are integral if we want to unpack the role of household indebtedness in growth models. In this section, I argue that while household indebtedness may have followed similar patterns in some CMEs as it did in the LMEs, it played a very different role in their growth models.

Credit and consumption-led growth in the LMEs

The expansion of credit to households may not have been unique to the LMEs but it was ubiquitous among them. No LME (including Ireland and New Zealand) did not see a substantial increase in household indebtedness during the Great Moderation. The fact some CMEs saw equivalent (or larger) increases in household indebtedness does not—as claimed by Barnes (2015)—invalidate the large body of work in CPE

and economics that points to the central role that credit played in the LMEs' consumption-led growth model.

The consumption-led growth model of the LMEs was underwritten by the expansion of private credit. In a time of stagnating real wages for the median worker, credit was a means of propping up consumption and living standards (Rajan 2010). Financialisation supported the reorientation of the LMEs towards the low-skilled non-traded service sectors and high-end knowledge based services during the era of deindustrialisation (see Section 3.2). Barnes and Wren (2012) provide empirical evidence that private sector indebtedness helped expand employment in non-traded private services, such as retail, restaurants and personal services, in OECD countries between 1970 and 2000. They suggest this operates through two channels. First, a line of credit creates the illusion of additional household wealth, and second, credit expansion often fuels house price increases that boost the net wealth of homeowners. The LMEs were also uniquely well placed to benefit from financialisation at the top end of the labour market. It is no coincidence that London and New York are the world's foremost financial centres. The flexible wage setting and focus on general education at the tertiary level in the LMEs facilitates radical innovation in high-end services, especially high-risk financial activities (including securitisation) (Iversen and Soskice 2012). Unlike the high-level household indebtedness figures, the expansion of the financial services sector was greater in the LMEs than the CMEs during the Great Moderation (Barnes 2015), just as the varieties of capitalism approach would predict. The CPE literature has also more broadly highlighted the complementarity of national systems of financial regulation with national varieties of capitalism and growth models (Iversen and Soskice 2012; Kalinowski 2013).

There is a political narrative that runs alongside the economic narrative when it comes to credit expansion in the LMEs: in the face of stalling wages and living standards, and rising inequality, governments in the LMEs deliberately expanded credit in order to boost employment and growth, and placate their electorates (Barnes and Wren 2012; Calomiris and Haber 2014; Rajan 2010). In the United

States, the policy actions taken to support credit expansion were very explicit, including the direct provision of subprime mortgages to low-income households through the government sponsored enterprises (GSEs) Fannie Mae and Freddie Mac, as well as a commitment for these institutions to repurchase risky mortgages made by commercial banks to low-income households under the Community Reinvestment Act (CRA) (Calomiris and Haber 2014). The aggressive government lending targets led Fannie Mae and Freddie Mac to loosen their underwriting standards (i.e. provide riskier loans), and the commercial banks did the same as they could resell many of their CRA loans to the GSEs and remove the risk from their balance sheets (Calomiris and Haber 2014). In the LMEs in general, government policies were less explicit but indirectly fuelled the rise of financial services and risky lending, for example, light-touch financial regulation (championed loudly by Gordon Brown and Tony Blair in the UK) and publicly-listed banks aggressively pursuing high returns (Barnes 2015; Kalinowski 2013).

Fuller (2015, 258) looks at five different dimensions of government policy that can affect the expansion of credit to households and creates a composite index of different countries' "systemic approach to credit" during the 2000s. He finds that the United States government *encouraged* credit expansion more than any other government in the advanced democracies. On average, the LMEs were also much more encouraging than the CMEs, although the gap between the LMEs and the Nordic CMEs was smaller than the gap between the LMEs and the continental European CMEs.³⁸ In a number of the continental European CMEs, the government actually took steps to actively *mitigate* the growth of credit to households (Fuller 2015).

As discussed at length in Section 3.3, the majoritarian electoral systems of the LMEs systematically privilege the interest of consumers (Chang et al. 2011; Rogowski and Kayser 2002), force parties to compete for the median voter (Soskice 2007), and give electorates the clarity of responsibility to hold governments

³⁸ Fuller's (2015) index scores for the fifteen advanced democracies in my sample are shown in Table 4.1 in Chapter 4 of the thesis.

accountable for short-term economic performance (Anderson 2000; Nadeau, Niemi, and Yoshinaka 2002; Powell and Whitten 1993; Whitten and Palmer 1999). Hence, the electoral systems of the LMEs provide clear incentives for governments to pursue policies that stimulate consumer spending, such as the expansion of credit to households. In modern macroeconomics, a rise in consumption will, *ceteris paribus*, result in an appreciation in the real exchange rate and a fall in net exports (see Section 4.4 of Chapter 4 of the thesis). The appreciation of the exchange rate will further benefit consumers by raising their purchasing power (Walter 2014). The downside of real exchange rate appreciation is that it reduces external competitiveness, but the LME consumption-led growth model does not require maintaining external competitiveness. Hence, pursuing policies that expand access to credit are very attractive for governments in the majoritarian LMEs. The four-to-five year electoral cycle and the close association between winning elections and governing in majoritarian systems typically outweigh the long-term risks of credit expansion to the stability of the financial system and the broader economy.

Credit and export-led growth in the CMEs

Rapid growth in household indebtedness is not central to the export-led growth model. We can see from Table 3.10 that household indebtedness did not rise markedly in all the CMEs during the Great Moderation. However, Table 3.10 does show that the growth of household indebtedness was similarly spectacular in the Nordic CMEs and the Netherlands as it was in the LMEs, which poses some interesting questions. Why did household indebtedness rise dramatically in some CMEs and not others? Why was the contribution of consumption to GDP growth so much lower in the highly indebted CMEs than in the highly indebted LMEs? Why did the growth of household indebtedness in the Nordic CMEs and the Netherlands not undermine their export-led growth models? This subsection aims to answer these questions using the growth models approach set out in this paper and some further empirical analysis.

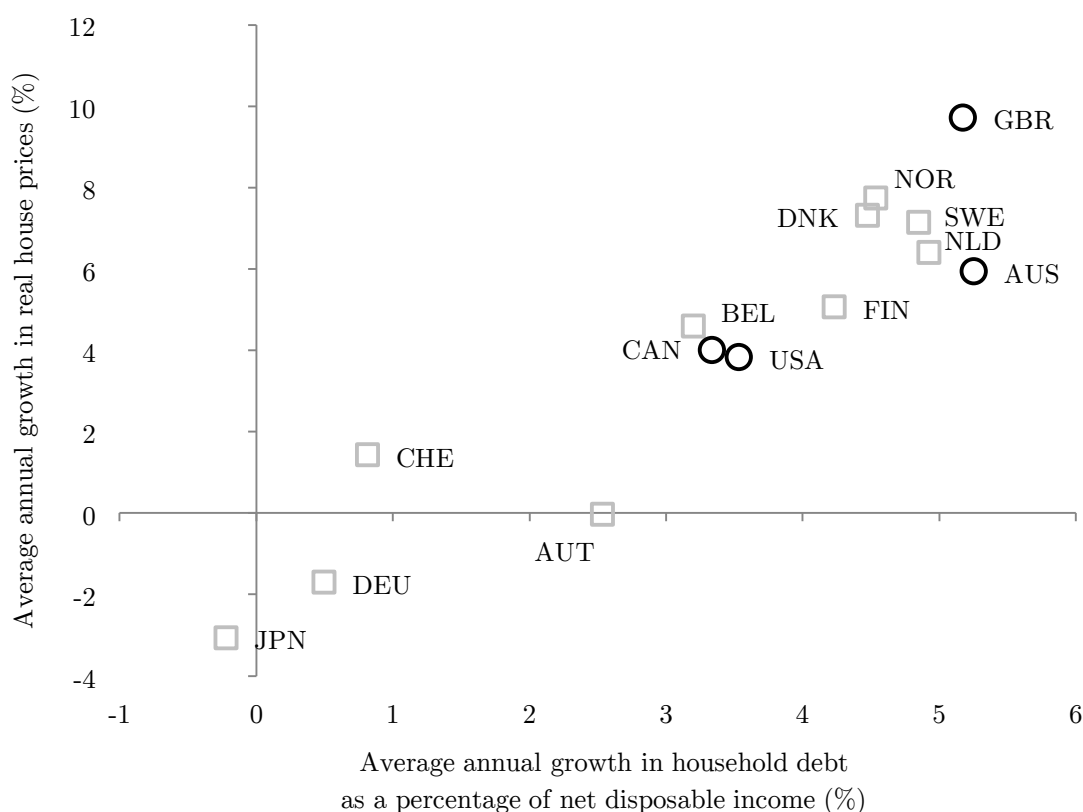
The household indebtedness data in Table 3.10 does not give us any information about the type of debt households are taking on (mortgages, consumer credit or other loans) or the type of households that are taking on debt (low-income, medium-income, high-income). Mortgage debt (loans for house purchase) typically makes up the majority of household debt; mortgage debt averaged just over 70% of total household debt across OECD countries in 2005 (Girouard, Kennedy, and André 2007). A rapid expansion of mortgage debt generally coincides with a rise in house prices, as a boost in demand for residential property cannot easily be met with a rise in supply, at least in the short term. Houses (and many other financial assets) are unlike ordinary goods, as a rise in price typically increases demand (as buyers expect prices to go up further in the future). Buyers will therefore make capital gains from holding housing as long as expectations of continuously rising prices do not change. This makes house prices prone to self-fulfilling bubbles (Carlin and Soskice 2015).

Figure 3.8 shows that the growth of household indebtedness was mirrored by the growth of real house prices during the Great Moderation. In fact, no country had a credit boom without also having a house price boom. House price growth in the CMEs during the Great Moderation had a distinct geographical pattern. Much like the growth of household indebtedness, the Nordic CMEs and the Netherlands saw faster house price growth than the other CMEs.

There are a number of reasons why this was the case. On the supply-side, mortgage borrowing was encouraged by high loan-to-value ratios (the Netherlands), mortgage interest deductibility (Denmark, Finland, Netherlands, Norway and Sweden), the availability of housing equity release (Denmark, Finland, Netherlands and Sweden) and the development of interest-only loans (Denmark and the Netherlands) (André 2010; IMF 2011; Schwartz and Seabrooke 2008). In contrast, mortgage borrowing was discouraged in Germany and Switzerland by tighter credit conditions, comparatively low homeownership rates and large rental markets (André 2010). On the demand-side, the economies of the Nordic CMEs and the Netherlands grew much faster than the other CMEs during the Great Moderation. The former group averaged 3.2% annual GDP growth over the period compared to just 2% in

the other CMEs. This may have increased demand for housing directly, as well as increased expectations about future house price appreciation, which has been shown to contribute significantly to house price booms (Miles and Pillonca 2008).

Figure 3.8 Average annual growth in household indebtedness and real house prices, 1996-2007



Source: OECD National Accounts at a Glance, June 2016; OECD Analytical House Price Indicators (accessed July 2016).

Note: Average annual growth rates for 1996-2007 for all countries except Austria (2001-2007), Switzerland (2000-2007) and the UK (1998-2007). No household indebtedness data is available for New Zealand so it is excluded from the figure. The markers correspond to varieties of capitalism. The grey squares are CMEs and the black circles are LMEs.

The equity in a homeowner's house (the difference between the market price and the price at purchase) is a source of wealth. For low- and middle-income homeowners, who typically hold few financial assets (stocks, bonds, etc.), it is often their biggest (or only) source of wealth (Mian and Sufi 2014). A rise in house prices pushes up the housing wealth of homeowners, which has been found to significantly boost household consumption (Benjamin, Chinloy, and Jud 2004; Case, Quigley, and

Shiller 2005; Ludwig and Sløk 2004). The difference in house price growth in the Nordic CMEs (and the Netherlands) and the continental European CMEs (see Figure 3.8) is therefore likely to have been a factor in the larger contribution of consumption to GDP growth in the former group.

Catte et al. (2004) find that the majority of the housing wealth effect on consumption runs through the housing equity withdrawal channel. In a rising housing market, homeowners build up equity in their homes. In markets with highly developed and complete mortgage markets, homeowners can then take out additional loans using the equity in their home as collateral. This channel was shown to be particularly important for fuelling consumption in Australia, Canada, the Netherlands, the UK and the US but had no effect in continental Europe and Japan, where home equity loans are much less common (Catte et al. 2004). For example, Mian and Sufi (2011) estimate that a total of \$1.25 trillion in the rise in household debt in the United States between 2002 and 2006 was attributable to home equity withdrawals, and that the vast majority of these withdrawals were used to prop up consumption expenditures. In related work, Mian, Rao and Sufi (2013) find that poorer and more levered households have a higher marginal propensity to consume out of housing wealth. Their findings suggest that housing booms facilitate the expansion of consumption (when home equity loans are easily obtainable) because they loosen the credit constraints on low-income households.

The average annual contribution of consumption to GDP growth during the Great Moderation was 1.4% in the Nordic CMEs and the Netherlands and 2.3% in the LMEs.³⁹ In contrast, the average growth of household indebtedness was slightly higher in the Nordic CMEs and the Netherlands at 4.6%, compared to 4.3% in the LMEs.⁴⁰ We have already discussed a multitude of institutional and political reasons why the LMEs are more consumption-led, but there are also five reasons why the

³⁹ Source: European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update).

⁴⁰ Source: OECD National Account at a Glance, June 2016.

rise in household indebtedness in the Nordic CMEs and the Netherlands is likely to have affected consumption less than it did in the LMEs.

The first reason is that homeownership rates were higher (on average) in the LMEs than the Nordic CMEs and the Netherlands in the 1990s and early 2000s; the average share of owner-occupied dwellings was 69% in the former group and only 57% in the latter group.⁴¹ As some of the effect of credit on consumption operates through the house price channel, countries with a lower proportion of homeowners are likely to see smaller effects on consumption.

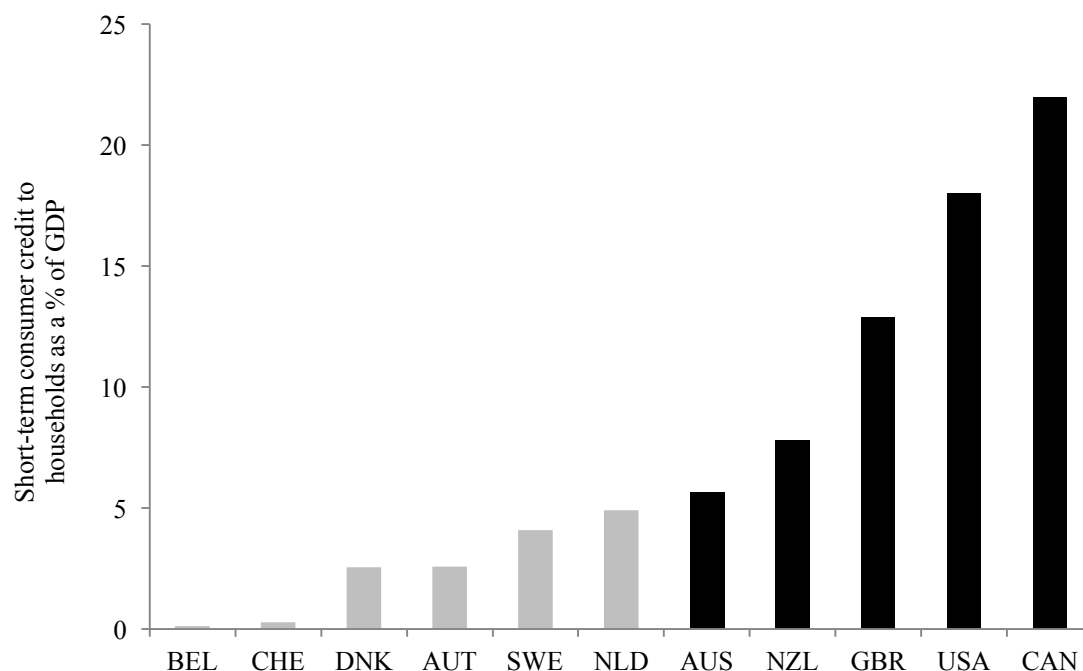
The second reason is that more low-income households were indebted in the LMEs than elsewhere, particularly in Canada, New Zealand and the United States, where around 50% of households in the bottom 20% of the income distribution held some form of debt in the mid-2000s (Girouard, Kennedy, and André 2007). This affects consumption because households at the lower end of the income and wealth distributions typically have much higher marginal propensities to consume than richer households (Carroll, Slacalek, and Tokuoka 2014; Jappelli and Pistaferri 2014; Mian and Sufi 2014).

The third reason is that more of the expansion in credit to households was used to finance consumption in the LMEs.

Figure 3.9 shows that consumer credit— borrowing used for purchasing goods and services such as credit cards and overdrafts—was larger relative to GDP in the LMEs than any of the CMEs (data is available for) on the eve of the financial crisis in 2007. The figure is particularly striking considering household indebtedness was considerably higher in Denmark and the Netherlands than it was in the LMEs in 2007 (see Table 3.10). The more consumer-focused lending in the LMEs likely reflects more developed consumer credit markets and the ease of obtaining (and widespread use of) home equity loans (Catte et al. 2004; Schwartz and Seabrooke 2008), as well as the greater presence of returns-driven banks pursuing high-risk strategies (Barnes 2015; Kalinowski 2013).

⁴¹ Source: Table 1 in Schwartz and Seabrooke (2008). The figures are an average of homeownership rates in 1992 and 2002.

Figure 3.9. Short-term (up to one year) consumer credit to households, 2007



Source: Author's calculations using OECD National Accounts and OECD Households' Financial Assets and Liabilities (data accessed July 2016).

Note: No short-term consumer credit data is available for Finland, Germany, Japan or Norway. Consumer credit data for Belgium, Canada, Sweden, Switzerland and the United Kingdom are from archived version of OECD Households' Financial Assets and Liabilities as data is not available for these countries in the most recent version. Households includes non-profit institutions serving households. The colours of the columns correspond to varieties of capitalism. The grey columns are CMEs and the black columns are LMEs.

The fourth reason is that the Nordic CMEs and the Netherlands are very open to international trade compared to the LMEs. The average trade openness of the former group was 83% of GDP between 1994 and 2007, while the equivalent figure for the LMEs was just 50% of GDP.⁴² This means that a higher proportion of any increase in credit-financed household spending is likely to be spent on goods from abroad in the Nordic CMEs and the Netherlands. The encouragement of credit growth as a policy tool to increase consumption is clearly more desirable in the consumption-led LMEs, but it also more feasible due to the presence of large internal markets (excluding New Zealand).

⁴² Source: Authors' calculations using OECD Annual National Accounts (data accessed June 2016). Trade openness = (exports + imports) as a % of GDP (all in current prices).

The final reason is that the governments in the Nordic CMEs and the Netherlands partially offset the expansionary effects of credit expansion with restrictive fiscal policies during the Great Moderation. There is a lot of evidence that the Nordic countries switched to non-accommodating fiscal policies after the breakdown in centralised bargaining that occurred during the severe economic crises of the early 1990s (Dølvik, Andersen, and Vartiainen 2015; Iversen 1996; Iversen and Soskice 2012).

Governments in the CMEs have different incentives to those in the LMEs. As discussed in detail in Section 3.3, governments in consensus (PR) political systems privilege the interest of producers (Chang et al. 2011; Rogowski and Kayser 2002) and labour unions and business associations are heavily involved in the policymaking process (Soskice 2007). In addition, parties in coalition governments with low clarity of responsibility are held less accountable for short-term economic performance at the ballot box (Anderson 2000; Nadeau, Niemi, and Yoshinaka 2002; Powell and Whitten 1993; Whitten and Palmer 1999), so are freer to pursue policies in the long-term interest of their supporters. These political institutions complement the economic institutions that underpin the export-led growth model in the CMEs (see Sections 3.2 and 3.3), because they allow the social partners to take a long-term view and privilege external competitiveness over short-term economic gains.

It may then seem paradoxical that the Nordic CMEs and the Netherlands allowed household indebtedness to rise so dramatically, and even pursued policies that encouraged house price bubbles. However, as discussed earlier, it is only expansions of domestic demand that, *ceteris paribus*, lead to appreciation of the real exchange rate and falling external competitiveness (see Section 4.4 of Chapter 4 of the thesis). We have already seen that credit growth in these countries likely had a smaller effect on consumption than in the LMEs. The effects of credit expansion on domestic demand were also partially counteracted by restrictive fiscal policies.

We saw in Figure 3.4 that the Nordic countries and the Netherlands managed to maintain external competitiveness in the face of credit and housing booms. Hence, governments in CMEs may be willing to generate housing booms (or at least not

take actions to dampen them down) as long as their effects on domestic demand are not too large or are counteracted by restrictive macroeconomic policies. Rising house prices can be politically useful to governments in CMEs (and of course also LMEs) because they increase voters' housing wealth and can lower voters' demands for social insurance programs and redistribution (Ansell 2012, 2014; Schwartz and Seabrooke 2008). The latter channel may be especially important in the Nordic economies, which have seen the biggest fall in redistribution over course of the Great Moderation (see Table 3.7).

3.6 Conclusion

The advanced democracies have been through a period of profound change since the collapse of the Fordist system in the 1970s. While the wage-led growth model of the Golden Age was able to secure both rising living standards and reductions in inequality among households, achieving this combination in the post-Fordist era of deindustrialisation and skills-biased technological change has proved elusive.

This paper explores the growth models that advanced democracies have pursued during the post-Fordist period, and argues that post-Fordist growth models are deeply intertwined with both varieties of capitalism and political systems. The LMEs pursued consumption-led growth models, partly driven by credit expansion and underpinned by their flexible labour markets and general skills focused education systems. In contrast, the CMEs have pursued export-led growth models based on external competitiveness and underpinned by coordinated and cooperative industrial relations and specific skills focused education systems. The consensus political systems of the CMEs and the majoritarian political systems of the LMEs further reinforce growth models by providing governments with a strong set of incentives to pursue policies that support national growth models.

Post-Fordist growth models became particularly entrenched during the Great Moderation—the long period of low inflation and reduced macroeconomic volatility that preceded the global financial crisis. This was the result of two major changes in

the macroeconomic regimes of advanced democracies: the introduction of independent inflation-targeting central banking and the move to financial market openness. These changes, *paradoxically*, gave governments more discretion to pursue demand-side policies that supported national growth models, because they enhanced the credibility of governments in financial markets and ensured external deficits could be easily financed (without pressure for adjustment).

Monetary policymakers were unconcerned about the build up of macroeconomic imbalances during the Great Moderation. This came back to haunt policymakers when the global financial crisis hit in 2008-09. The current account imbalances that accumulated between advanced democracies pursuing different growth models during the Great Moderation sowed the seeds for the crisis by helping inflate dangerous asset price and credit bubbles.

The Great Moderation was also a period of divergence in other important areas of the macroeconomy. The cross-country differences observed in the distribution of income and household indebtedness help to explain how the export-led Nordic CMEs generally had a higher contribution of consumption to GDP growth than the export-led continental European CMEs. Consumption was propped up in the Nordic CMEs by high levels of public employment, solidaristic wage outcomes, low inequality and credit expansion. Even in the Nordic CMEs, however, the contribution of consumption to GDP growth was still well below that in the consumption-led LMEs, which suggests that growth models are deeply embedded in varieties of capitalism and that these other factors are only of second-order importance.

This paper uses theory and an empirical analysis of the Great Moderation to set out a broad growth models framework. It can only scratch the surface of the comparative political economy of post-Fordist growth models, however, so leaves many open questions for future research. An obvious starting point would be an analysis of growth models in the post-global financial crisis phase since 2010. Despite a protracted and slow recovery in most advanced democracies, as well as a turn towards austerity policies (particularly in Europe), the high-level evidence points to pre-crisis growth models remaining in tact. After a small rebalancing during the

crisis, current account imbalances have re-emerged. The average current account balance in the LMEs was -3.6% of GDP in 2015, compared to 6% of GDP in the CMEs. The gap between the two groups is barely different from the gap on the eve of the financial crisis in 2007.⁴³ The re-emergence of imbalances since the crisis clearly needs to be explored further in order to ascertain whether they have been driven by the same set of interrelationships set out in this paper.

Another critical research agenda is how coordinated capitalism and the export-led growth model can survive in the long term. Deindustrialisation continues to erode the industrial core and success in increasingly important knowledge-intensive service sectors seems to depend on flexibility rather than coordination. The Nordic CMEs provide reason to be optimistic, as they have shown that the export-led growth model can be partially liberalised without undermining solidaristic wage outcomes and success in traditional manufactured exports. The newfound success of the Nordic countries in knowledge-intensive services and high levels of public employment (particularly among women) are both rooted in mass publicly funded education systems that have shifted towards a focus on general skills. This suggests that the more dualised continental European CMEs (particularly Germany) that have doubled-down on traditional manufacturing sectors and vocational training systems may have more cause to worry about the long-term viability of their export-led growth models. That being said, both the Nordic and continental European CMEs have a long history of using coordination, cooperation and negotiation to underpin a growth model based on success in exporting. It is therefore likely that these economies will adapt to future challenges the way they have done in the past—by taking the route that safeguards their export-led growth models.

⁴³ Source: IMF World Economic Outlook Database, April 2016. See Table B.3 in Appendix B1 for a comparison of current account balances in the LMEs and the CMEs in 1994, 2007 and 2015.

Open economy macroeconomics and political science: Demand-side policies and external imbalances in advanced democracies

ABSTRACT

The Great Moderation period that preceded the global financial crisis was characterised by low and stable inflation, low interest rates and reduced macroeconomic volatility. On the surface the shift to a macroeconomic regime centred on independent inflation-targeting central banking and open financial markets had been a great success but this period also coincided with the build up of dangerous imbalances among advanced democracies in real exchange rates and current accounts. The dominant models of the macroeconomy used in political science cannot explain the variation in macroeconomic outcomes and government policies observed during the Great Moderation. They are typically closed economy and still rooted in new classical economic theory from the 1970s and 1980s, which means they leave no scope for government policy to affect the economy beyond the very short term. In this paper, we set out a suite of simple modern open economy macroeconomic models to close the gap between the theory and the empirics. We then use the models to show how government demand-side policies, such as easing access to credit or fiscal policy, can affect the economy in the medium term, and how governments pursuing different policies can lead to persistent external imbalances even within a system of inflation targeting central banking.

4.1 Introduction

The Great Moderation—the long period of reduced macroeconomic volatility and low inflation that preceded the global financial crisis of 2008-09—saw the build up of imbalances in real exchange rates and current accounts among advanced democracies.⁴⁴ These imbalances reflected the build up of dangerous asset price and credit bubbles and helped sow the seeds of the global financial crisis and the Eurozone sovereign debt crisis (Blanchard and Milesi-Ferretti 2012; Lane 2012; Lane and Milesi-Ferretti 2012). The use of restrictive demand-side policies by some governments and expansionary demand-side policies by other governments was a major factor in driving the accumulation of imbalances (Iversen and Soskice 2012).

Perhaps surprisingly given the immense importance of macroeconomic developments over recent decades, political science research using contemporary macroeconomic modelling has been very limited. And the variation in macroeconomic outcomes and government policies across advanced democracies during the Great Moderation is at odds with the dominant macroeconomic models still used in political science (Persson and Tabellini 2000). Still rooted in new classical theory from the 1970s and 1980s, these models leave no scope for economic policies to affect macroeconomic outcomes beyond the very short term (Iversen and Soskice 2006b). They are also typically *closed* economy models—modelling a single nation that does not trade or interact with other nations. This is not only unrealistic in our highly globalised world but also means existing models cannot analyse external imbalances.

This paper aims to close the gap between the theory and the empirics by setting out a suite of simple modern *open* economy macroeconomic models. Our models incorporate important elements of frontier New Keynesian (NK) macroeconomics models, such as imperfect competition in product markets and rigidities in wage- and price-setting, whose implications have yet to be properly considered in political science. However, we also aim firmly for simple, tractable models that closely match

⁴⁴ The term Great Moderation was first introduced by Stock and Watson (2002).

real world outcomes, so we abstract from some of the more stringent New Keynesian assumptions, such as all agents forming expectations in a forward-looking, fully rational manner. This is one of the assumptions that have led modern macroeconomics to become so complex as to be all but impenetrable to scholars outside of the discipline. Unfortunately, the added complexity has not been driven by a desire to better explain how the macroeconomy works but instead by the “internal theoretical standards of the academic profession” (Hope and Soskice 2016, 219). A central aim of this paper is that political scientists can use these simple models to study a range of problems, and through that we hope to reinvigorate the dormant research agenda at the intersection of macroeconomics and political science.

The main implications of our open economy macroeconomic models, which build on the models developed by Carlin and Soskice (2015), are: (1) permanent changes in domestic demand can have lasting effects on real wages and real exchange rates (and potentially also output); (2) governments have the discretion to pursue policies that affect domestic demand, even when monetary policy has been delegated to an independent central bank; and (3) governments pursuing different demand-side policies can lead to persistent current account imbalances in the medium run.

The second implication is particularly striking because the delegation of control of monetary policy to independent central banks was designed to tie the hands of governments. Our argument, *paradoxically*, is that central bank independence is a critical *enabler* for governments to stimulate domestic demand for electoral gain because it anchors inflation expectations and increases the credibility of governments in the eyes of financial markets. This provides an alternative, and arguably more plausible, argument than Barro and Gordon’s (1983) modelling of the time-inconsistency problem in monetary policymaking, as to why a government with an output target below equilibrium would voluntarily give up control of monetary policy to an independent central bank.

The analysis in this paper fits closely with the emerging growth models literature in comparative political economy (Baccaro and Pontusson 2016; Hope and Soskice 2016; Martin 2016). This work emphasises the divergent paths of advanced

democracies during the Great Moderation, with some pursuing *consumption-led* growth models and others pursuing *export-led* growth models. Although these growth models are rooted in political-economic institutions, they are reinforced by government demand-side policies (see Section 3.3 of Chapter 3 of the thesis). The novel argument made in this paper about growth models and demand-side policies is that deficit-financed fiscal policy is not a pre-requisite for running a consumption-led growth model, as *credible* governments have other policy levers, such as loosening credit constraints, which they can freely use to expand the domestic economy. The government can use expansive fiscal policy but this approach is often precluded by implicit and/or explicit fiscal sustainability rules. It is much simpler for governments to use restrictive fiscal policy to support the export-led growth model, however, as this does not require the build-up of public sector debt.

It is worth noting that this discussion in this paper stands apart from the supply-side led *growth theory* literature in economics (see Acemoglu (2009) for a comprehensive overview of modern growth theory). This literature focuses on the *proximate* sources of long run growth such as the accumulation of capital (human and physical) and advancement and diffusion of new technologies and methods of production (Carlin and Soskice 2015). In contrast, we are more concerned with the demand side of the economy, and specifically, how changes in domestic demand affect the economy in the short and medium run.

The remainder of the paper is structured as follows. Section 4.2 uses empirical evidence to build a picture of the macroeconomic trajectories of advanced economies during the Great Moderation. Section 4.3 charts the evolution of the literature at the intersection of macroeconomics and political science. Section 4.4 makes our case for building a better macroeconomic model for use in political science. It then sets out a suite of simple modern macroeconomic models—starting with a closed economy model as a point of comparison and then moving onto our preferred open economy models. Section 4.5 gives our high-level view of the politics behind demand-side policies, before Section 4.6 provides evidence supporting our argument that

governments in advanced democracies pursued systematically different demand-side policies during the Great Moderation. The final section concludes.

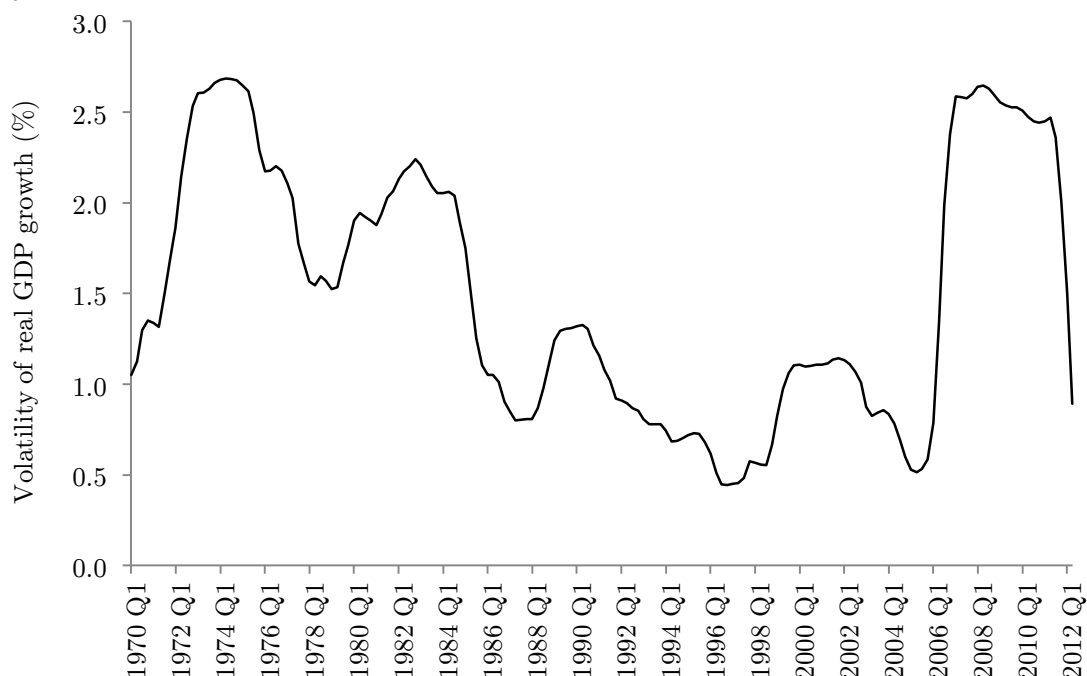
4.2 Macroeconomic outcomes in advanced democracies during the Great Moderation

The Great Moderation gained its moniker because it was an extended period of reduced macroeconomic volatility. In practical terms, this meant that fluctuations in GDP growth were less frequent and/or less dramatic over this period than at other times; the macroeconomy was more stable. The volatility of the macroeconomy can be calculated by taking the standard deviation of quarterly real GDP growth over a given time period (in our case 21 quarters). Figure 4.1 shows the volatility of real GDP growth in advanced democracies between the start of 1970 and the middle of 2012. As in the Chapter 3 of the thesis, the sample of advanced democracies comprises the following 15 countries: Australia, Austria, Belgium, Canada, Denmark, Finland, Germany, Japan, the Netherlands, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, the United States.⁴⁵ We can see that

⁴⁵ Ireland and the southern European economies (France, Greece, Italy, Portugal and Spain) are excluded from the sample. The sample is restricted to the LMEs (excluding Ireland) and the CMEs identified by Hall and Soskice's (2001) *varieties of capitalism* framework. As set out in detail in Chapter 3 of the thesis, the political-economic institutions, growth models and political systems of the LMEs and the CMEs all reinforce one another to give governments in these economies strong incentives to pursue distinct and predictable *demand-side* policies. This is not the case in Ireland and southern Europe. Ireland's institutional configuration differs from the textbook LME case. Its wage bargaining was more centralised, which along with high levels of inward FDI meant exports made a much bigger contribution to growth during the Great Moderation than in the other LMEs, particularly in the 1990s (Barnes and Wren 2012). The Irish government therefore did not have clear incentives to pursue particular demand-side policies during the Great Moderation. Likewise, the mixed market economies (MMEs) of southern Europe (France, Greece, Italy, Portugal and Spain) lack institutional coherence and (partly as a consequence) did not possess a consistent growth model during the Great Moderation. Lastly, the paper focuses on advanced democracies and a number of the MMEs were much less developed than the LMEs and CMEs at the start of the sample period. The average GDP per capita of Greece, Portugal and Spain was \$11,521 in 1994, compared to \$25,955 for the fifteen countries analysed in the paper (Source: IMF World Economic Outlook Database, April 2016).

volatility dropped markedly in the mid-1980s and stayed low for the next 20 years or so.

Figure 4.1. Volatility of real GDP growth in advanced democracies, 1970 Q1 – 2012 Q2



Source: Author's calculations using OECD Quarterly National Accounts (accessed August 2016).

Note: Volatility has been calculated as the standard deviation of the GDP growth rate of our combined 15-country sample over a rolling 21-quarter period. The underlying GDP data used is gross domestic product (expenditure approach, US dollars, volume estimates, fixed PPPs, OECD reference year, annual levels, seasonally adjusted).

In this extended period of low volatility, politicians, policymakers and economists in advanced democracies were quick to praise themselves for their part in taming the business cycle. In 2002, Gordon Brown, then Chancellor of the Exchequer for the United Kingdom, proclaimed:⁴⁶

With Bank of England independence, tough decisions on inflation, new fiscal rules, and hard public spending controls, we today in our country have economic stability not boom and bust.

⁴⁶ This excerpt is taken from Gordon Brown's speech *Manufacturing Matters*, which was delivered to the TGWU conference on March 28th 2002.

In a similar vein, Governor (and later Chairperson) of the Federal Reserve (the central bank of the United States) Ben Bernanke stated in 2004 that:⁴⁷

My view is that improvements in monetary policy, though certainly not the only factor, have probably been an important source of the Great Moderation.

The economics profession also jumped to take credit, with Nobel Prize winning economist Robert Lucas Jr. (2003, 1) boasting in his Presidential Address to the American Economic Association in 2003 that:

Macroeconomics was born as a distinct field in the 1940's, as a part of the intellectual response to the Great Depression. The term then referred to the body of knowledge and expertise that we hoped would prevent the recurrence of that economic disaster. My thesis in this lecture is that macroeconomics in this original sense has succeeded: Its central problem of depression prevention has been solved, for all practical purposes, and has in fact been solved for many decades.

All these self-congratulatory remarks turned out to be premature. The Great Moderation was brought to a dramatic end by the global financial crisis of 2008-09, the worst economic downturn since the Great Depression of the 1930s. Figure 4.1 shows that macroeconomic volatility jumped back to levels not seen since the early 1970s as a result of the crisis. This paper is concerned with using simple modern open economy macroeconomic models to show how government policies helped fuel the dangerous external imbalances that were a crucial precursor to the crisis. We therefore concentrate the remaining empirical analysis in this section on the pre-crisis period.

⁴⁷ This excerpt is taken from Governor Ben Bernanke's speech *The Great Moderation*, which was delivered at the meetings of the Eastern Economic Association in Washington D.C. on February 20th 2004.

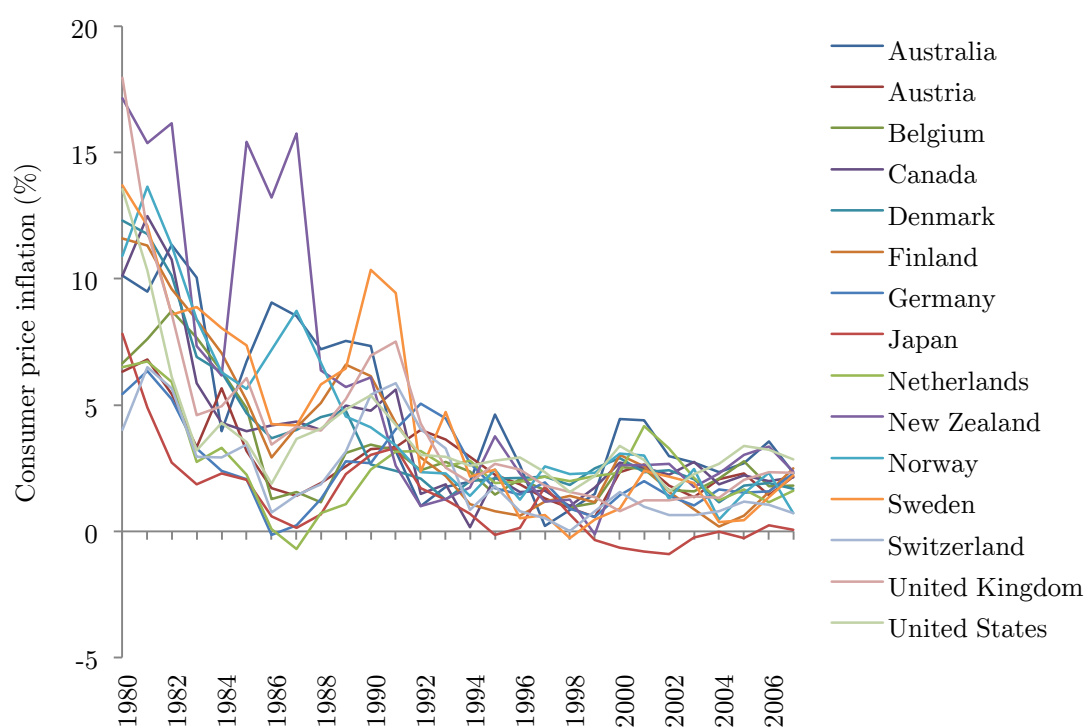
A major macroeconomic trend during the Great Moderation was the convergence of inflation to low and stable levels. Figure 4.2 shows the evolution of inflation in advanced democracies between 1980 and the eve of the financial crisis. In 1980, inflation was above 10% in many of the countries, and only below 5% in one of the fifteen countries in our sample. Inflation dropped substantially between 1980 and the early 1990s and remained low thereafter; inflation did not exceed 5% in any of the fifteen countries between 1993 and 2007.

The reduction in inflation was mirrored by a reduction in short-term (and long-term) interest rates. Figure 4.3 shows the big drop in short-term interest rates from 1980 to the mid-2000s. Interest rates ticked up briefly in the years directly before the global financial crisis but they were still well below their level in the 1980s. The inflationary pressure that provoked interest rate increases from the mid-2000s arose largely from the massive rise in oil prices over the 2000s. The price of Brent crude oil went from \$28 in January 2000 to \$133 in July 2008.⁴⁸

Figure 4.2 and Figure 4.3 provide evidence that from the mid-1990s until the global financial crisis the advanced democracies were operating in a low inflation–low interest rate environment. As the quotes above demonstrate, politicians, policymakers, and economists were quick to attribute this benign macroeconomic environment to the governments’ delegation of monetary policy to independent central banks. This institutional change put monetary policy in the hands of unelected technocrats with no incentive to manipulate the economy for electoral gain. For example, Chancellor Gordon Brown gave the Bank of England operational independence over monetary policy when New Labour came to power in 1997 (Carlin and Soskice 2015). The contribution of academic macroeconomics to the case for central bank independence will be discussed in Section 4.3.

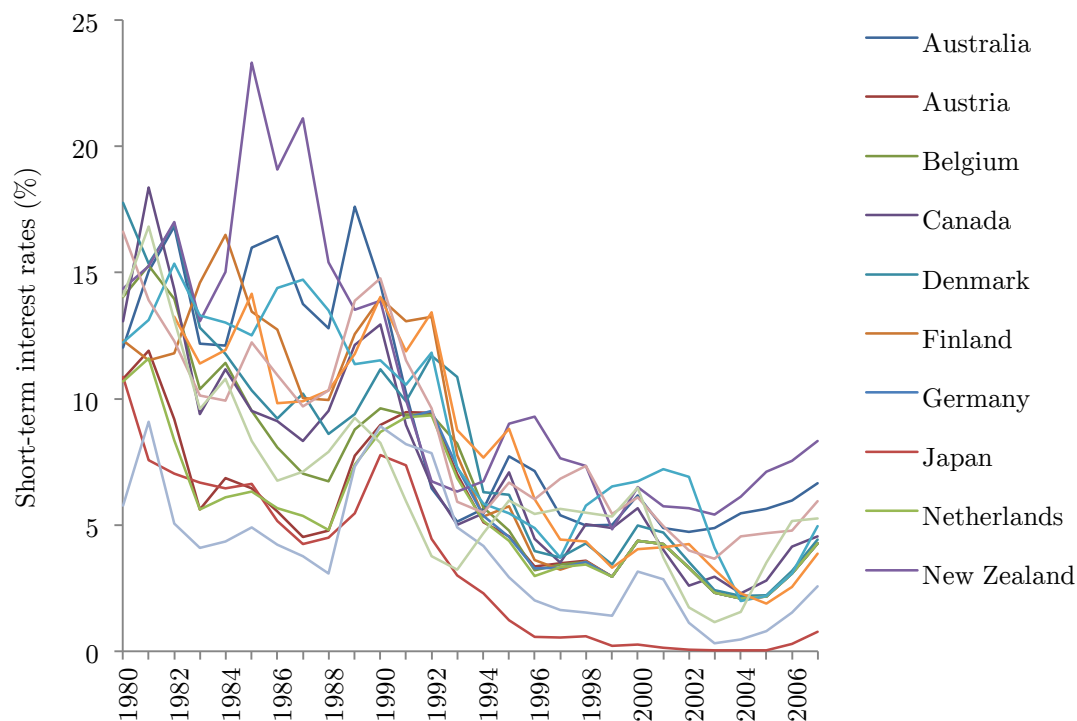
⁴⁸ Source: US. Energy Information Administration, Crude Oil Prices: Brent - Europe [DCOILBRETEU], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/DCOILBRETEU>, 22 July 2016.

Figure 4.2. Consumer price inflation, 1980-2007



Source: OECD Key Short-Term Economic Indicators (data accessed June 2016).

Figure 4.3. Short-term interest rates, 1980-2007



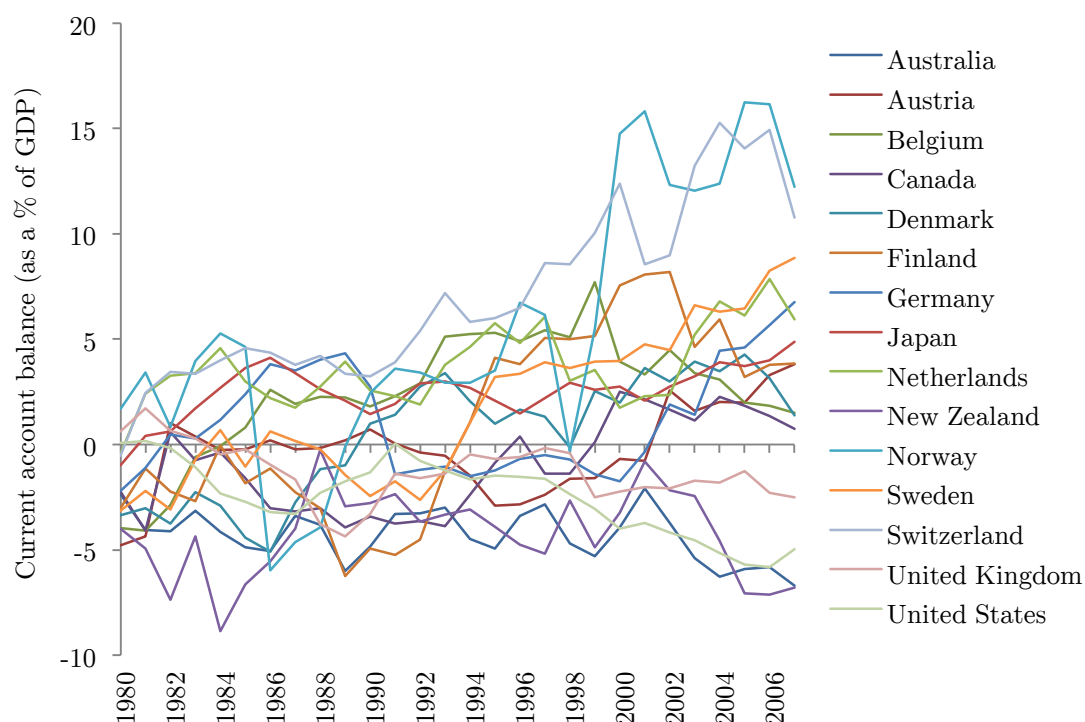
Source: OECD Economic Outlook No. 99, June 2016.

Note: Short-term rates are typically the three-month interbank offer rate, or the rate associated with three-month government debt instruments (e.g. Treasury bills in the US) or certificates of deposit (CDs).

The primary focus of central banking during the era of independence was price stability, often explicitly through an inflation target. Inflation targeting central banks adjusted short-term interest rates in order to keep inflation at target and output (or unemployment) at equilibrium. This new macroeconomic regime meant that (1) policymakers took a benign view of macroeconomic imbalances and asset price bubbles beyond their immediate effect on consumer price inflation (Carlin and Soskice 2015); and (2) it was taken as given that international coordination in inflation targeting (and monetary policy more generally) was not required (Iversen and Soskice 2012).

The convergence in inflation and interest rates across advanced democracies was therefore allowed to coincide with significant divergences in other aspects of the macroeconomy. We can see from Figure 4.4 that large external imbalances emerged between advanced democracies from the mid-1990s onwards. The divergence in current account balances had a distinct geographical pattern, with the English-speaking countries amassing deficits and the continental and northern European countries amassing surpluses. These imbalances made the world economy vulnerable to a financial crisis as they reflected the build up of dangerous asset price and credit bubbles and left deficit countries exposed to a *sudden stop* in capital inflows (Blanchard and Milesi-Ferretti 2012; Lane 2012; Lane and Milesi-Ferretti 2012).

Figure 4.4. Current account balances (as a % of GDP)

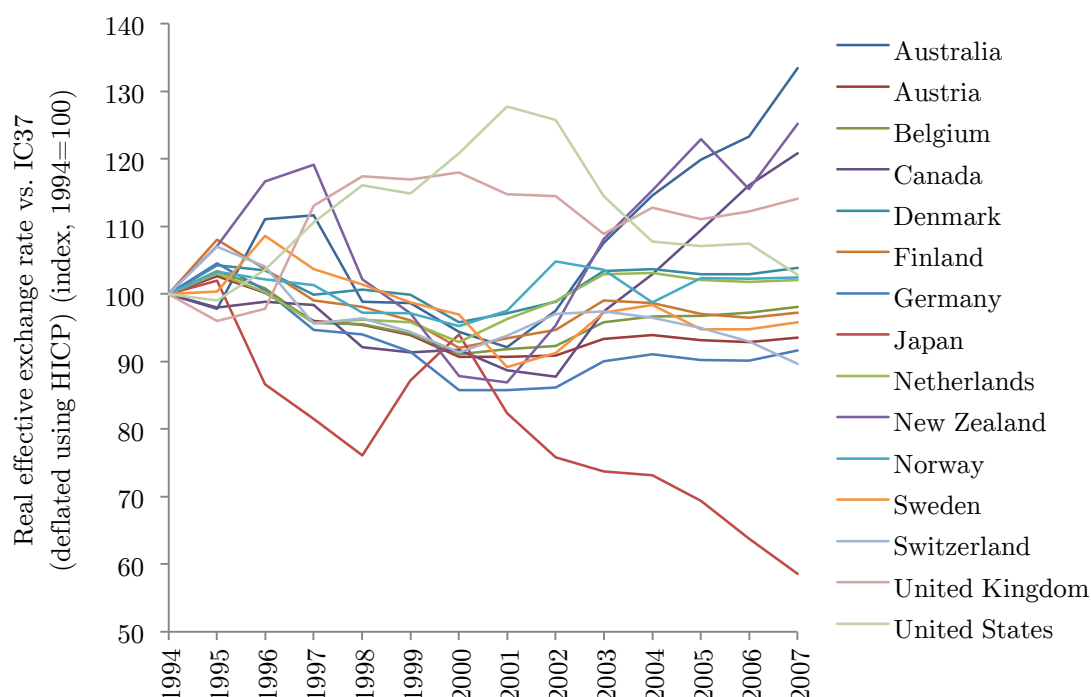


Source: IMF World Economic Outlook, April 2016.

Figure 4.5 shows the path of real exchange rates in advanced democracies during the Great Moderation. A movement upward in the figure signifies an appreciation of the real exchange rate—i.e. a worsening of price competitiveness. We can see that real exchange rates diverged, especially during the 2000s. The same geographical divide emerges as in current account balances. The real effective exchange rate of all the English-speaking countries appreciated between 1994 and 2007. In contrast, the real effective exchange rate of the majority of the continental and northern European countries (as well as Japan) depreciated.

The broad real exchange rate trends of the Great Moderation match the divergence in current account balances but there is still significant variation *within* the two groups, and especially within the English speaking countries. The appreciation of the UK and US real exchange rates took place more in the 1990s than the 2000s, whereas the appreciation of the real exchange rates in Australia, Canada and New Zealand occurred mainly the 2000s.

Figure 4.5. Real effective exchange rate (price competitiveness) index (1994=100), 1994-2007



Source: European Commission, Economic and Financial Affairs, Price and Cost Competitiveness - Data Section (22 April 2016).

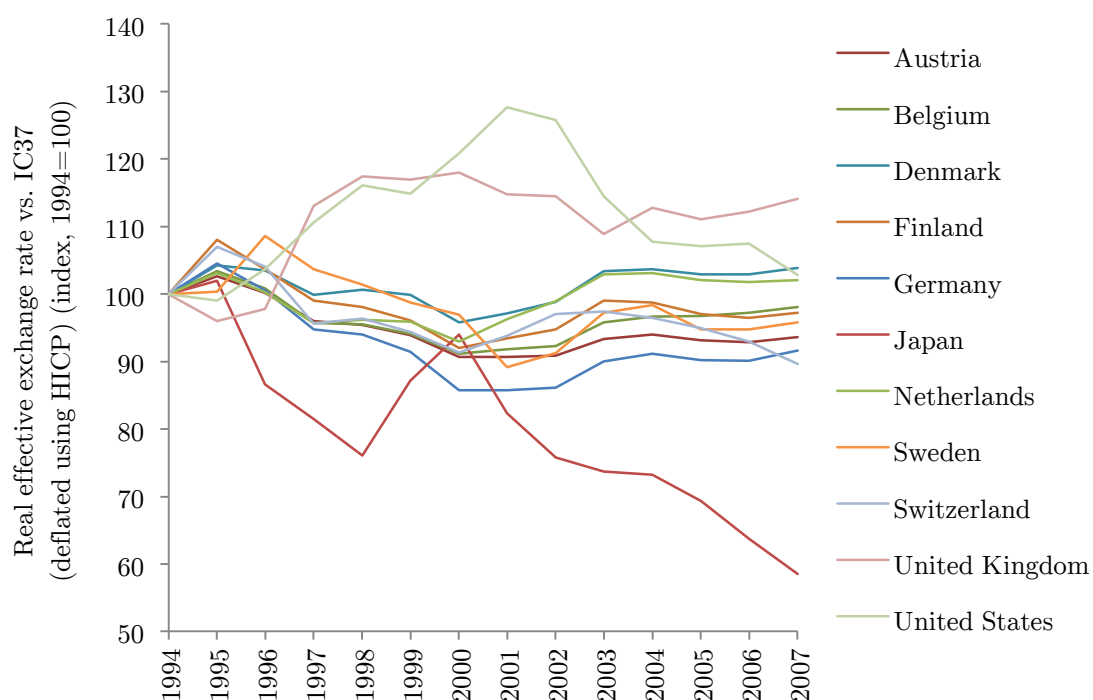
Note: IC37 includes the EU28 plus Australia, Canada, Japan, Mexico, New Zealand, Norway, Switzerland, Turkey and the United States.

Obstfeld and Rogoff (2000) pick out the difficulty of explaining short- and medium-term fluctuations in exchange rates with movements in macroeconomic fundamentals as one of the major puzzles in international macroeconomics. In Section 4.4, we will present a simple open economy macroeconomic model that posits a clear link between domestic demand and real exchange rates. This simple model fits well with the high-level divergence in real exchange rates observed during the Great Moderation, but as Obstfeld and Rogoff (2000) emphasise, modelling exchange rate behaviour is extremely difficult even in complex models. It is therefore necessary to look at individual countries more closely to get a better picture of the variation within the English-speaking countries.

One factor that needs to be taken into account when considering the exchange rate dynamics of Australia, Canada and New Zealand is the fact that a high proportion of their exports are primary commodities. The prices of primary

commodities are usually determined on centralised world markets, which provides an exogenous source of terms-of-trade fluctuations for these countries (Chen and Rogoff 2003). Chen and Rogoff (2003, 133) find that “the US dollar price of their commodity exports has a strong and stable influence on their floating real rates”, especially for New Zealand and Australia. This helps to explain the extent of their appreciation in the 2000s, which coincided with a global commodities boom. Figure 4.6 removes these three countries and Norway (another major primary commodities exporter) from the real exchange rate figure; the divergence of the UK and the US from the continental and northern European countries and Japan becomes even more striking.

Figure 4.6. Real effective exchange rate (price competitiveness) index without major primary commodity exporters (1994=100), 1994-2007



Source: European Commission, Economic and Financial Affairs, Price and Cost Competitiveness - Data Section (22 April 2016).

Note: IC37 includes the EU28 plus Australia, Canada, Japan, Mexico, New Zealand, Norway, Switzerland, Turkey and the United States.

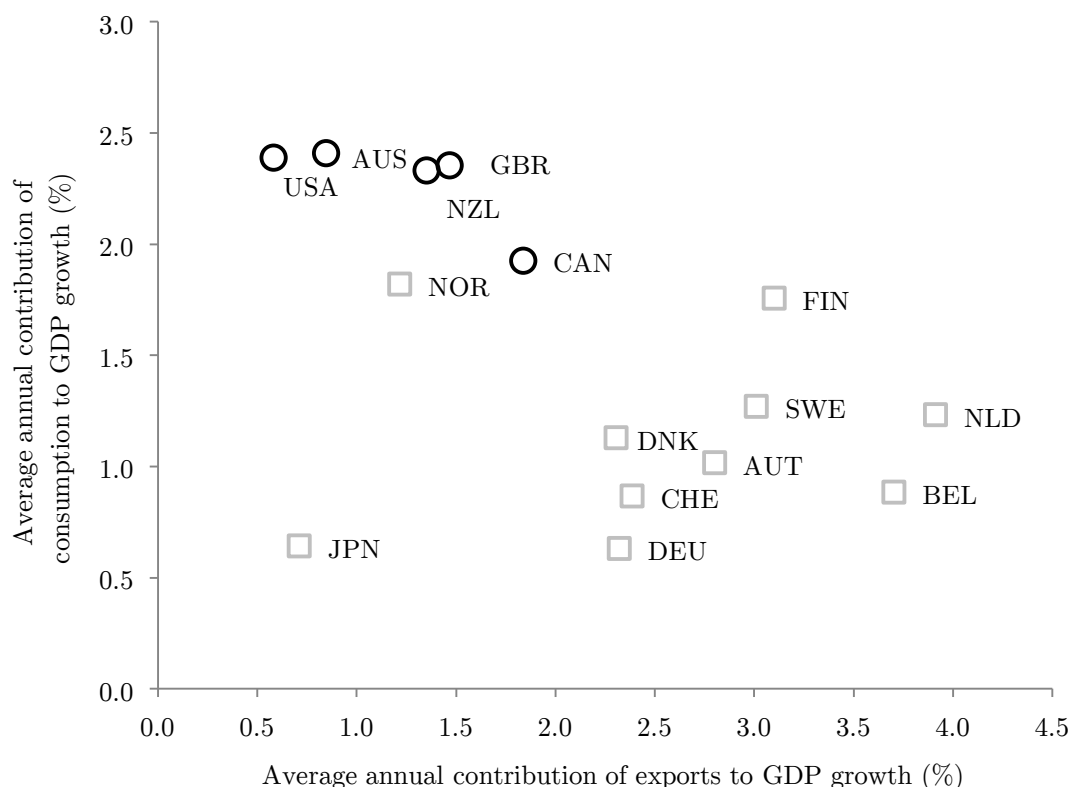
Another trend that warrants explanation is the large real exchange rate depreciation in the United States in the 2000s. This is likely to have been driven by the relatively

loose monetary policy of the Federal Reserve in the wake of the bursting of the dot-com bubble and the 9/11 terrorist attacks, as well as the dollar's privileged position as a global reserve currency (Obstfeld and Rogoff 2009).

Taken together, Figures 4.1 to 4.6 show us that the period from 1994 to 2007 in advanced democracies was characterised by low and stable inflation, low interest rates and macroeconomic stability, but also by current account balance and real exchange rate divergence. The macroeconomic regime in place in this period was built around independent inflation-targeting central banking and open financial markets. The foundations of the global financial crisis were laid in this period of relative macroeconomic calm. It is therefore the 1994 to 2007 period that we hope to shed light on using simple open economy macroeconomic models. As in the previous chapter of the thesis, this is the period we will refer to as the Great Moderation.

The current account and real exchange rate divergence during the Great Moderation was underpinned by advanced democracies pursuing different growth models. This is the central premise of the previous chapter of the thesis, which analyses growth models in more detail. We can see from Figure 4.7 that the average annual contributions to GDP growth of consumption and exports varied widely across countries between 1994 and 2007. However, the countries cluster into two groups. Growth was more driven by consumption in countries in the top left-hand corner of the figure, whereas growth was more driven by exports in countries in the bottom right-hand corner. In the terminology used in the emerging growth models literature in CPE, the countries in the top left-hand corner pursued *consumption-led* growth models and the countries in the bottom right-hand corner pursued *export-led* growth models (Baccaro and Pontusson 2016; Hope and Soskice 2016).

Figure 4.7. Average annual contributions of consumption and exports to GDP growth, 1994-2007



Source: European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update).

Note: See Appendix B2 for a guide on how to calculate annual contributions to GDP growth and more information on the data source for the figure. The markers in the figure correspond to varieties of capitalism. The grey squares are CMEs and the black circles are LMEs.

Another important thing to take from the figure is that growth models have institutional foundations. The markers in the figure correspond with varieties of capitalism (Hall and Soskice 2001): the black circles are liberal market economies (LMEs) (the English-speaking countries) and the grey squares are coordinated market economies (CMEs) (the continental and northern European countries and Japan). We can see that the LMEs are predominantly consumption-led and the CMEs are predominantly export-led. The relationship between varieties of capitalism and growth models is discussed at length in the Chapter 3 of the thesis. In this paper, we focus more on role of government demand-side policies in the growth models and macroeconomic imbalances of the pre-crisis period.

4.3 Literature review: Macroeconomics and political science

In the 1970s, the intersection of macroeconomics and political science was a vibrant area of research.⁴⁹ Two different approaches stood at the centre of the field.⁵⁰

The first was the *political business cycle* model developed by Nordhaus (1975), Lindbeck (1976), and MacRae (1977). In this model, politicians are opportunistic and care only about being elected to office (as in Downs (1957)). They can also use fiscal and monetary policies to exploit the trade-off between inflation and unemployment. Voters are myopic and judge the incumbent government on the economic conditions they produce, regardless of their future consequences. The model implies that the incumbent government will use the policy levers at their disposal to stimulate the economy and reduce unemployment in the run up to elections. Following the election, the government will then slam on the brakes in a bid to squeeze the resulting inflation out of the system. In this framework, naïve voters can be tricked in this way election after election because they are short-sighted and do not learn from the past.

The political business cycle model is on a shaky footing empirically. Nordhaus (1975) and MacRae (1977) only found evidence of cycles in macroeconomic outcomes in a subset of the countries and time periods (respectively) that they analysed. Further single country studies in the United States (Tufte 1978) and five major Western economies (Lewis-Beck 1988) also provided little evidence of electorally-induced cycles in unemployment and inflation, as did studies that pooled observations across OECD countries (Alesina, Cohen, and Roubini 1992; Alesina, Roubini, and Cohen 1997).

The second approach was the *partisan* model developed by Hibbs (1977, 1987). Politicians in this framework care about both winning elections and implementing

⁴⁹ For excellent reviews of the evolution of the literature at the intersection of macroeconomics and political science see Franzese (2002), Clark (2003), and Iversen and Soskice (2006b).

⁵⁰ The summaries of the different approaches to macroeconomics and political science in this section rely heavily on the work of Alesina, Roubini and Cohen (1997).

their preferred policies. Parties are therefore partly ideologically motivated. Parties of the left are assumed to assign more importance to reducing unemployment than parties of the right, while parties of the right are more concerned about price stability. This is put down to the differing constituencies of left and right wing parties. Left wing parties rely on the union movement and the lower middle class for political support, whereas the right wing parties rely on the business and financial communities and the upper middle class. In other words, left and right wing parties have different ideal points on the exploitable trade-off between unemployment and inflation. Backward-looking voters also have different preferences over inflation and unemployment (or economic growth) and vote for the party located closest to their preferred policy.

There is no empirical consensus when it comes to the partisan model. In his original paper, Hibbs (1977) found empirical support for his partisan hypothesis in the United Kingdom and the United States. In a follow up book a decade later, he then provided evidence of the distributional impact of unemployment and inflation in the United States that accorded with the partisan model (Hibbs 1987). Particularly striking was the finding that unemployment reduced the income share of the lowest two quintiles of the income distribution and boosted the income share of the top two quintiles. More recent papers have examined survey-based measures of inflation and unemployment aversion across advanced democracies and have found evidence that richer respondents (voters) are more inflation averse and less unemployment averse than poorer respondents (voters) (Jayadev 2006, 2008; Scheve 2004). Alt (1985) also found a statistical association between left government control and decreasing unemployment using a sample of 12 OECD countries. In contrast, more recent cross-country panel data studies have found little evidence of partisan effects on macroeconomic outcomes (Clark 2003), or have only found short-lived effects immediately following elections (Alesina and Roubini 1992; Alesina, Roubini, and Cohen 1997).

These two models reflected the dominant macroeconomic theories of their time. They relied on a stable inverse relationship between unemployment and inflation

that could be exploited by governments through policy. In effect, these models suggested that governments could choose where to locate on the downward-sloping Phillips curve (Phillips 1958). In their simple formalization of the two models, Alesina, Roubini and Cohen (1997) also highlight their use of adaptive inflation expectations (Phelps 1967, 1968), where current inflation expectations are formed by looking at past inflation and incorporating an (often small) adjustment for past forecasting mistakes. Crucially, voters do not take into account all available information when forming their expectations and do not anticipate the future inflationary consequences of today's government policies.

The field of macroeconomics was completely transformed between the late 1960s and the early 1980s. There were three major developments that changed the course of the discipline. The first was the introduction of a natural or equilibrium rate of unemployment by Friedman (1968) and Phelps (1968). This meant that while “there is always a temporary trade-off between inflation and unemployment; there is no permanent trade-off” (Friedman 1968, 11); hence, the Phillips curve is vertical in the long run and government policies aimed at pushing unemployment below equilibrium will simply result in higher inflation. The second development was the widespread adoption of rational expectations in macroeconomic modelling. The concept of rational expectations had been around since the early 1960s (Muth 1961) but was brought into the heart of mainstream macroeconomics in the 1970s by Robert Lucas Jr. (1972, 1973, 1975) and his contemporaries (Barro 1976; Sargent and Wallace 1975). When forming inflation expectations in a rational manner, individuals are forward-looking, take all available information into account and do not make systematic mistakes (Carlin and Soskice 2015). One key consequence of these two developments is that only unanticipated changes in policy (and demand) can affect output (and unemployment) in the short run, and output is fixed at equilibrium output in the medium and long run.

The third development was the concept of time-inconsistency (Kydland and Prescott 1977) and its application to macroeconomic policymaking (Barro and Gordon 1983). In the Barro–Gordon (1983) model (as neatly summarised in Iversen

and Soskice (2006b)), governments care about both unemployment and inflation and can set the rate of inflation using monetary policy instruments. The government is assumed to prefer a rate of unemployment that is below the equilibrium rate. As the government dislikes inflation, it may seem logical that they would set an inflation target of zero and abide by it, but a government commitment to zero inflation would not be credible. If the public believed the government's target then it would no longer be in the government's interest to set inflation at target; once the public's expectations had formed, the government would boost inflation to push unemployment below equilibrium. A rational public can see that a zero inflation target is not credible and raises their inflation expectations to a level where the government has no incentive to use policy to decrease unemployment. The time inconsistency problem in monetary policymaking therefore leads to a stable equilibrium with unemployment at equilibrium but inflation above the government's target—i.e. the government's lack of credibility generates an *inflation bias*.

The institutional solution to the time inconsistency problem is to delegate control of monetary policy to an inflation-targeting central bank free from political interference that can credibly commit to targeting equilibrium unemployment (Cukierman 1992). This theoretical development made an intellectual contribution to the movement towards central bank independence across advanced democracies in the 1990s. Taken together, these three developments in macroeconomic theory implied that governments were unable to influence the medium and long run trajectory of the economy (Iversen and Soskice 2006b). The focus in political science therefore shifted to a new generation of models where government policy could only exert transitory effects on the economy.

The political business cycle model takes on a different complexion once inflation expectations are formed rationally. Governments are no longer able to create inflation surprises before elections in equilibrium, and they also know that forward-looking voters will factor in the expected future costs of any pre-electoral economic expansions when evaluating the performance of the incumbent government (Clark 2003). In the late 1980s, many versions of the rational political business cycle model

emerged. A commonality in the models was the idea that rational voters used all available information to make decisions but did not know with certainty the ‘competence’ of the two parties vying for power. As set out in Alesina, Roubini and Cohen (1997), the models defined competence in different ways, such as efficiency in the budgetary process (Rogoff 1990; Rogoff and Sibert 1988), the ability to generate economic growth without putting pressure on inflation (Persson and Tabellini 1990) and the ability to buffer the economy against random shocks (Cukierman and Meltzer 1986). There is an informational asymmetry at the centre of all of these models; the parties know their own competence and the voters do not. This provides an incentive for governments to manipulate policy instruments in the run up to elections, because voters will be unable to tell whether the changes are the result of greater competency (for example, tax cuts due to newfound efficiencies in the public sector) or are the result of politically-motivated expansionary policy prior to the election.

In accordance with rational political business cycle models, evidence of the manipulation of macroeconomic *policies* prior to elections is more robust than evidence of the manipulation of macroeconomic *outcomes* prior to elections. Evidence of cycles in fiscal policy (Alesina 1988; Nordhaus 1989; Tufte 1978) and monetary policy (Grier 1989) have been found in the United States, as well as in a wider sample of OECD countries (Alesina 1989; Alesina, Cohen, and Roubini 1992). However, Alesina, Roubini and Cohen (1997) do stress that while cycles in policy instruments are common in advanced democracies, they do not occur in every election and they are typically not of very large dimensions.

Alesina (1987) sets out a version of the partisan model with rational expectations (see Alesina, Cohen and Roubini 1997 for a simplified version of the model). Again, voters take all available information into account when forming inflation expectations, but this time, there is uncertainty surrounding the election outcome. As a result of incomplete information, voters cannot perfectly predict which party will win the election. There is also wage stickiness; nominal wages are bound by wage contracts in the short term. Parties still have the same policy preferences as in

Hibbs' (1977) model—left wing parties prefer higher inflation and lower unemployment than right wing parties—but cannot influence the economy beyond the short term due to rational expectations and a unique equilibrium rate of unemployment. In this model, the uncertainty over electoral outcomes means that inflation (or deflation) surprises can affect the real economy after the election. However, they only persist for the time it takes rational workers (voters) to renegotiate their nominal wage contracts.

Alesina and his co-authors have found macroeconomic evidence consistent with the rational partisan model. Using quarterly panel data from OECD countries, they find evidence of temporary differences in output and unemployment after a shift to left government (Alesina and Roubini 1992; Alesina, Roubini, and Cohen 1997). These results are stronger and more robust in countries where there is a clear divide between parties of the left and parties of the right.

The other major contribution to the recent literature at the intersection of macroeconomics and political science is that on context-conditional electoral cycles.⁵¹ This research agenda takes a different tack from the work rooted in rational expectations, it reverts back to adaptive expectations, and explains cross-country variation in electoral cycles in macroeconomic policies and outcomes instead through differences in the institutional constraints facing government policymakers. Clark and Reichert (1998) find that central bank independence and a lack of national policy autonomy (through internationally mobile capital and fixed exchange rates) reduces the presence of cycles that coincide with the electoral calendar. Cycles are only found when both constraints are absent. In further work that leans heavily on the Mundell–Fleming conditions, Clark and Hallerberg (2000) and Clark (2003) confirm the results of the earlier work but also find that fiscal policy cycles only occur in countries with fixed exchange rates (regardless of central bank independence). These models therefore find evidence that electoral cycles do occur in advanced democracies when the institutional context allows government control over

⁵¹ For a thorough review of the literature on context-conditional electoral (and partisan) cycles see Franzese (2002).

the trajectory of the economy. It is worth noting, that Clark's (2003) work also tests for partisan differences but finds no evidence of partisan cycles in either policies or outcomes (in any institutional context).

4.4 Building a better model of the macroeconomy for use in political science

The macroeconomic trends of the Great Moderation (see Section 4.2) cannot be explained using the macroeconomic models that have come to dominate the political economy literature (as set out in the previous section). The rational political business cycle model and the rational partisan model are both rooted in macroeconomic models that leave no room for demand-side policies to impact the economy beyond the very short run (Iversen and Soskice 2006b).

The wider implication of these models and Barro and Gordon's (1983) modelling of the time-inconsistency problem in monetary policymaking is that governments hands should be tied when it comes to macroeconomic policies because they can only have short run and largely negative effects on the economy (Iversen and Soskice 2006b). This was the type of argument that led governments to delegate control of monetary policy to independent (inflation targeting) central banks in the 1990s. In addition, financial markets, including the foreign exchange market, were largely liberalised by the early 1990s. The latter policy shift was largely driven by a desire to boost foreign investment, but acted as a further disciplining device for governments, as they were now likely to be punished by financial markets if they accumulated excessive public sector deficits or debts.

In the earlier political economic models, these two institutional changes weaken, or even completely remove, governments' incentives to pursue expansionary policies for political reasons. In reality, they did not. For example, the UK and US governments expanded domestic demand in the 1990s and 2000s by promoting the widespread easing of credit rules and conditions (Barnes and Wren 2012; Iversen and Soskice 2012; Rajan 2010). A central argument of this paper is that, *paradoxically*,

central bank independence and the opening of financial markets were critical *enablers* for governments to stimulate domestic demand in this (tempting) way, because they enhanced financial market credibility and helped anchor inflation expectations. This argument provides a different, and arguably more plausible, explanation for why governments would voluntarily give up their control over monetary policy than the standard Barro–Gordon (1983) argument. In the standard argument, it is not clear what a government with a preferred level of output below equilibrium has to gain from handing over the monetary policy reins to an independent central bank (Iversen and Soskice 2006b).

Governments in advanced democracies pursued different growth models during the Great Moderation, which were supported by different demand-side policies (as will be explored further in Section 4.6). The opposing policies led to the build up of globally significant current account imbalances between consumption-led economies and export-led economies (see Figure 4.4). The major contribution of this paper to the growth models debate is that our models show that deficit-financed fiscal policy is not a pre-requisite for pursuing a consumption-led growth model. *Credible* governments can also loosen credit conditions to boost domestic demand, which has identical equilibrium effects on the economy to a fiscal stimulus but is not constrained by implicit and/or explicit fiscal sustainability rules.

This section aims to provide a model of the macroeconomy that can better explain government behaviour and macroeconomic outcomes during the Great Moderation. We start by discussing why the dominant models of the macroeconomy used in the political economy literature are ill suited to explaining the pre-crisis trajectories of advanced democracies. We then set out a suite of simple modern macroeconomic models and discuss their implications for political science—we first present a closed economy model as a point of comparison, before moving onto our preferred set of open economy models.

Bridging the gap between the theory and the empirics

How have governments of advanced democracies been able to adopt what are widely thought of as expansionary or restrictive demand-side policies in light of both the earlier political economic literature—still taken by most political scientists as received wisdom—and the subsequent institutional changes (central bank independence and the opening of financial markets)? We see three major reasons.

First, macroeconomics has moved on markedly since the new classical economics of the 1970s and 1980s that sits beneath the rational political business cycle and rational partisan models. New Keynesian (NK) macroeconomics has emerged as the dominant macroeconomic paradigm in the past two decades. It emphasises “nominal rigidities and a role for aggregate demand” (Blanchard 2016, 1). In NK models, it is typically assumed that there are rigidities in wage- and price-setting and imperfect competition in product markets, which means that there is a welfare-enhancing role for macroeconomic stabilisation policy (Carlin and Soskice 2015; Iversen and Soskice 2006b). Inflation targeting central banks are also built into NK models, which contrasts with the earlier political economy models, where the government directly chooses the inflation rate (see the simplified versions of the rational political business cycle and rational partisan models in Alesina, Roubini and Cohen (1997)). The developments in macroeconomics since the 1980s have yet to be incorporated into the models of the macroeconomy used in political science. This is partly the result of the technical complexity of the NK dynamic stochastic general equilibrium (DGSE) models that have come to dominate academic macroeconomics.⁵²

Second, the existing models in the political economic literature are overwhelmingly *closed* economy models. This means they model a single country that does not trade or interact with other economies. Not only is this highly unrealistic in our increasingly globalised world but it also means that these models

⁵² See Chapter 16 of Carlin and Soskice for an excellent introduction to the Real Business Cycle and New Keynesian models (including NK DSGE models), as well as a discussion of their limitations and how they differ from simpler versions of the 3-equation model (such as the models set out in this paper).

cannot shed any light on the *external* imbalances of the pre-crisis period. In the closed economy, when aggregate demand is equal to equilibrium output (or unemployment equal to the natural rate), any sustained increase in real aggregate demand—whether public or private—generates increasing inflation with accommodating monetary policy.⁵³ If instead there is an independent inflation targeting central bank, the interest rate rises to counterbalance the increase in aggregate demand. If we assume rational expectations (leaving aside time lags and incomplete information for now), then these costs are imposed instantaneously and all temptation to pursue expansionary policies is removed. This is because the economy jumps to the new equilibrium with unchanged output and inflation and a higher stabilising rate of interest as soon as the policy is announced. Absent rational expectations, these costs are imposed over a longer period of time but with identical equilibrium consequences. In sum, governments in advanced democracies have no incentives to pursue expansionary (or restrictive) policies in closed economy models.

Open economy macroeconomics is a vibrant area of research that needs to be brought into political science in order to understand the political economy of the Great Moderation. In open economy models, a distinction needs to be drawn between small and large open economies—though the fundamental analysis and conclusions are similar (as we shall see when we go through both models later in the section). Focus for now on a small open economy and assume an independent inflation targeting central bank. The central bank guarantees that domestic demand and net exports are equal to equilibrium output at the target inflation rate. On top of that, fully liberalised financial markets and the uncovered interest parity (*UIP*) condition guarantee that the domestic real interest rate is equal to the world real interest rate in medium-run equilibrium (Carlin and Soskice 2015). If domestic demand is boosted, by a loosening of credit conditions for example, then this is completely offset in the medium run by a reduction in net exports—i.e. the extra

⁵³ The discussion of the equilibrium effects of economic shocks in the closed and open economy in this subsection is based on the models presented later in the modelling section. The discussion is also consistent with the macroeconomic models set out in Carlin and Soskice (2015).

domestic demand is fully financed by lending from abroad. There is no change in either the inflation rate or the domestic interest rate in the medium run. As we will show later, the increase in domestic demand does raise both the real exchange rate *and* the real wage (and potentially also output) compared to what they otherwise would have been. The size of this effect is reduced the higher the proportion of the increase in domestic demand that leaks abroad through imports.

This rather striking result can go along way to explaining the (almost casual) way in which the US and UK governments promoted the widespread easing of credit rules and conditions in the 1990s and 2000s. However, expansionary demand-side policies are only viable in the medium run if financial markets have confidence in the government of the country concerned. Three changes in macroeconomic regimes enhanced the credibility of advanced democracies in financial markets during the Great Moderation. First, central bank independence, which took monetary policy out of the hands of governments and anchored inflation expectations. Second, the liberalisation of financial markets, which enabled markets to punish governments for future actions.⁵⁴ And third, the use of fiscal policy rules, which required sticking to a primary deficit that guaranteed that the public sector debt/GDP ratio did not change (or did not rise above a certain level).⁵⁵

These three conditions then focus the attention of financial markets on the default risks engendered by private loans; and it was not surprising that a huge derivatives market developed in credit default swaps. The difficulty in fulfilling these conditions makes it unsurprisingly that only advanced economies with no (perceived) danger of defaulting on the conditions possess the necessary reputation. The role of financial market credibility in pursuing a growth model based on foreign borrowing and domestic consumption means that, *paradoxically*, these three

⁵⁴ One might add: so long as financial markets believe that no future government will restore exchange controls. And that doubtless explains why Margaret Thatcher, when she abolished exchange controls, publicly required the Bank of England to destroy all the mechanisms for re-imposing them.

⁵⁵ Fiscal policy rules were not employed in all advanced democracies during the Great Moderation but were very prominent in Europe—e.g. the EU's Stability and Growth Pact. See Chapter 14 of Carlin and Soskice (2015) for further discussion of fiscal policy rules.

institutional changes, which were meant to tie the hands of governments, acted as a critical *enabler* for governments to expand domestic demand in this (tempting) way.

On the other side of the coin, it is much easier, at least as far as financial markets are concerned, for a country such as Germany to pursue restrictive policies. The consequences of restrictive policies are a depreciated real exchange rate and a reduction in the real wage. And as if argued in this paper, the German government wants to pursue an export-orientated strategy then it can consistently do so. The reason that restrictive policies are of less of a concern for financial markets is because they do not require the build-up of public or private debt.

The major exception to the widespread use of closed economy models in the political economic literature is the work of William Clark and his co-authors (Clark 2002, 2003; Clark and Reichert 1998; Clark and Hallerberg 2000). This pioneering body of work uses an open economy framework to look at whether electoral cycles in macroeconomic policies are conditional on institutional features such as the degree of central bank independence and the exchange rate regime. The open economy models at the centre of Clark's work rely on the outdated Mundell-Fleming model of the 1960s, however, which Carlin and Soskice (2010) claim is unsuitable for analysing contemporary open economies. The main problem with the Mundell-Fleming model is that it isn't built around an independent inflation targeting central bank, which was a key part of the macroeconomic regime of advanced democracies during the Great Moderation. The model also assumes prices are constant, which is unrealistic and at odds with modern policymakers' focus on stabilising prices. Furthermore, the model implies that fiscal policy is ineffective outside of a fixed exchange rate regime, which we will show is not the case in modern open economy macroeconomic models. Lastly, the models in Clark's (2003) work are game theoretic rather than the 3-equation models that are used in modern macroeconomics (and will be set out later in the section).

The third and final reason why governments were able to pursue expansionary or restrictive demand-side policies during the Great Moderation in spite of the earlier political economy literature and institutional changes is because other advanced

democracies were pursuing the opposite policies. Governments need to have heterogeneous growth models, some pursuing expansionary policies and other pursuing restrictive policies, since increasing external deficits and appreciated real exchange rates must be balanced by increasing external surpluses and falling real exchange rates. Thus, the division of advanced democracies into export-led countries and consumption-led countries during the Great Moderation was both appropriate and mutually reinforcing.

In recent decades, serious discussion of the political economy of macroeconomics in political science (as well as to some extent in economics) has slowly died off. A large part of the blame has to be laid at the feet of the technically complex DSGE models that have come to dominate the field and the top macroeconomics journals. DSGE models are based on either Real Business Cycle models or more recently NK models.⁵⁶ The set of modern macroeconomic models that we will set out in the remainder of this section will simplify the NK model and relax some of its more unrealistic assumptions. A central aim of this paper is to present a simple and tractable model of the macroeconomy that political scientists can use to study a range of research questions. In this way, we hope to breath new life into the research agenda at the intersection of macroeconomics and political science.

A set of simple modern macroeconomic models

A NK macroeconomic model can be broken down into three main blocks of equations, and is therefore part of a group of modern macroeconomic models referred to as *3-equation* models (Blanchard 2016; Carlin and Soskice 2015).⁵⁷ The first block is the set of equations that determine, y , aggregate demand: the *IS* equation (in the closed and open economy model) and the aggregate demand (*AD*) equation (only in the open economy model). The second block, the Phillips curve, determines inflation

⁵⁶ See Chapter 16 of Carlin and Soskice (2015) for a comparison between RBC, NK and NK DSGE models.

⁵⁷ The models presented in this section owe much to Carlin and Soskice's (2015) excellent macroeconomics textbook, which simplifies closed and open economy modern macroeconomic models for an intermediate undergraduate and graduate audience.

and links the two blocks. The Phillips curve relates the difference between inflation and expected inflation, $\pi - \pi^E$, to the output gap between aggregate demand and equilibrium output, $y - y_e$. Within the inflation block are equations governing price and wage setting, which together determine equilibrium output, y_e , and the equilibrium real wage, w_e . The final block is the monetary rule (MR), which tells the central bank the output gap it should set in response to a given move in inflation away from target, $\pi - \pi^T$. The central bank then uses its control over the nominal interest rate (the policy rate) to set the real interest rate required to achieve their desired output gap.

These three blocks form the basis of NK models and the more complicated NK DSGE models. The technical complexity of these models arises because of their underlying assumptions and the decisions taken about how to model the behaviour of individual agents—firms, consumers, the central bank, the foreign exchange market, and the government—in the economy. In this subsection we present our simplified version of the 3-equation model. We relax some of the more unrealistic assumptions of NK models, while keeping the core (and empirically defensible) elements of nominal rigidities and imperfect competition.

Oliver Blanchard, a former chief economist at the IMF, is one of the world's leading macroeconomists. In a piece on the future of DSGE models, Blanchard (2016, 1) boldly states that NK DSGE models:

are based on unappealing assumptions. Not just simplifying assumptions, as any model must, but assumptions profoundly at odds with what we know about consumers and firms.

More specifically, Blanchard (2016, 1–2) takes issue with how poorly the specific forms of the aggregate demand equation and the Phillips curve used in NK models match the real-world empirical evidence:

At least the first two [equations in the 3-equation model] are badly flawed descriptions of reality: Aggregate demand is derived as consumption demand

by infinitely lived and foresighted consumers. Its implications, with respect to both the degree of foresight and the role of interest rates in twisting the path of consumption, are strongly at odds with the empirical evidence. Price adjustment is characterised by a forward-looking inflation equation, which does not capture the fundamental inertia of inflation.

In a bid to address Blanchard’s concerns and to make our model simpler, more realistic and more tractable, we make two alterations to the basic NK framework. Alterations of this type are commonplace in the existing literature and are usually employed to make NK macroeconomic models fit more closely with what we observe in the real world. The first alteration is the presence of consumers who do not make their consumption decisions to maximise lifetime utility (as implied by Friedman’s (1957) Permanent Income Hypothesis), but rather “follow a simple rule-of-thumb: each period they consume their current labor income” (Galí, López-Salido, and Vallés 2004, 740). Campbell and Mankiw (1989) provide empirical evidence that a substantial fraction of consumers in the United States and other advanced democracies display such non-Ricardian consumption behaviour.

The second alteration we make is to assume that inflation expectations are formed in a backward-looking manner, such that current inflation, π , depends on past inflation, π_{-1} , and the output gap (as in Carlin and Soskice (2015)). This is due to the phenomenon of inflation persistence, which arises because “the rate of change of the price level tends to remain constant (inflation tends to be persistent) in the absence of an economic “force” to move it from its current level” (Fuhrer 2010, 425). Empirical evidence has shown that inflation is much more persistent in both the United States (Fuhrer and Moore 1995) and other advanced democracies (Fuhrer 2010) than is implied by models in which inflation expectations are formed in a forward-looking, rational manner.⁵⁸ These models also imply jumps in inflation that

⁵⁸ Although there is some evidence that the degree of inflation persistence has fallen since the mid-1980s in advanced democracies (Fuhrer 2010). This could be due to the shift to independent inflation-targeting central banking and the effect this has had on anchoring inflation expectations.

are inconsistent with the time series data on inflation from advanced democracies (Estrella and Fuhrer 2002). Estrella and Fuhrer (2002) suggest that models with backward-looking components do a much better job of matching actual inflation data.

It is important to note that in the simplified 3-equation models presented in this section, “business cycles are *disequilibrium* phenomena” (Carlin and Soskice 2015, 583). Supply and demand shocks shift the economy away from equilibrium and the central bank steps in and alters interest rates to put the economy back on a path to equilibrium. In contrast, all actors in the economy have model-consistent expectations in NK models, so that even when the economy is away from steady state, it is always in rational expectations equilibrium. Additionally, there is no involuntary unemployment in NK models, but there is in our simplified 3-equation model (Carlin and Soskice 2015). In sum, the models set out in the following sections aim to provide an intuitive understanding of macroeconomics in open economies, which NK models so clearly do not. Our 3-equation models are also the type of models that are used (informally) by many leading macroeconomists and practically by many central banks.⁵⁹

A simple equilibrium model of a closed economy

We start by considering a simple equilibrium model of the closed economy that produces results in line with the earlier political economic literature. This provides a point of comparison for the open economy models that follow, as well as helping highlight why it is problematic using closed economy models to model advanced democracies. We set out our simplified 3-equation model by going through each of the three equations in turn:

⁵⁹ See for example: Blanchard and Katz (1997); Gordon (1997); Stiglitz (1997); Allsopp and Vines (2000); Krugman (2000); and Frank and Bernanke (2001). As highlighted in Hope and Soskice (2016), a number of these leading macroeconomists have also held major policy positions in governments or central banks.

Equation I: The IS curve

The first equation, usually referred to as the *IS* (Investment–Saving) curve, is built of several components. Aggregate demand is y^D , where,

$$y^D = c + g + i,$$

and c = aggregate private consumption, g = government expenditure, and i = investment (all in real terms).

Next, output, y , responds directly to aggregate demand (y is also income by national accounting definitions), such that:

$$y = y^D.$$

That output responds directly to aggregate demand, as opposed to inflation or price changes responding directly to aggregate demand, is both a basic empirical fact, and a fundamental Keynesian idea. But the competitive market microeconomics of the *General Theory*,⁶⁰ in which firms respond to prices not demand, do not justify it. New Keynesianism by contrast provides an imperfect competition micro-foundation that implies this—individual companies face their own downwards sloping demand curve for the differentiated product that they produce (Dixit and Stiglitz 1977). An increase in aggregate demand shifts these individual demand curves outwards; and given a gap between price and marginal cost it pays the individual company to meet increased demand by directly increasing output. (This does not of course apply to markets in second hand assets, such as financial markets.)

We assume that households' consumption depends primarily on current (post-tax) income y (equal to output), i.e. they follow a simple rule-of-thumb. This replaces the Euler condition in standard NK models; this assumes that households maximise the present value of their utility function, and if rational expectations are incorporated, this gives rise to unrealistic behaviour by households (as also argued

⁶⁰ Keynes (1936).

forcefully by Blanchard (2016)). We also allow that households may be more inclined to purchase investment-type goods and consumer durables when interest rates are lower:

$$c = c_a - c_r r + c_m y, \quad (\text{consumption function})$$

where the right-hand side is equal to autonomous consumption expenditure, c_a , which comprises expenditure on investment-type goods and consumer durables, less its interest sensitivity, $c_r r$, plus the marginal propensity to consume times income, $c_m y$.

We also assume that autonomous consumption expenditure, c_a , increases if the government takes steps to ease credit conditions. This is in line with Gross and Souleles (2002) who find using US credit card data that: (1) an increase in credit limits leads to an immediate increase in both debt and consumption; and (2) the effect is largest for the credit-constrained individuals that start near their credit limit.⁶¹

At this stage we simply assume that investment depends inversely on r .⁶² Thus:

$$i = i_a - i_r r. \quad (\text{investment function})$$

Putting the consumption and investment functions back into the aggregate demand equation gives us an equation for the *IS* curve:

$$\begin{aligned} y &= c_a + c_m y - (c_r + i_r) r + i_a + g_a \\ y &= \frac{c_a}{1 - c_m} + \frac{i_a}{1 - c_m} + \frac{g_a}{1 - c_m} - \frac{c_r + i_r}{1 - c_m} r, \end{aligned}$$

which will be written for ease of use (dropping investment) as:

⁶¹ For further empirical evidence that increasing access to credit increases demand for credit and household consumption see Alessie, Hochguertel and Weber (2005) and Leth-Petersen (2010).

⁶² The model in this chapter abstracts from the very important relation between investment and growth. In fact we believe growth expectations with multiple Keynesian coordinating equilibria reflecting levels of animal spirits increase investment, and that investment increases productivity. But it is not central to the arguments we are making here.

$$y = c + g - \alpha r. \quad (IS \text{ curve})$$

Next, we note the equilibrium condition that equilibrium output, y_e , is equal to aggregate demand:

$$y_e = y,$$

with the output gap defined as $y - y_e$. If output is greater than equilibrium output then there is a positive output gap, and vice versa.

In medium run equilibrium, the *IS* curve can be written as:

$$y_e = c + g - \alpha r_s, \quad (IS \text{ curve, in medium-run equilibrium})$$

where the value of r that brings about $y = y_e$ is referred to as the stabilising (or sometimes Wicksellian) interest rate, r_s .

We assume that the government is pursuing a *consistent fiscal plan* with the implication that g is fixed and for the moment we will write:

$$g = \bar{g}.$$

It is evident that, if g is fixed, consumption must be equal to $c = y_e - \bar{g} + \alpha r_s$ in equilibrium.

Thus if the non-interest sensitive part of consumption, c , increases by Δc (for example by loosening borrowing conditions), then in equilibrium: r must be increased (by the central bank) by $\Delta c / \alpha$; or alternatively g must fall. The government therefore has no room for manoeuvre to boost consumption in equilibrium unless it also pursues an equal and corresponding reduction in government expenditure. If that does not happen then the central bank will step in and push up the stabilising rate of interest, r_s , and completely offset the government induced boost in consumption. In the medium run, an increase in autonomous consumption therefore has no effect on output or unemployment.

There is an analogous result in relation to government changes (up or down) in \bar{g} . Since in equilibrium $\bar{g} = y_e - c + \alpha r_s$, an increase in \bar{g} in equilibrium requires either a decrease in c or an increase in r_s .

These two examples make our first important modelling point: in equilibrium in a closed economy, the government has its hands tied. Put another way, the government cannot affect the macroeconomy in the medium run, which is perfectly in line with the findings of the rational political business cycle and rational partisan models in the earlier literature.

Equation II: The Phillips curve and the micro-foundations of wage and price setting

We also set out the other two equations of the 3-equation model for three reasons: (1) to show how the economy transitions to a new equilibrium after a policy change, with attention to the central bank's use of the interest rate to target inflation; (2) to explain how a simplified (but complete) version of the 3-equation model works (and we generalise it in moving from a closed to an open economy); and most importantly (3) to understand the consequences of government demand-side policies for the equilibrium real wage.

The second core element of NK models is that nominal wages and prices do not revert immediately to their equilibrium values after a shock: they are sticky, and this reflects a second fundamental Keynesian idea. We specifically assume that the nominal price level adjusts immediately to cost (wage) changes, but there is a lag before wages adjust to price changes. In other words, wages are sticky as nominal wage contracts are only renegotiated periodically (e.g. annually) but firms are able to adjust their prices immediately following any change in wages. The stickiness of wages is clear to see in the real world: using US survey data, Barattieri, Basu and Gottschalk (2014) find that wages are most likely to be changed just once per year.

Wage and price setting: equilibrium output and the equilibrium real wage

We start by setting out the wage- and price-setting equations, in nominal then real terms. We then use them to derive the equilibrium real wage and the equilibrium

level of output (or unemployment). We use logs throughout, except in the footnote on micro-foundations.⁶³

The price setting (mark-up) equation is:

$$P^{PS} = \mu + W - \lambda, \quad (\text{price-setting equation})$$

where $\mu = \eta / (\eta - 1)$ is the log of the profit mark-up, with η the elasticity of demand, W is the nominal wage and λ is the log of productivity per worker.⁶⁴ The micro-foundations in the footnote (see also Dixit and Stiglitz (1977)) show that each *variety* (i.e. good) enters the household utility function symmetrically, which means that $p_i = p = 1$. The real wage implied by price setting (the real wage that guarantees business its profit margin) is therefore given by:

$$\begin{aligned} w^{PS} &= W - P^{PS} \\ \rightarrow w^{PS} &= \lambda - \mu. \end{aligned} \quad (\text{price-setting real wage equation})$$

Wage setters (unions, individual employees bargaining with an employer or a potential employer, or employers setting efficiency wages) are also concerned to set a real wage given conditions in the labour market. Depending on which actor is setting wages, different forms of the wage-setting real wage equation are possible. A simple form of this (where the i th union sets a monopoly wage) is:

$$w^{WS} = b + \beta(y - \lambda), \quad (\text{wage-setting real wage equation})$$

⁶³ As highlighted by Carlin and Soskice (2015), it is often useful to use natural logs to display equations in a simpler manner and make them easier to manipulate. It is important to note that taking the natural log of a variable does not change the underlying meaning of the data because it is simply a monotonic transformation. A monotonic transformation changes the values in a series but preserves the order of the original series.

⁶⁴ This can be derived more formally: households maximise a CES utility function across n symmetric varieties (i.e. goods), each produced by a single firm; this implies (in real numbers) that the demand for the i th variety is $y_i = n^{-1} p_i^{-\eta} y$, so the i th firm maximises

$$p_i y_i - w_i y_i \lambda^{-1} = \left(p_i^{1-\eta} - p_i^{-\eta} w_i \lambda^{-1} \right) n^{-1} y; \text{ this implies } p_i = \left(\frac{\eta}{\eta - 1} \right) w_i \lambda^{-1}.$$

where output, y , is a measure of labour market pressure, and $\beta > 0$. A micro-founded derivation of this equation is shown in the following footnote.⁶⁵

In this simple model, y_e and the real wage, w , are determined by the wage- and price-setting equations respectively:

$$y_e = \lambda + \frac{\lambda - \mu - b}{\beta}$$

$$w_e = w^{PS} = w^{WS} = \lambda - \mu,$$

with $w^{WS} = w^{PS} = w_e$ the condition for labour market equilibrium.

Endogenising y_e in this way enables us to see that it responds positively to increases in productivity and negatively to any ‘monopoly restriction’ of output, whether via price setters (raising μ) or wage setters raising β or b . This means that changes on the supply side can alter equilibrium output in the medium run.

However, in the simple closed economy model, equilibrium output and the equilibrium real wage cannot be altered by government demand-side policies, which only affect the IS curve.

The Phillips curve and inflation

We can also derive the Phillips curve equation from the labour market equations with three further conditions (all in logs):

Condition (i)

Price setters pass on increased costs immediately so that $w = w^{PS} = \lambda - \mu$; hence the real wage (under this assumption) is *always* equal to $w = \lambda - \mu$. Note that since $y_e = \lambda + \beta^{-1}(\lambda - \mu - b)$, these together imply that $y_e = \lambda + \beta^{-1}(w - b)$, and this in turn implies that $w = b + \beta(y_e - \lambda)$.

⁶⁵ The union (or individual) maximises (in real numbers):

$$w_e - b \frac{e^{\beta+1}}{\beta+1} \rightarrow w^{WS} = be^\beta = b(y\lambda^{-1})^\beta; \text{ and in logs: } w^{WS} = b + \beta(y - \lambda).$$

Wage-setters (employees, unions, employers setting efficiency wages etc.) want $w^{WS} = b + \beta(y - \lambda)$ so a key implication is wage-setters want a real wage increase of $w^{WS} - w = \beta(y - y_e)$. Hence, when output is above equilibrium output, wage setters require an increase in real wages for their wage expectations to be met, and vice versa.

Condition (ii)

Second as noted above there is an exogenously imposed time lag (assume of one period) between wage settlements; this is (in one form or another) the second core Keynesian/New Keynesian assumption. Wage-setters want/aim to get the real wage increase, $\beta(y - y_e)$, in one period's time: thus they set an increase in the log money wage equal to the desired real wage increase plus the expected increase in inflation over the period, π^E . Hence:

$$\Delta W = \pi^E + \beta(y - y_e). \quad (\text{wage inflation})$$

Since price-setters immediately update prices as a result of cost increases, we have $\pi = \Delta W - \Delta\lambda + \Delta\mu$ and assuming $\Delta\lambda = \Delta\mu = 0$:

$$\pi = \Delta W \rightarrow \pi = \pi^E + \beta(y - y_e). \quad (\text{price inflation})$$

Inflation is therefore equal to expected inflation plus a constant times the output gap. Hence, output above equilibrium puts upward pressure on inflation and output below equilibrium puts downward pressure on inflation.

Condition (iii)

Aside from the use of the Euler condition, the modelling of expected inflation has given rise to the sharpest critiques of NK theorists. As pointed out by Blanchard (2016) and others (Gordon 1997; Krugman 2000), and borne out empirically by Fuhrer and co-authors (Fuhrer 2010; Fuhrer and Moore 1995), there is a large degree of inertia in inflation. Estrella and Fuhrer (2002) argue that a simple backward-looking expectations function does a better job of capturing the empirical

data than the forward-looking, rational expectations function used in NK models. We therefore use a simple expectations function in our model that says that households expect inflation this period to be equal to last period's inflation:

$$\pi^E = \pi_{-1}. \quad (\text{expected inflation})$$

New Keynesian (or forward-looking) expectations generate jumps in inflation when certain shocks and/or policy changes occur. Jumps in inflation are rarely observed in the real world. (This is aside from the (clearly unrealistic) extraordinary computing capacity and ability to arrive at complex common knowledge strategies that would be required of a great number of wage and price setters).

Our inflation expectations function can be substituted back into condition (ii) to generate the following Phillips curve:

$$\pi = \pi_{-1} + \beta(y - y_e). \quad (\text{Phillips curve})$$

Note that the Phillips curve does not explain the level of the inflation rate: it shows the condition for a *constant rate of inflation*; that condition is that the output gap is zero, i.e. $y - y_e = 0$. When $y = y_e$ that implies that $\pi = \pi_{-1}$. Another way of writing the Phillips curve is in terms of the rate of employment or the rate of unemployment that produces a constant rate of inflation. The unemployment rate associated with constant inflation is referred to as the non-accelerating inflation rate of unemployment, or the NAIRU.

Equation III: Monetary policy and the Taylor rule

We now turn to explaining how central banks use inflation targeting to determine the actual rate of inflation. For that the third equation of the 3-equation model is needed, which shows monetary policy. In following a 'modern' approach to monetary policy, it is assumed there is an independent central bank, whose policy instrument is the short-term real interest rate, with a target rate of inflation of $\pi = \pi^T$. The central bank then conducts monetary policy using a Taylor rule equation:

$$r = r_s + \tau(\pi - \pi^T), \quad (\text{Taylor rule})$$

which shows the real interest rate the central bank should set in response to a given deviation in inflation from its target rate.

In equilibrium, $\pi = \pi^T$ and $r = r_s$. How the central bank uses r to generate this result is shown below in analysing disequilibrium behaviour; but intuitively if the economy is in equilibrium apart from $\pi > \pi^T$, the Taylor rule equation implies that the central bank raises $r > r_s$, which from the IS equation pushes $y < y_e$. The Phillips curve then implies that $\pi < \pi_{-1}$, so that inflation falls; and this process continues until $\pi = \pi^T$, at which point r is restored to r_s , inflation is back at target and output is back at equilibrium.

Summary: The closed economy 3-equation model

The three components of the 3-equation model and the medium-run equilibrium conditions are:

The IS curve:

$$y = c + \bar{g} - \alpha r$$

$$y = y_e$$

$$y_e = c + \bar{g} - \alpha r_s$$

The Phillips curve:

$$\pi = \pi_{-1} + \beta(y - y_e)$$

$$w_e = \lambda - \mu$$

$$y_e = \lambda + \beta^{-1}(\lambda - \mu - b)$$

The Taylor rule:

$$r = r_s + \tau(\pi - \pi^T)$$

$$r_s \equiv \alpha^{-1}(c + \bar{g} - y_e)$$

And the key equilibrium relationships are:

$$y_e = c + \bar{g} - \alpha r_s$$

$$w_e = \lambda - \mu$$

$$y_e = \lambda + \beta^{-1}(\lambda - \mu - b).$$

In the closed economy 3-equation model, the comparative statics for a permanent increase in autonomous consumption are: $\Delta c > 0$; $\Delta r = \Delta r_s = \alpha^{-1} \Delta c > 0$; and $\Delta w_e = \Delta y_e = 0$. Thus in a closed economy, the government can use demand-side policies (such as easing credit rules) to increase autonomous consumption but it will not have medium-run effects on either real wages or output. The rise in consumption must be matched by a corresponding fall in government expenditure ($\Delta c = -\Delta g$) otherwise the central bank will step in and increase r so that private domestic expenditure is unchanged in the new medium-run equilibrium ($\Delta c = \alpha \Delta r$).

A simple equilibrium model of a small open economy

The open economy models that follow all assume what are widely seen by political scientists as three key conditions that tie the hands of politicians in advanced democracies. These conditions are: first, that central banks are independent and committed to low rates of inflation; second, that international financial markets are fully liberalised and that there are no exchange controls; and third, that neither governments nor central banks intervene in foreign exchange (forex) markets to attempt to control the exchange rate.

All the advanced democracies (whom we are investigating) have adopted these conditions since the 1990s, with the exception of the members of the Eurozone—discussed separately—that have given up their individual currencies. But the Eurozone as a whole operates subject to all three conditions.

In moving to the open economy, we need to formally introduce the concept of the exchange rate. A country's nominal exchange rate, e , is the number of units of home currency that can be purchased with one unit of foreign currency. An increase in e denotes a depreciation of the nominal exchange rate and a decrease denotes an appreciation (this is a common convention in macroeconomics, see Carlin and Soskice (2015)). In order to gauge a country's price competitiveness, we need to take into account both the nominal exchange rate and the relative price of home and foreign goods. The real exchange rate is therefore defined as:

$$Q = \frac{P^* e}{P}, \quad (\text{real exchange rate})$$

where P is the price level in the home economy and P^* is the price level in the foreign economy. For computational ease, we will use the log of the real exchange rate, q , in our open economy models. A depreciation of the real exchange rate ($\uparrow q$), *ceteris paribus*, makes home's goods cheaper abroad and home's imports more expensive, whereas an exchange rate appreciation ($\downarrow q$) has the opposite effects. Hence, a depreciation represents an improvement in home's price competitiveness and an appreciation represents a deterioration in home's price competitiveness.

If we assume a small open economy, which cannot affect the world real interest rate, r^* , or the world inflation rate, π^* , then under the three conditions outlined above, we get a very different set of results in equilibrium to those of the closed economy when the government increases c (by for example, loosening borrowing rules).

The medium-run results of an increase in autonomous consumption (and no change in government expenditure), i.e. $\Delta c > 0, \Delta g = 0$, are: (i) there is an appreciation of the real exchange rate, $\Delta q_e < 0$; (ii) the real wage increases, $\Delta w_e > 0$; (iii) the change in equilibrium output is non-negative, $\Delta y_e \geq 0$, and apart from efficiency-wage setting, $\Delta y_e > 0$; (iv) there is no change in inflation in equilibrium, which is pinned down by the inflation target (of world inflation), $\Delta \pi_e = 0, \pi_e = \pi^T = \pi^*$; and (v) there is no change in the real interest rate in equilibrium, which is pinned down by the world real interest rate, $\Delta r_e = 0, r_e = r^*$.

The same medium-run results apply to an increase in g , although the scope for using government expenditure to boost demand may be restricted by the government's fiscal plan or fiscal rules. In cases where g is not completely fixed and the government is not in danger of running excessive deficits or debt which may be penalised by financial markets, then expansive fiscal policy can be used to appreciate the real exchange rate and boost real wages (and potentially also output). This runs

contrary to the findings of the Mundell-Fleming model at the centre of Clark's (2003) political economy model, which suggests that fiscal policy is ineffective in a small open economy with flexible exchange rates.

What is happening is actually quite intuitive and obvious. When the sometimes complex mechanisms of the economy have worked themselves through in equilibrium: a large proportion of domestic households are credit-constrained (and were through the Great Moderation as well as now), and when governments have relaxed rules on borrowing, domestic consumers have been able to increase real consumption by borrowing from abroad (via intermediation by creditworthy financial institutions), and will do so (in equilibrium). Because of inflation-targeting central banks, inflation does not change in equilibrium. Because of international financial market liberalisation and the absence of both exchange controls and intervention in forex markets, as well as central bank inflation targets, markets will continue to lend at the world real interest rate, r^* . In addition, markets are aware of the huge cost a government would face if it imposed exchange controls or changed the rules governing its central bank.

Thus our basic argument is that in open economies, the three conditions—which many have seen as tying the hands of governments—have in fact provided governments with the temptation to solve their domestic electoral problems (indirectly) by facilitating borrowing internationally. This is more the case in majoritarian systems, where winning elections is a prerequisite for governing and four-to-five year electoral cycles mean that current government leaders get to reap the short run benefits of credit expansion without having to worry too much about the longer term risks to financial and economic stability.

We will now go through the main changes to each of the three equations in the model as we move from the closed economy to the open economy. We then show how the open economy model can explain the equilibrium results we have just outlined.

Equation I: The Aggregate Demand (AD) curve

Two changes are necessary to model the goods market in the open economy. First we need to add a term to the IS curve that represents net external demand. The current external balance, B , increases with world income, y^* , and decreases with domestic income, y . It also depends on the real exchange rate, q . We assume, as is standard in modern macroeconomics (see Carlin and Soskice (2015)), that the current external balance increases with a depreciation of q and falls with an appreciation of q —i.e. we assume the Marshall-Lerner condition holds. For this analysis, y and y^* are taken as given, and we assume for simplicity that the open economy IS curve takes the form:

$$y = c + \bar{g} - \alpha r + Bq \quad (\text{open economy IS curve})$$

with $B > 0$.

The second addition is the Uncovered Interest Parity (UIP) condition:

$$r - r^* = q^E - q. \quad (UIP \text{ condition})$$

The UIP condition states that if an interest gain over a period of time arises from holding a (safe) domestic asset $r - r^*$ then that must be balanced by an equivalent depreciation of the exchange rate $q^E - q$; (this may be expressed either in nominal or real terms). This condition holds (subject to some assumptions) because the sophisticated, forward-looking, foreign exchange market buys and sells domestic and foreign assets in order to take advantage of the arbitrage opportunities that arise from interest rate differentials between countries.

If we assume that in medium-run equilibrium:

$$y = y_e \text{ and } q = q_e,$$

then we can define the Aggregate Demand (AD) curve in equilibrium as:

$$y_e = c + \bar{g} - \alpha r^* + Bq_e. \quad (AD \text{ curve})$$

The AD curve is a medium-run equilibrium condition that incorporates both the open economy IS curve and the UIP condition. At any point on the AD curve, the domestic interest rate is equal to the world interest rate and the real exchange rate is constant.

The AD curve implies that equilibrium q is:

$$q_e = B^{-1}(y_e - c - \bar{g} + \alpha r^*), \quad (\text{equilibrium real exchange rate})$$

and this summarises the key comparative static point that if c increases in equilibrium and g is held at \bar{g} , and given that r must be equal to r^* in medium-run equilibrium, then q_e must appreciate (i.e. decrease).

Equation II: The Phillips curve and real wage and output equilibrium

The key change here goes back to the price-setting equation. A simple assumption is that export prices are equal to domestic (consumption) prices, so the domestic price-setting equation now needs to incorporate the unit cost of imports. In real numbers:

$$P^{PS} = \mu(lW + mP^*e), \quad (\text{open economy price-setting equation})$$

where l is the unit labour requirement or reciprocal of labour productivity, i.e. $l = \lambda^{-1}$, and m is the unit import requirement. We can see that the domestic price level is now a combination of the price of domestic goods and the price of imports.

Still in real numbers not logs, dividing both sides of the price-setting equation by P and using the definition for the real exchange rate we find that:

$$1 = \mu(lw^{PS} + mq),$$

which can then be rearranged to provide the price-setting real wage equation for the open economy:

$$w^{PS} = l^{-1}(\mu^{-1} - mq). \quad (\text{open economy price-setting real wage equation})$$

Since there is no time lag between cost changes and price changes (in that order), this relationship holds continuously as well as in equilibrium.

If we substitute l^{-1} for λ , we can therefore write the equilibrium condition (in real numbers) as:

$$w_e = \lambda(\mu^{-1} - mq),$$

and in logs as:⁶⁶

$$w^{PS} = w_e = \lambda - \mu - (m + q),$$

so that the equilibrium real wage rises when the real exchange rate appreciates. This is because a real exchange rate appreciation makes imports cheaper and increases workers' purchasing power (for a given nominal wage).

Next, there is no necessary change in the wage-setting real wage equation and hence in the wage-setting real wage:

$$w^{WS} = b + \beta(y - \lambda), \quad (\text{wage-setting real wage equation})$$

so with the equilibrium condition $w^{WS} = w^{PS}$ we have

$$w_e = w^{PS} = \lambda - \mu - (m + q) = w^{WS} = b + \beta(y_e - \lambda),$$

implying in equilibrium in the open economy:

$$\begin{aligned} b + \beta(y_e - \lambda) &= \lambda - \mu - (m + q) \\ \rightarrow y_e &= \lambda + \beta^{-1}(\lambda - \mu - b - (m + q)). \end{aligned}$$

As in the closed economy, y_e increases with labour productivity and is reduced by the bargaining power of labour expressed as β and b , but now it is also *increased* by an *appreciation* of the real exchange rate, q .

This dependence of y_e on q does not hold in general. For example, with a simple model of efficiency-wage setting, the i th firms sets the i th real wage relative to the

⁶⁶ Note that when we move from real to logs, the logs are approximations. We can approximate in real numbers logarithmic formulae by a first order Taylor expansion. Thus expanding $\log x$ around $x = 1$, we have: $\log x \approx \log 1 + (x - 1) = x - 1$. More generally, expanding $\log(ax + b)$ around $x = (1 - b)/a$, we have:

$$\log(ax + b) \approx \log(1) + \frac{a}{a + b}(x - 1) = \frac{a}{a + b}(x - 1).$$

expected (or perceived) market real wage; it is set high when the labour market is tight (y high) to retain and or motivate staff, and vice versa: hence $w_i^{WS} = w^{WS,E} + \beta y - \delta$.

In equilibrium, $w_i^{WS} = w^{WS,E} = w^{WS}$ so that $w_e = w^{WS} = w^{PS} = \lambda - \mu - (m + q)$ and $y_e = \beta^{-1}\delta$. Hence, y_e is not dependent on q under efficiency wage setting.

The response of y_e to changes in domestic demand in the open economy therefore depends on how we choose to model wage setting; y_e increases in response to a rise in c when we assume wages are set by unions or individual employees bargaining with an employer, whereas y_e is unaffected when we assume employers set efficiency wages. It is important to note, however, that the main findings of the paper continue to hold whichever model of wage setting is used, i.e. they do not rely on equilibrium output increasing in response to changes in domestic demand.

Finally we turn to the relevant modifications of the Phillips curve. Exactly as on closed economy lines, we have (in logs):

$$\begin{aligned} w &= w^{PS} = w_e = b + \beta(y_e - \lambda) \\ w^{WS} &= b + \beta(y - \lambda) \\ \rightarrow w^{WS} - w &= \beta(y - y_e) \\ \Delta W - \pi^E &= \beta(y - y_e) \\ \Delta W - \pi_{-1} &= \beta(y - y_e). \end{aligned}$$

But in the open economy—reverting to real numbers—the price-setting equation is given by:

$$P^{PS} = \mu(lW + mP^*e). \quad (\text{open economy price-setting equation})$$

If we assume that μ , l and m are constant, then we can use the price-setting equation to find an expression for the change in prices, ΔP :

$$\Delta P = \mu(l\Delta W + m(\Delta P^*e + P^*\Delta e)).$$

The intuition of the equation is that the change in prices is equal to the change in each of the non-constant right-hand side variables multiplied by their weights in the price-setting equation. To make the price change equation more manageable, we next multiply each Δ component on the right-hand side by one, i.e. $\frac{W}{W}$ for the ΔW component, $\frac{P^*}{P^*}$ for the ΔP^* component and so on, which gives:

$$\Delta P = \mu \left(lW \frac{\Delta W}{W} + mP^* e \left(\frac{\Delta P^*}{P^*} + \frac{\Delta e}{e} \right) \right).$$

The next stage in deriving the open economy Phillips curve is to note that inflation is equal to $\frac{\Delta P}{P}$. Hence, we can divide both sides of the price change equation by P to get the following equation for inflation:

$$\pi = \frac{\Delta P}{P} = \mu \left(l \frac{W}{P} \frac{\Delta W}{W} + m \frac{P^*}{P} e \left(\frac{\Delta P^*}{P^*} + \frac{\Delta e}{e} \right) \right).$$

We can now simplify the equation by defining σ_L as $l \frac{W}{P}$ and σ_M as $m e$, such that:

$$\pi = \mu \sigma_L \frac{\Delta W}{W} + \mu m e \left(\frac{\Delta P^*}{P^*} + \frac{\Delta e}{e} \right) = \mu \sigma_L \frac{\Delta W}{W} + \mu \sigma_M \left(\frac{\Delta P^*}{P^*} + \frac{\Delta e}{e} \right),$$

and by substituting in the equation derived earlier (converted into real numbers):

$$\frac{\Delta W}{W} - \pi_{-1} = \beta(y - y_e),$$

we have that:

$$\pi = \mu \sigma_L \pi_{-1} + \mu \sigma_L \beta(y - y_e) + \mu \sigma_M \left(\frac{\Delta P^*}{P^*} + \frac{\Delta e}{e} \right).$$

The final step in deriving the open economy Phillips curve is to make the assumption that there is a lag from import price increases to the increase in domestic prices, such that:

$$\pi = \mu\sigma_L\pi_{-1} + \mu\sigma_L\beta(y - y_e) + \mu\sigma_M\left(\frac{\Delta P^*}{P^*_{-1}} + \frac{\Delta e}{e_{-1}} - \pi_{-1}\right) + \mu\sigma_M\pi_{-1},$$

where $\mu\sigma_M\pi_{-1}$ has been added and subtracted from the equation. We can now use the fact that $\mu\sigma_L + \mu\sigma_M = 1$ to arrive at the Phillips curve in the open economy 3-equation model:

$$\pi = \pi_{-1} + \mu\sigma_L\beta(y - y_e) + \mu\sigma_M\left(\pi_{-1}^* + \frac{\Delta e}{e_{-1}} - \pi_{-1}\right). \quad (\text{open economy Phillips curve})$$

Equation III: Monetary policy and the Taylor rule

The Taylor rule is largely unaffected by the move to the open economy, although there is no stabilising rate of interest, as the real interest rate is pinned down by the world real interest rate, and the target inflation rate is the world inflation rate. Hence, the Taylor rule becomes:

$$r = r^* + \tau(\pi - \pi^*), \quad (\text{open economy Taylor rule})$$

One other notable change in the Taylor rule in the open economy is that the τ coefficient is reduced. This reflects the fact that the foreign exchange market shoulders some of the burden of adjustment to economic shocks in the open economy. If the central bank wants to achieve a given negative output gap in the open economy it requires a smaller increase in the real interest rate because the accompanying exchange rate appreciation will also help dampen aggregate demand.

Summary: Medium-run effects of an increase in autonomous consumption in the open economy

Now that we have set out the open economy version of the 3-equation model, we can use the model to look at the medium-run equilibrium effect of a permanent increase in autonomous consumption (via an easing of credit conditions) on the economy:

- (a) In equilibrium $q_e = B^{-1}(y_e - c - \bar{g} + \alpha r^*)$, and given y_e , c and \bar{g} , $\Delta q_e = 0$. A permanent increase in consumption of Δc therefore implies an appreciation of the exchange rate of $\Delta q_e = -B^{-1}\Delta c$.
- (b) To satisfy the *UIP* condition, $r = r^*$ in the new medium-run equilibrium and the exchange rate is constant at the new appreciated level (as $q = q^E$).
- (c) From the equilibrium real wage condition (in logs), $w_e = \lambda - \mu - (m + q)$, the increase in c increases the equilibrium real wage. In logs $\Delta w_e = -\Delta q_e = B^{-1}\Delta c$.
- (d) Since (under standard wage-setting conditions, not under efficiency wages) $y_e = \lambda + \beta^{-1}(\lambda - \mu - b - (m + q_e))$, so an appreciation of q increases y_e ; with efficiency wages y_e remains constant. Whichever assumption is made about wage setting, $y_e \geq 0$.
- (e) At the new medium-run equilibrium, $y = y_e$ and $\Delta q = 0$, so the *Phillips curve* reduces to stable inflation $\pi = \pi_{-1} + \mu\sigma_L\beta(y - y_e) = \pi_{-1}$.
- (f) The *Taylor rule* then eventually produces $\pi = \pi^*$ (which implies that $\Delta q_e = 0 \rightarrow \Delta e = 0$).

To summarise, in the new medium-run equilibrium: consumption is higher, the exchange rate is appreciated, real wages are higher, the external balance has deteriorated, output is either higher or unchanged, inflation is at the world inflation rate and the real interest rate is at the world real interest rate. Looking back at the United States and the United Kingdom (as well as the other LMEs) in Figures 4.1 to 4.6, we can see that they evolved in much this manner during the Great Moderation—low inflation and interest rates coincided with real exchange rate appreciation and the accumulation of current account deficits. As emphasises in Figure 4.7, they also had strongly consumption-led growth models during this period. We saw in Section 3.4 of Chapter 3 of the thesis, that the consumption-led LMEs also had the highest levels of disposable income inequality among advanced democracies during the Great Moderation. This further strengthens the incentive of

politicians to expand the growth of credit, particularly to poorer areas, and to boost real wages by holding down the price of imports (through real exchange rate appreciation), as will be discussed further in Section 4.6.

It is useful to note that if the government is able to use fiscal policy, i.e. when they are not bound by strict fiscal rules and are not already running high deficits, to expand domestic demand ($\Delta g > 0$), then this has exactly the same set of medium-run equilibrium effects as an increase in autonomous consumption.

Conversely, if the government chooses to pursue restrictive fiscal policies, i.e. $\Delta g < 0$, then this has the exact opposite set of medium-run equilibrium effects. Looking back at Figures 4.1 to 4.6 we can see that this fits well with the coordinated market economies of continental and northern Europe (as well as Japan) during the Great Moderation. These countries also had low and stable inflation and interest rates, but in contrast to the LMEs, saw real exchange rate depreciation and the accumulation of current account surpluses. As emphasised in Figure 4.7, these countries pursued strongly export-led growth models during this period.

Transitions between equilibria in a small open economy: Intuition

In the previous subsection, we looked at the medium-run effects of an increase in consumption of Δc . Let's define c^{old} as the level of consumption before the government eases credit conditions and c^{new} as the level of consumption afterwards, so that $\Delta c = c^{new} - c^{old}$. How does the economy move from the initial equilibrium associated with c^{old} to the new equilibrium associated with c^{new} ? There are three 'stories' one can tell about the adjustment of the economy, which depend on the assumptions made about time lags and whether or not the nominal exchange rate is fixed in the simple open economy model set out above. In all three cases, we assume efficiency wage setting, such that y_e is not dependent on q . This makes the analysis simpler but also reiterates that none of our main findings are reliant on equilibrium output changing as a result of demand-side policies.

Version 1: fixed exchange rate

If the exchange rate is fixed or the economy is a small member state of a common currency area (and there are no exchange controls), then the national central bank cannot use the interest rate as a policy lever; the interest rate is fixed at the world interest rate, i.e. $r = r^*$ at all times. We also assume that fiscal policy is bound by a consistent fiscal plan so that g is fixed at \bar{g} .

Figure 4.8 shows the adjustment of the economy to the increase in consumption. Assume that the economy is initial at point A , with $\pi = \pi^*$ and $y = y_e$. (To make the argument simple also assume that $\pi^E = \pi^*$, i.e. inflation expectations are firmly anchored to world inflation throughout.)

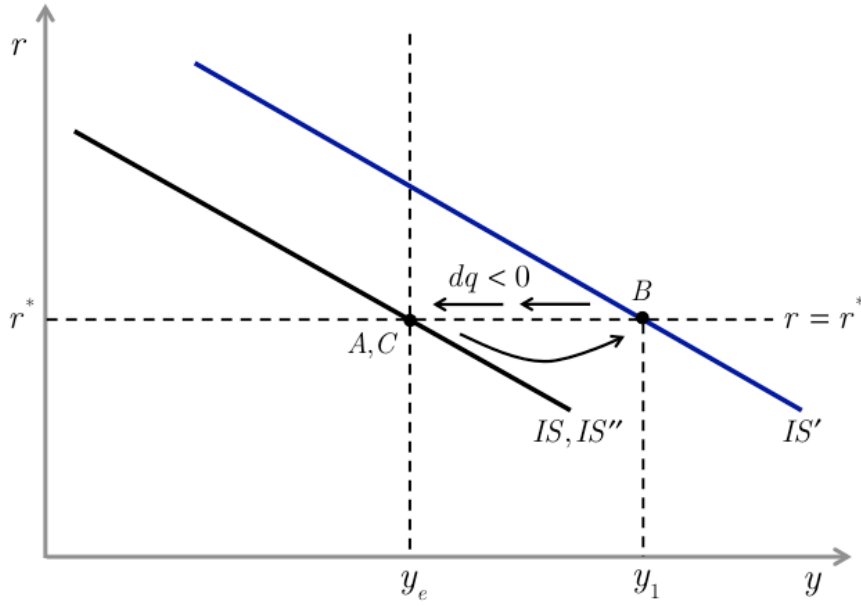
The increase in consumption from $c^{old} \rightarrow c^{new}$ shifts the IS curve outwards from $IS : y = c^{old} + \bar{g} - \alpha r + Bq_e^{old}$ to $IS' : y = c^{new} + \bar{g} - \alpha r + Bq_e^{old}$. The economy moves to point B on IS' , and output rises to y_1 . From the Phillips curve we know that $y > y_e$ leads to $\pi > \pi^*$. The real exchange rate, q , therefore falls by $\pi - \pi^*$, which reduces the output gap, $y - y_e$. The economy moves along the $r = r^*$ line back towards the initial equilibrium as the appreciated real exchange rate reduces net exports, and consequently aggregate demand. Hence, next period π still exceeds π^* but by less than in the previous period. Again there is a real exchange rate appreciation but by less than before. This process continues for a number of periods until a new equilibrium is reached at point C , where output is back at equilibrium and inflation is back at world inflation. The IS curve at the new equilibrium is $IS'' : y = c^{new} + \bar{g} - \alpha r + Bq_e^{new}$, which is in the same position as the initial IS curve but the composition of aggregate demand has changed; consumption is higher and the external balance has deteriorated. The equilibrium appreciation of the real exchange rate exactly offsets the affect of the rise in consumption on output, i.e.

$$q_e^{new} - q_e^{old} = -B^{-1}(c^{new} - c^{old}).$$

In an economy with a fixed exchange rate, or in a small member of a common currency area, all the adjustment of the real exchange rate to its new medium-run

equilibrium level following the boost in consumption takes place through the change in the domestic price level because the nominal exchange rate, e , is fixed throughout. As we shall see, however, the new medium-run equilibrium is exactly the same as it would be in a flexible exchange rate economy. Hence, demand-side policies can affect the medium-run trajectory of advanced democracies both inside and outside of the Eurozone.

Figure 4.8. Adjustment to an increase in autonomous consumption in the 3-equation open economy model with a fixed exchange rate, $r = r^*$; $\Delta e = 0$



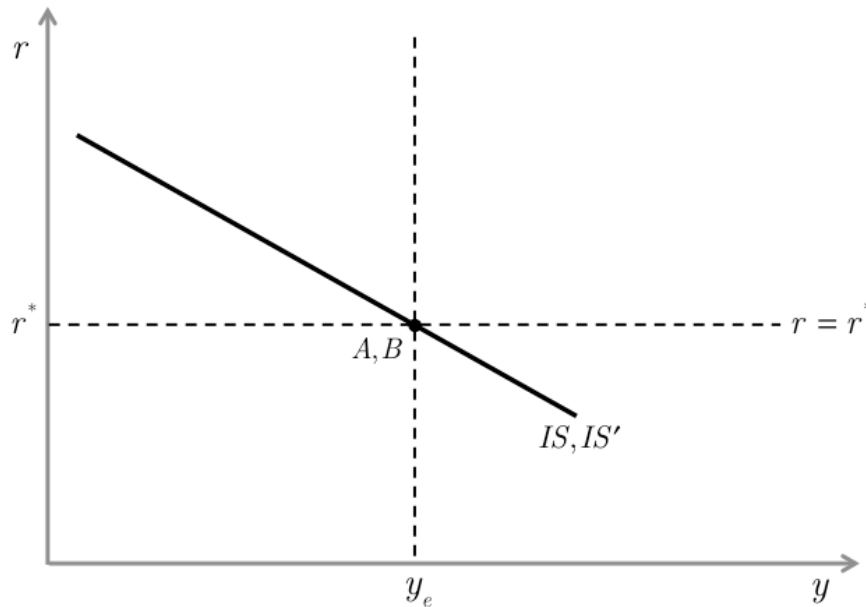
Version 2: flexible exchange rates, no time lags

This is very simple. Forex market participants have rational expectations and know immediately that $c^{old} \rightarrow c^{new}$. Hence, they know at once that the new equilibrium q is given by $q_e^{new} = q_e^{old} - B^{-1}(c^{new} - c^{old})$. They therefore instantaneously appreciate the nominal exchange rate e , such that $\Delta e = q_e^{new} - q_e^{old} = -B^{-1}(c^{new} - c^{old})$. The economy jumps to its new medium-run equilibrium because there are no time lags. Nothing else happens.

Figure 4.9 shows the adjustment of the economy to the increase in consumption. The economy initially starts at point A with output equal to equilibrium and inflation equal to world inflation. The initial IS curve is $IS : y = c^{old} + \bar{g} - \alpha r + Bq_e^{old}$.

As soon as consumption increases, the economy jumps to the new equilibrium at point B ; nothing happens to output or inflation. In the new medium-run equilibrium, the IS curve is given by $IS' : y = c^{new} + \bar{g} - \alpha r + Bq_e^{new}$. In a flexible exchange rate economy with no time lags, all the adjustment in the economy takes place immediately, through a jump in the nominal exchange rate, e .

Figure 4.9. Adjustment to an increase in autonomous consumption in the open economy 3-equation model with flexible exchange rates and no time lags



Version 3: flexible exchange rates, time lags as in the closed economy model

Analysing the transition from the old to the new equilibrium is much more complex in this case. We set out an explicit model in the next subsection using the three time lags assumed here (in wage-setting, in the impact of r , and in the lag of external prices in price setting). Forex markets form expectations in a fully rational manner but only have access to information about the change in c after inflation has increased; equally the central bank cannot eliminate the inflationary consequences of the increase in c (even without an information lag) since there is a time lag between the central bank's immediate response in raising r above r^* and its effect on aggregate demand. Modern central banks conduct monetary policy taking account of the lags in transmission. For example, the Bank of England states “the maximum

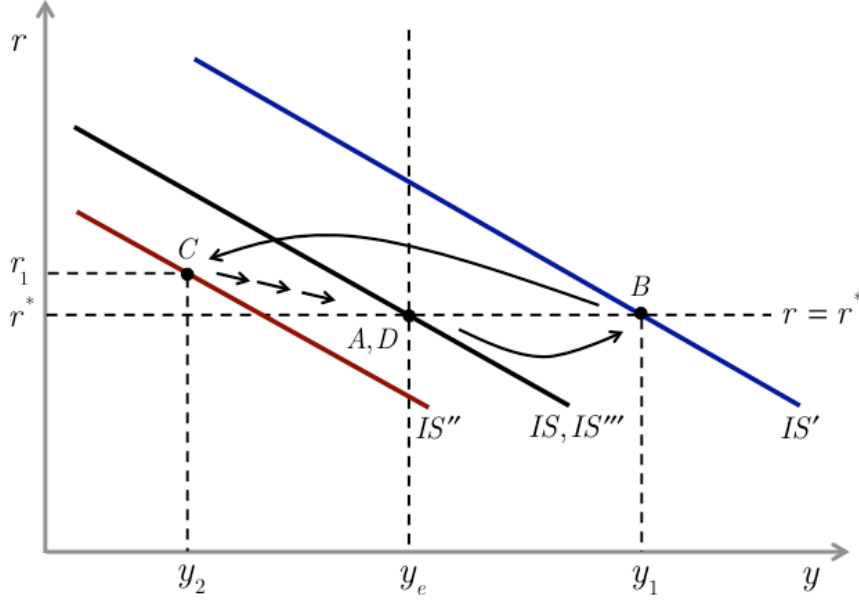
effect of a change in interest rates on output is estimated to take up to about one year”.⁶⁷

The adjustment process is thus of the Dornbusch type with exchange rate overshooting, and lags in the wage-setting/price-setting process as inflation is gradually restored to π^* and r to r^* . The increase in c results in a period where the central bank must hold home’s interest rate above the world interest rate in order to squeeze the resulting inflation out of the system. The foreign exchange market knows this and the exchange rate therefore overshoots its equilibrium appreciation (i.e. appreciates more) so that it can depreciate over the period that $r > r^*$. This happens so that the *UIP* condition holds in each period as the economy adjusts to the new medium-run equilibrium. The real exchange rate depreciates until it reaches the equilibrium appreciation, which is the exchange rate that restores aggregate demand to equilibrium. In the new equilibrium, the increase in c has been exactly offset by an increase in the external deficit.

Figure 4.10 shows the adjustment of the economy to the increase in autonomous consumption. The economy starts at point A with output at equilibrium and inflation at world inflation. The initial *IS* curve is $IS : y = c^{old} + \bar{g} - \alpha r + Bq_e^{old}$. The increase in the exogenous component of domestic private demand c (which in our narrative is induced by the loosening of credit rules) generates excess aggregate demand, which moves the *IS* curve out to $IS' : y = c^{new} + \bar{g} - \alpha r + Bq_e^{old}$. The economy moves to point B , with output at $y_1 > y_e$, which in turn pushes inflation above world inflation, π^* ; $\pi - \pi^* > 0$ directly appreciates the real exchange rate, i.e. $\Delta q < 0$, since $\Delta q \equiv \pi^* + \Delta e - \pi$. The real exchange rate also appreciates via monetary policy: the central bank responds to $\pi > \pi^*$ via the Taylor rule by raising r to r_1 .

⁶⁷ This excerpt is from the page *How does monetary policy work?* on the Bank of England’s website (accessed August 31st 2016). Available from: <http://www.bankofengland.co.uk/monetarypolicy/Pages/how.aspx>

Figure 4.10. Adjustment to an increase in autonomous consumption in the open economy 3-equation model with flexible exchange rates and time lags



The Dornbusch overshooting mechanism is then brought into operation, leading to a further real appreciation through the nominal exchange rate, e . With rational expectations: (i) forex operators believe that in the new equilibrium $\pi = \pi^*$ and $\Delta q_e = -B^{-1}(c^{new} - c^{old})$; thus to bring q to the new equilibrium, Δe has to appreciate (i.e. fall) by $-B^{-1}\Delta c + (\pi - \pi^*)$ since the rise in π has already led to a real appreciation of $-(\pi - \pi^*)$; but in addition (ii) forex operators expect r will be greater than r^* for a period of time as inflation comes back to π^* . The latter means that for UIP to hold during that adjustment period the exchange rate must be depreciating, and for that to happen subsequently the initial appreciation has to overshoot the equilibrium appreciation to allow for this depreciation.

Thus q appreciates to q_1 due to a combination of the burst of higher inflation and the appreciation of the nominal exchange rate. As we shall see in the next subsection, the initial appreciation of the real exchange rate to q_1 includes both the equilibrium appreciation and the overshooting. The economy moves to point C , with output below equilibrium at y_2 and the interest rate above the world interest rate at r_1 . The IS curve shifts to $IS'' : y = c^{new} + \bar{g} - \alpha r + Bq_1$ as a result of the fall in net

exports. The negative output gap puts downward pressure on inflation and the real exchange rate depreciates. This is reinforced by the central bank slowly lowering interest rates as the economy moves back towards equilibrium output. The process continues until the new equilibrium at point D is fully established with r back to r^* , π back to π^* , and $\Delta q = \Delta q_e = -B^{-1}\Delta c$. The IS curve at the new medium-run equilibrium is $IS''' : y = c^{new} + \bar{g} - \alpha r + Bq_e^{new}$. At the end of the adjustment process, the real wage has been increasing to a new equilibrium (still in logs) of $\Delta w_e = -\Delta q_e = B^{-1}\Delta c$ since $w_e = \lambda - \mu - (m + q)$.

An explicit model of transition (in Version 3)

The adjustment process works by the central bank using interest rate policy, and the forex market anticipating the central bank's behaviour (actually a Nash equilibrium game).

Assume that the increase in autonomous consumption takes place in period 1, such that $\Delta c = c_1 - c_0$. A positive output gap therefore opens up in period 1, which is equal to the change in aggregate demand between the two periods:

$$\begin{aligned} y_1 - y_e &= (c_1 + \bar{g} - \alpha r_0 + Bq_0) - (c_0 + \bar{g} - \alpha r^* + Bq_{e,0}) \\ y_1 - y_e &= c_1 - c_0. \end{aligned}$$

The change in the output gap is simply the change in consumption because the real interest rate and the real exchange rate remain at their initial levels in the period of the consumption increase, i.e. $r_0 = r^*$ and $q_0 = q_{e,0}$.

Turning to the open economy Phillips curve, we have that:

$$\pi_1 - \pi^* = \mu\sigma_L\beta(y_1 - y_e) = \mu\sigma_L\beta\Delta c,$$

since $\pi_0 = \pi^*$, and therefore we can use the open economy Taylor rule to find the interest rate response of the central bank (in period 1) to the rise in inflation caused by the increase in autonomous consumption:

$$r_1 - r^* = \tau(\pi_1 - \pi^*) = \tau\mu\sigma_L\beta\Delta c.$$

We know that the *UIP* condition, $r - r^* = q^E - q$, must hold in every period in the open economy. After the increase in consumption the forex market knows the central bank will hold the real interest rate above the world real interest rate for several periods. The sum of all the deviations of the real interest rate from the world interest rate from the period of the change in consumption through to the new medium-run equilibrium therefore need to equal the over-appreciation (overshooting) of the real exchange rate in period 1. As explained above, this is so that the real exchange rate can depreciate to its new equilibrium value over the period when $r > r^*$. In mathematical terms this means that:

$$\sum_1^\infty r_t - r^* = -(q_1 - q_2^E + q_2^E - q_3^E + \dots - q_{e,1}) = q_{e,1} - q_1.$$

If we then assume that the deviations in the real interest rate from the world real interest rate decline at a constant rate, i.e. $r_t - r^* = \eta(r_{t-1} - r^*)$, then we can simplify the expression, such that:

$$\rightarrow \sum_1^\infty r_t - r^* = \frac{r_1 - r^*}{1 - \eta} = q_{e,1} - q_1,$$

and then multiplying each side by minus one and substituting the value of $r_1 - r^*$ calculated from the Taylor rule, we have that:

$$q_1 - q_{e,1} = -\frac{r_1 - r^*}{1 - \eta} = -\frac{\tau\mu\sigma_L\beta}{1 - \eta}\Delta c. \quad (\text{real exchange rate overshoot})$$

This is the amount by which q appreciates (i.e. falls) below the new equilibrium real exchange rate. In other words, the amount it overshoots the new equilibrium. This happens so that the gradual depreciation of the real exchange rate to the new equilibrium will parallel the interest gains from holding home currency for that period of time.

In the new equilibrium, output has not changed (if we assume efficiency wage setting), such that:

$$y_e = c_1 + \bar{g} - \alpha r^* + Bq_{e,1} = c_0 + \bar{g} - \alpha r^* + Bq_{e,0},$$

but the composition of output has changed. In the new equilibrium, consumption is higher and the external balance is lower due to the appreciation real exchange rate. The equilibrium change in the exchange rate is equal to:

$$q_{e,1} - q_{e,0} = -B^{-1}\Delta c,$$

hence the total appreciation of q in period 1 is equal to:

$$q_1 - q_{e,0} = -\left(\frac{\tau\mu\sigma_L}{1-\eta} + 1\right)B^{-1}\Delta c = -\frac{\tau\mu\sigma_L B^{-1}}{1-\eta}\Delta c - B^{-1}\Delta c,$$

where the first term on the right-hand side is the overshooting and the second term the equilibrium change in q .

Large economies and global imbalances

As discussed earlier, a precondition for one country running an external deficit is that others run a corresponding surplus. It is simplest to see this in the case of a world of two economies, both of which start in external equilibrium, and in one (say A for the US) $\Delta c > 0$, and in the other (say G for Germany) $\Delta g < 0$.

If the net addition to world aggregate demand is positive, i.e. if $\Delta c - \Delta g > 0$, then $\Delta r^* > 0$, and vice versa. As the two economies comprise the entire world economy any demand-side policies that alter world aggregate demand require a change in the world interest rate to keep inflation at target (much like in the closed economy model). In equilibrium, the real interest rate must be equal in both countries in order to satisfy the *UIP* condition.

There is only one exchange rate in the two-country world, q , which is the real dollar exchange rate. If q increases this amounts to a depreciation of the US real exchange rate and an appreciation of German real exchange rate, and vice versa.

The *AD* curves for the two blocs can be written as:

$$A: y_e = c_1^A + g^A - \alpha r_1^* + Bq_1$$

$$G: y_e = c^G + g_1^G - \alpha r_1^* - Bq_1$$

We then introduce an increase in autonomous consumption in the US and a reduction in government spending in Germany, such that:

$$\Delta c^A > 0, \Delta g^G < 0, \Delta c^G = \Delta g^A = 0.$$

In the new medium-run equilibrium, the AD curves are:

$$A: y_e = c_2^A + g^A - \alpha r_2^* + Bq_2$$

$$G: y_e = c^G + g_2^G - \alpha r_2^* - Bq_2.$$

As equilibrium output in both countries is unchanged in the medium-run (assuming efficiency wages), we know that the changes in domestic demand in each country must be offset by changes in the real interest rate and the real exchange rate, such that:

$$\Delta c^A = \alpha(r_2^* - r_1^*) - B(q_2 - q_1)$$

$$\Delta g^G = \alpha(r_2^* - r_1^*) + B(q_2 - q_1).$$

We can then use these two equations to find the equilibrium changes in both the world real interest rate and the real exchange rate:

$$\Delta c^A + \Delta g^G = 2\alpha(r_2^* - r_1^*)$$

$$\rightarrow (r_2^* - r_1^*) = \frac{\Delta c^A + \Delta g^G}{2\alpha}$$

$$\Delta c^A - \Delta g^G = -2B(q_2 - q_1)$$

$$\rightarrow q_2 - q_1 = -\frac{\Delta c^A - \Delta g^G}{2B} \rightarrow \Delta q < 0.$$

Hence, the world real rate of interest, r^* , will rise or fall or remain unchanged depending on whether the net increase in world aggregate demand, $\Delta c^A + \Delta g^G$, is $> 0, < 0, = 0$. In contrast, the real exchange rate, q , necessarily falls, which means that the US real exchange rate appreciates and the German real exchange rate depreciates.

The real wages in A and G are given by:

$$w^A = \beta^{-1}(\lambda - \mu - b - (m + q))$$

$$w^G = \beta^{-1}(\lambda - \mu - b + (m + q)).$$

So $\Delta c^A > 0 \rightarrow \Delta w^A > 0, \Delta w^G < 0$ and also $\Delta g^G < 0 \rightarrow \Delta w^A > 0, \Delta w^G < 0$. Hence, the changes in domestic demand in the two countries are mutually reinforcing, both pushing up real wages in the US and reducing real wages in Germany (through their effects on the real exchange rate).

This simple model suggests that global imbalances can arise despite successful inflation targeting if two large groups of countries are pursuing opposing, but ultimately complementary, demand-side policies. Looking back at Figure 4.7, we can see that advanced democracies pursued different growth models during the Great Moderation, with the CMEs pursuing export-led growth and the LMEs pursuing consumption-led growth. As predicted by the large economies model, this led to imbalances emerging between the two groups of countries in real exchange rates and current accounts, as shown by Figures 4.4 and 4.5. We will explore how demand-side policies varied between the CMEs and LMEs during the Great Moderation in Section 4.6.

Possible objections: (1) International Risk Sharing

If households are identical across all countries, the common Euler conditions result from maximising:

$$U = \sum \beta^t \log c_t$$

$$\sum \frac{p_t c_t}{(1+r_t)}$$

These conditions imply that: $c = c^* + q$.⁶⁸

Since $y_e = c + \bar{g} - \alpha r^* + Bq$ in equilibrium, the international risk sharing (*IRS*) uniquely determines y_e since it implies that:

$$y_e = c^* + q + \bar{g} - \alpha r^* + Bq,$$

so that,

$$q_e = (1+B)^{-1} [y_e - c^* - \bar{g} + \alpha r^*].$$

⁶⁸ For further explanation of the international risk sharing condition, see Appendix C1.

This equation for the real exchange rate invalidates the arguments set out in our simple open economy 3-equation model because it implies that a change in c has no effect on the equilibrium exchange rate, q_e . Hence, if *IRS* holds, the government is unable to borrow internationally to boost consumption and push up real wages (and potentially also output).

For three reasons, we do not see the *IRS* as an issue for our argument:

- (i) Analytically, our model rules out Euler conditions because of credit-constrained households, so *IRS* does not apply.
- (ii) Empirically, as Obstfeld and Rogoff (2000) highlight, *IRS* is one of the six theoretical conditions in international macroeconomics that are factually problematic. They refer to it as the puzzle of why consumption is not more highly correlated across advanced economies, where consumers in different economies face the same set of world markets. They attribute it to differential costs of trade in the broadest interpretation. We refer to differential costs of borrowing and household access to capital markets.
- (iii) Even if the other conditions of our model met the conditions for the *IRS* condition to hold, any change in the conditions underlying the consumption decision in the home country, for example a taste shift, imply $c = \gamma + c^* + q$ so that now $q_e = (1 + B)^{-1} [y_e - \gamma - c^* - \bar{g} + ar^*]$. The introduction of country constant, γ , does provide scope of policies aimed at boosting consumption (e.g. credit easing) to affect the real exchange rate through γ .

Possible objections: (2) Absence of home bias in small Ricardian models

We take the extreme case to make this objection clear: assume that all goods and services are traded (so no non-traded sector), and that each small economy in a large- N world economy has the Ricardian capacity to produce a unique differentiated product (say because it has workers with the requisite specific skills). The credit rules for our consumers are now relaxed, and they increase consumption

by Δc . But only an infinitesimal amount of the increased consumption consists of the differentiated product they produce. Hence, imports rise by Δc .

In equilibrium terms the economy moves from:

$$y_e = c_0 + \bar{g} - \alpha r^* + Bq_{e,0},$$

with $q_{e,0} = B^{-1}(y_e - c_0 - \bar{g} + \alpha r^*)$ to:

$$y_e = c_0 + \Delta c + \bar{g} - \alpha r^* + (Bq_{e,1} - \Delta c), \text{ with}$$

$$\begin{aligned} q_{e,1} &= B^{-1}(y_e - c_0 - \Delta c - \bar{g} + \alpha r^* + \Delta c) \\ &= B^{-1}(y_e - c_0 - \bar{g} + \alpha r^*) = q_{e,0}. \end{aligned}$$

In this special case, of small Ricardian economies, with no sheltered sector and no home bias in trade, there is no change in the equilibrium real exchange rate, because all the increase in consumption goes on imports, and the increased negative external balance immediately and exactly counterbalances the increased aggregate demand generated by the increase in consumption expenditure. But it is only in this special case that (at least in extensions to our simple model) that an increase in consumption implies no appreciation of the real exchange rate.

The first of Obstfeld and Rogoff's (2000, 341) six puzzles in international macroeconomics is the "home bias in trade" puzzle: "Why do people seem to have such a strong preference for consumption of their home goods?" (Obstfeld and Rogoff 2000, 339). And in fact the economies we are empirically concerned with are large and have correspondingly large sheltered sectors, in addition to their home bias in trade. (This is also true of changes in government expenditures in these countries.) Our concern here is not to solve the home bias puzzle, but to use it to give strong empirical support to our argument.

4.5 The politics of demand-side policies

The main focus of this paper is on bringing the latest advances in macroeconomics back into political science. It is therefore beyond the scope of the paper to set out a

full model of political behaviour. However, we strongly believe that politics played an important role in the macroeconomic trajectories of advanced democracies during the Great Moderation. This section briefly sets out our view of the politics behind governments' demand-side policies, as well as contrasting our view with the way politics was modelled in the earlier political economy literature (as set out in Section 4.3). The following section then provides some high-level empirical evidence on the demand-side policies of advanced democracies during the Great Moderation that fits nicely with our central argument.

Politicians are assumed to be motivated by different goals in political business cycle models (Lindbeck 1976; MacRae 1977; Nordhaus 1975) and partisan models (Hibbs 1977, 1987) (as discussed in Section 4.3). In the former, winning elections is the sole motivation of politicians and they choose policies to maximise their chances at the ballot box. On the other hand, politicians in partisan models have preferences over policies and want to obtain office so they can implement their desired policies.

In our view, politicians are both office seeking and ideologically motivated but in a different way to politicians in the traditional partisan model. There is no exploitable trade-off between unemployment and inflation in our model. This rules out politicians on the left and right being differentiated by their relative aversion to inflation and unemployment (as they are in partisan models). Governments cannot affect inflation in the medium run in advanced democracies, as independent central banks ensure that inflation is kept at the target rate.

As we saw in the previous section, government demand-side policies in open economies can affect both the real exchange rate and real wages (and potentially also output) beyond the short term. Instead of left and right parties *within* countries having different preferences over real exchange rates and real wages, we see parties *across* countries with different growth models having distinct preferences. This is because different combinations of the real exchange rate and real wages support different growth models; an appreciated real exchange rate and higher real wages support the consumption-led growth model and a depreciated real exchange rate and lower real wages support the export-led growth model.

As explored in detail in the Chapter 3 of the thesis, the incentive for politicians to support particular growth models in liberal market economies (LMEs) and coordinated market economies (CMEs) is reinforced by their political systems. The majoritarian electoral systems of the LMEs systematically privilege the interests of consumers (Chang et al. 2011; Rogowski and Kayser 2002), who prefer appreciated exchange rates because they raise purchasing power (Walter 2014). In contrast, the PR electoral systems of the CMEs systematically privilege the interests of producers (Chang et al. 2011; Rogowski and Kayser 2002), who typically prefer depreciated exchange rates because they are beneficial for the export sector (Frieden 1991, 2015).

National growth models have deep institutional roots and have been in place over the long period since the collapse of Fordism in the late 1970s (see Chapter 3). We therefore see promotion of national growth models, and especially advanced sectors, as a valence issue for voters (as in Iversen and Soskice (2015b)). Advanced sectors are important sources of economic growth, tax revenue and high-value added employment (Iversen and Soskice 2012), so policies to support them “typically garner broad cross-class support” (Iversen and Soskice 2015b, 77). Parties of the both the left and the right have to show competence in managing the economy in order to be re-elected—the large ‘economic voting’ literature finds that voters reward governments at the ballot box for good economic performance and punish them for bad economic performance (Duch and Stevenson 2008; Lewis-Beck and Stegmaier 2000; Nadeau, Lewis-Beck, and Bélanger 2013). We therefore expect parties all along the political spectrum to pursue policies that support advanced sectors and the national growth strategy. This holds in both consumption-led and export-led economies.

Our models stand apart from political business cycle models in that governments are not trying to ‘fool’ voters by inflating the economy in election years. Instead, we posit that governments pursue policies that support the national growth model throughout their terms in office and not just in election years.

There is an area outside of macroeconomic outcomes, however, where governments on different sides of the partisan divide do have different preferences: redistributive outcomes. In advanced democracies with class-based parties governments can influence the distribution of income through many channels such as the progressivity of the tax system; the size, responsiveness and coverage of the welfare state; and the education system (Iversen and Soskice 2006a, 2015a; Iversen and Stephens 2008). We therefore assume that left wing parties, which represent voters lower down the income distribution than right wing parties, prefer relatively higher redistribution than right wing parties. As discussed at length in Section 3.4 of Chapter 3 of the thesis, redistribution only has second order effects on consumption—i.e. the effects are insufficient to alter the overall growth model. In short, the level of government redistribution is likely to contribute to differences in the contribution of consumption to GDP growth in the export-led CMEs, but is unlikely to change the general stance of government demand-side policies, which are typically expansionary in the LMEs and restrictive in the CMEs.

4.6 Demand-side policies during the Great Moderation

In this section, we explore the use of government policies to influence domestic demand in advanced democracies. Focusing on credit expansion (or mitigation) and fiscal policy, we find ample support for our argument that governments in the consumption-led LMEs and the export-led CMEs pursued systematically different *demand-side* policies during the Great Moderation.

Credit expansion or mitigation

The key modelling section of this paper focused on the effect of an expansion in autonomous consumption on the medium-run equilibrium of a small open economy. We show that permanent changes in autonomous consumption can lead to lasting changes in the real exchange rate and real wages, which fits well with the macroeconomic data from the Great Moderation presented in Section 4.2.

One principal way in which governments can boost household consumption is by increasing the supply of credit. For example, raising credit card limits in the United States has a significant positive effect on both debt and consumption (Gross and Souleles 2002). Having access to a line of credit can increase consumption by creating the illusion of household wealth (Barnes and Wren 2012). It can also boost consumption by stimulating the housing market and pushing up house prices. Many studies have found that higher house prices (and consequently household wealth) increase household consumption (Benjamin, Chinloy, and Jud 2004; Case, Quigley, and Shiller 2005; Ludwig and Sløk 2004).

Governments are not directly in control of credit in advanced democracies. Lending to households is typically carried out by commercial banks, which in the era of liberalised global finance are typically large and powerful, and often operate across national borders. However, governments can use the policy levers at their disposal and their control over the national regulatory framework to *encourage* or *mitigate* credit growth (Fuller 2015). For example, a government wanting to expand credit to households could introduce legislation to make it easier for households to obtain credit or provide added incentives for households to take on debt. Fuller (2015, 251) identifies five key dimensions of government policy that can affect the expansion of credit to the households:

- (1) interest rate restrictions on household borrowing;
- (2) capital gains rules on the transfer of households' assets;
- (3) a society's comfort or institutional capacity to accept high debt loads, as indicated by the ratio of typical mortgage loans to the value of the property purchased;
- (4) mortgage subsidies; and
- (5) the size of a secondary market for household debt.

Fuller's (2015, 251) chosen dimensions "place a heavy emphasis on mortgages and the market for residential real estate", because mortgages make up the majority of lending to households in advanced democracies (as also shown in Girouard, Kennedy, and André (2007)). On each of these five dimensions, Fuller (2015) gives each of the 32 countries in his sample a score based on the extent to which the

government mitigates or encourages credit expansion. He then adds up the scores (assuming all dimensions are of equal importance) to create a composite index of each country's "systemic approach to credit" in the 2000s (Fuller 2015, 258). The Index is shown for each of the advanced democracies in our 15-country sample in Table 4.1. We can see that the LMEs typically have higher scores on the index than the CMEs, which indicates that (on average) governments in the LMEs pursued a set of policies and regulations in the 2000s that were more favourable to credit expansion than governments in the CMEs.

Table 4.1. National Index of Approach to Credit during the 2000s

	National Index of Approach to Credit during the 2000s
Liberal market economies	
Australia	-1
Canada	0
New Zealand	0
United Kingdom	1
United States	3
Average	0.6
Coordinated market economies	
Austria	-5
Belgium	-3
Denmark	0
Finland	-1
Germany	-5
Japan	-2
Netherlands	2
Norway	-1
Sweden	-1
Switzerland	-4
Average	-2

Source: Table 6 in Fuller (2015).

Note: The maximum score on the National Index of Approach to Credit is 3 and the minimum score is -7. Higher scores indicate more government credit encouragement and lower scores indicate more government credit mitigation.

The table shows that it was the United States government that most encouraged credit expansion across our sample of advanced democracies. This fits with the popular narrative of the pre-crisis period that faced with rising inequality and

stagnating wages, the United States government used credit to boost employment, consumption and growth, and placate the electorate (Calomiris and Haber 2014; Rajan 2010). A similar argument has been made about the role of credit in the United Kingdom (Barnes and Wren 2012), as well as in the wider sample of LMEs (in Chapter 3 of the thesis).

In the United States, the Clinton (1993-2001) and Bush administrations (2001-09) were very open about their policy of extending credit to the poor. One channel President Clinton used to expand credit was the Community Reinvestment Act (CRA). Boasting about the Act's appropriation and extension during his time in office, President Clinton (1999) said in a speech at a Democratic National Committee Dinner:⁶⁹

The law was passed in 1977. But it was pretty well moribund until we took office. Over 95 per cent of the community investment, \$17 billion, made in the 22 years of that law have been made in the 6 and a half years that I've been in office—investing money into poor areas and in neighborhoods and to businesses that normally couldn't get credit.

In 1995, the Clinton administration revised the CRA so banks faced greater consequences for failing to comply with the Act. They also had leverage over the banks as the wave of mergers that were sweeping the banking industry required regulator, and therefore effectively government, approval (Calomiris and Haber 2014). The government intervention did not stop there. They also directly expanded the credit supply through the government-sponsored enterprises (GSEs) Fannie Mae and Freddie Mac (Rajan 2010). These institutions were implicitly guaranteed by the US government and provided mortgages directly to US households, including subprime mortgages to low-income households. They also committed to re-purchase subprime loans that commercial banks had made to meet their CRA commitments. The aggressive government targets for the GSEs subprime lending, as well as the

⁶⁹ A shortened version of this quote also appeared in Calomiris and Haber (2014, 217–18).

ability of banks to offload their risky mortgages onto the GSEs, led to a deterioration in lending standards and a massive expansion of lending to low-income households, particularly in the 2000s (Calomiris and Haber 2014). President George W. Bush made the extent of US government influence over the GSEs clear during National Homeownership Month in 2002:⁷⁰

I've called -- yesterday, I called upon the private sector to help us and help the homebuyers. We need more capital in the private markets for first-time, low-income buyers. I am proud to report that Fannie Mae has heard the call, and, as I understand, it's about \$440 billion over a period of time. They've used their influence to create that much capital available for the type of homeowner we're talking about here. It's in their charter; it now needs to be implemented. Freddie Mac is interested in helping. I appreciate both of those agencies providing the underpinnings of good capital.

The governments in the other LMEs were not as explicit about their policy of extending credit, although we can see from Table 4.1 they did take measures to encourage credit expansion. For example, in the United Kingdom, *light touch* regulation, especially in financial services, was a key pillar of Chancellor of the Exchequer Gordon Brown's macroeconomic policy framework, as he made clear at the launch of the government's Better Regulation Action Plan in 2005:⁷¹

In a risk based approach there is no inspection without justification, no form filling without justification, and no information requirements without justification. Not just a light touch but a limited touch. Instead of routine regulation attempting to cover all, we adopt a risk based approach which targets only the necessary few.

⁷⁰ This excerpt is taken from President George W. Bush's speech to HUD Employees on National Homeownership Month in Washington D.C. on June 18th 2002. Also quoted in Rajan (2010, 37) and Calomiris and Haber (2014, 252).

⁷¹ This excerpt is taken from Chancellor Gordon Brown's speech to business leaders at Downing Street at the launch of the Better Regulation Action Plan on 24th May 2005.

As set out in Fuller (2015), courting the City of London was a central part of New Labour’s strategy to build up their economic credibility and electoral support in the early 1990s. A crucial step in Tony Blair and Gordon Brown’s charm offensive was convincing the City they would not overturn the deregulations that came out of Margaret Thatcher’s Big Bang. Once in office, they then set up a single entity to regulate financial institutions—the Financial Services Authority—whose guiding principle was light touch regulation that allowed banks to manage much of their own risk. These actions solidified their political support with business leaders and the electorate, while simultaneously supporting the UK’s consumption-led growth model by easing access to mortgage and consumer credit (Barnes and Wren 2012).

The UK and US experiences show that politicians on both the left and the right of the political spectrum pursued policies that encouraged credit growth while in office. This suggests that LME governments pursued demand-side policies that supported the consumption-led growth model irrespective of partisanship.

There is strong evidence that governments in the LMEs encouraged credit expansion during the Great Moderation, but as Barnes (2015) points out the CPE literature has been guilty of portraying the rise in household indebtedness as a uniquely LME phenomenon (for example, Barnes and Wren (2012); Crouch (2009); Iversen and Soskice (2012)). In fact, household indebtedness grew slightly faster in the Nordic CMEs and the Netherlands than it did in the LMEs between 1995 and 2007.⁷² We can see from Table 4.1 that the governments in the Netherlands and the Nordic CMEs were also relatively credit encouraging when compared to the governments in the continental European CMEs (excluding the Netherlands) and Japan, although still less encouraging than the LMEs (on average). However, as we saw in Section 4.2, the Nordic CMEs and the Netherlands had substantially lower contributions of consumption to GDP growth than the LMEs during the Great Moderation and managed to successfully safeguard their external competitiveness.

⁷² Source: OECD National Accounts at a Glance, June 2016. See Table 3.10 in Chapter 3 of the thesis for country-level data on household indebtedness.

The experience of the Nordic CMEs and the Netherlands seems at odds with the model presented in the previous section. In order to square the circle we need to consider the extent to which credit expansion impacts domestic demand in these countries and in the LMEs. Only in countries where credit expansion produces a sizeable increase in domestic demand (that is not offset by other macroeconomic policies) would we expect to see the exchange rate appreciation and current account deterioration predicted by our model. There are five main reasons why credit expansion is likely to have boosted domestic demand more in the LMEs than in the Nordic CMEs and the Netherlands. These reasons are explored in detail in Section 3.5 in Chapter 3 of the thesis, so we just provide a brief summary here.

First, homeownership rates were on average higher in the LMEs than in the Nordic CMEs and the Netherlands in the 1990s and 2000s (Schwartz and Seabrooke 2008). As some of the effect of credit on consumption operates through the house price channel, countries with a lower proportion of homeowners are likely to see smaller effects on consumption. Second, more low-income households were indebted in the LMEs than elsewhere (Girouard, Kennedy, and André 2007), and households at the lower end of the income and wealth distributions typically have much higher marginal propensities to consume than richer households (Carroll, Slacalek, and Tokunaka 2014; Jappelli and Pistaferri 2014; Mian and Sufi 2014). Third, more of the expansion in credit to households was used to directly finance the purchase of goods and services in the LMEs (see Figure 3.10 in Chapter 3 of the thesis). Fourth, the Nordic CMEs and the Netherlands are very open to international trade compared to the LMEs. The average trade openness of the former group was 83% of GDP between 1994 and 2007, while the equivalent figure for the LMEs was just 50% of GDP.⁷³ This means that a higher proportion of any increase in credit-financed household spending is likely to be spent on goods from abroad in the Nordic CMEs and the Netherlands. Lastly, governments in the Nordic CMEs and the Netherlands

⁷³ Source: Authors' calculations using OECD Annual National Accounts (data accessed June 2016). Trade openness = (exports + imports) as a % of GDP (all in current prices). See Table 3.2 in Chapter 3 of the thesis for country-level data on trade openness.

partially offset the expansionary effects of credit expansion through restrictive fiscal policies (which will be explored further in the next subsection).

The first three reasons suggest that any government loosening of credit constraints is likely to have a smaller effect on consumption in the Nordic CMEs and the Netherlands than the LMEs, i.e. $\Delta c^{LME} > \Delta c^{Nordic} > 0$. The fourth reason suggests that more of any credit expansion leaks abroad in the Nordic CMEs and the Netherlands. Household spending on imports does not boost the domestic economy and hence does not shift the *IS* curve outwards in the same way that a boost in consumption does. The fifth reason suggests that the positive effect on credit expansion on consumption in the Nordic CMEs, $\Delta c^{Nordic} > 0$, was at least partially offset by a reduction in government spending, $\Delta g^{Nordic} < 0$. In combination, the five reasons suggest that domestic demand rose less as a result of credit expansion in the Nordic CMEs and the Netherlands than it did in the LMEs, which in our model results in a smaller appreciation of the real exchange rate and a smaller rise in real wages, i.e. $\Delta q^{LME} < \Delta q^{Nordic} \leq 0$; $\Delta w^{LME} > \Delta w^{Nordic} \leq 0$.

Governments in the LMEs encouraged the expansion of credit to boost consumption during the Great Moderation—credit was a key support of the LMEs’ consumption-led growth model (see Section 3.5 of Chapter 3 of the thesis). The long-term viability of a growth model centred on the expansion of credit and borrowing from abroad may be debatable but in the short and medium-term the economic benefits for the LMEs are clear. The incentives for LME governments to pursue policies that encourage credit expansion are further reinforced by majoritarian electoral systems and four-to-five year electoral cycles, which mean that short-term growth is often privileged over longer-term financial and economic stability.

Governments in some CMEs also encouraged credit growth, but for the reasons outlined above it had less effect on domestic demand, and hence did not lead to the real exchange rate appreciation that would risk undermining their export-led growth

models.⁷⁴ Figures 4.4 and 4.5, which show that the Nordic CMEs and the Netherlands had depreciated real exchange rates and current account surpluses throughout the Great Moderation, provide further evidence to support this assertion.

Fiscal policy

The government has another tool in its arsenal to influence domestic demand: fiscal policy. The government can stimulate domestic demand using a deficit-financed expansion of government spending. Likewise, the government can use restrictive fiscal policies to dampen down domestic demand. We saw in Section 4.4 that when government spending is not completely fixed by a fiscal rule it has the same effects on the economy as a change in autonomous consumption.

The use of fiscal policy to support growth models is not as simple as loosening credit conditions because it requires policymakers to have discretion over fiscal policy. The ability of policymakers to use fiscal policy to affect demand can be held back by strict fiscal rules but is also restricted by high public sector debts and deficits. Policymakers want to avoid high debt and deficits because they could lead to punishment from financial markets (i.e. higher borrowing costs). In extreme cases, when the public finances are viewed as unsustainable, the government may be denied credit altogether. Hence policymakers have less scope to use expansionary fiscal policy that worsens the government finances when debt and deficits are already elevated.

Table 4.2 shows the change in the cyclically adjusted government primary balances (as a % of potential GDP) in advanced democracies between 1994 and 2000, and 2000 and 2007. The cyclically adjusted government primary balance corrects for the position of the economy in the business cycle and removes the government's net debt interest payments. Changes in this measure are therefore

⁷⁴ The incentives for the Nordic CMEs and the Netherlands to encourage the expansion of mortgage credit are likely to rest with the benefits to (both CME and LME) governments of rising house prices. See the discussion in Section 3.5 of Chapter 3 of the thesis.

commonly used to measure changes in *discretionary* fiscal policy—Alesina and Ardagna (1998, 2010) and Alesina, Perotti and Tavares (1998) define episodes of fiscal adjustment (consolidation) and fiscal stimulus based on large changes the cyclically adjusted government primary balance. A positive change in Table 4.2 indicates a tightening of discretionary fiscal policy and a negative change indicates a loosening of discretionary fiscal policy.

The public finances were under stress in a large proportion of advanced democracies following the economic downturns of the 1990s, which were particularly severe in Sweden and Finland. This resulted in a number of the LMEs and CMEs pursuing large fiscal consolidation (austerity) packages in the first half of the Great Moderation. In Europe, there was also pressure to run tight fiscal policies during the 1990s to comply with the strict Maastricht convergence criteria for entry into the single currency. We can see from Table 4.2 that discretionary fiscal policy tightened in all countries in our sample except New Zealand and Japan between 1994 and 2000. The fiscal expansion in Japan is unsurprising given relatively poor state of their economy in this period. In fact, the 1990s were such a period of economic malaise for the Japanese economy that they have become known as the “lost decade” (Hayashi and Prescott 2002, 206).

In the 2000s up to the financial crisis, the Eurozone was up and running and the public finances of most advanced democracies had been returned to a stable footing. Hence governments had more discretion to pursue expansionary fiscal policies. The right-hand column of Table 4.2 shows that on average governments in the LME provided more fiscal stimulus than governments in the CMEs between 2000 and 2007, especially in the UK, the US and Canada.

Table 4.2. Change in cyclically adjusted government primary balances, 1994-2000 and 2000-2007

	Change in cyclically adjusted government primary balance (percentage points of GDP)	
	1994-2000	2000-2007
Liberal market economies		
Australia	1.8	-1.0
Canada	5.9	-3.9
New Zealand	-2.8	0.3
United Kingdom	6.2	-6.0
United States	1.9	-4.7
Average	2.6	-3.1
Coordinated market economies		
Austria	0.8	-0.2
Belgium	0.7	-3.3
Denmark	2.7	0.6
Finland	7.8	-4.8
Germany	3.0	-1.8
Japan	-2.3	2.1
Netherlands	1.5	-3.0
Norway	5.3	-0.9
Sweden	8.3	-3.3
Switzerland	1.6	0.5
Average	2.9	-1.4

Source: OECD Economic Outlook No. 99, June 2016.

The relative changes in cyclically adjusted government primary balances in the 2000s fit with the Iversen and Soskice's theory (explored in detail in Chapter 3 of the thesis) that fiscal policy is more restrictive in CMEs in order help facilitate the wage restraint that underpins the export-led growth model (Iversen and Soskice 2012). Tight macroeconomic policies (both fiscal and monetary) are most needed to discipline wage setters when wages are bargained at an intermediate level (Iversen and Soskice 2012; Soskice 2007; Soskice and Iversen 2000). This theory is supported by the fact that the Nordic countries shifted to non-accommodating macroeconomic regimes when centralised collective bargaining collapsed in the early 1990s (Dølvik, Andersen, and Vartiainen 2015; Iversen 1996; Iversen and Soskice 2012).⁷⁵ For

⁷⁵ The policy shift occurred slightly earlier in Denmark than elsewhere. Restrictive macroeconomic policies were introduced by the bourgeois coalition that came to power in

example, the social democratic government that came to power in Sweden in 1994 introduced a comprehensive (and at the time radical) set of fiscal rules that (at the time) formed part of the biggest fiscal consolidation seen in any OECD country since (at least) the early 1970s (Erixon 2011).

The Swedish experience also accords with the macroeconomic models presented in the previous section. In those models, a reduction in government spending, *ceteris paribus*, leads to a depreciation of the real exchange rate and a reduction in real wages. The idea that fiscal policy should not be used for stabilization and that restrictive fiscal policies supported the export sector was accepted on both sides of the partisan divide in Sweden by the early 1980s, as highlighted by Lindvall (2006, 262):

All economic policy bills presented by the center-right governments between 1980 and 1982 contained sections on the need for decreased public spending. When the social democrats took over, they did not consider expansionary policies either. The government instead opted for a "third way": a final, big devaluation, followed by austere fiscal policies that were expected to transfer resources from sheltered economic sectors, including the public sector, to the export-oriented sector.

This shift in ideas changed the tone of Swedish debates on fiscal policy but the restrictive fiscal policy regime was not properly institutionalised until after the severe economic crisis of the early 1990s and the shift to intermediate level bargaining that followed (Erixon 2011; Iversen 1996; Lindvall 2006).

The reaction of Germany to the Eurozone sovereign debt crisis of 2010-11 (hereby referred to as the euro crisis) provides another example of the belief among CME policymakers that tight fiscal policy is an essential pillar of a successful export-led growth model. Federal Chancellor Angela Merkel openly refers to Germany as “an

1982. However, wage bargaining had already moved to the intermediate level in Denmark by the early 1980s (Iversen 1996).

export nation”.⁷⁶ The German reaction to the euro crisis has been to push for greater fiscal discipline through the introduction of more stringent fiscal rules for the whole of the EU such as the Fiscal Compact.⁷⁷ German Federal Minister of Finance Wolfgang Schäuble nicely sums up the strong link in the minds of German policymakers between fiscal discipline and international competitiveness:⁷⁸

European Monetary Union won't succeed if a number of countries persistently run deficits and weaken their competitiveness at the expense of the Euro's stability ... [Deficit countries need to] develop a rules based approach to improve competitiveness and strengthen fiscal policy within the Eurozone.

The Economist reported that this viewpoint on the crisis and the proposed solution is shared by both major parties in the Bundestag:⁷⁹

All mainstream German politicians share Mrs Merkel's broad strategy because they interpret recent German history in much the same way that she does. As they see it, the key to economic success is export prowess, achieved by keeping budgets tight and wages competitive. In short, the rest of Europe needs to become more like Germany.

The reason for the consensus is that the major political parties, the social partners and the electorate in Germany all stand firmly behind the country's export-led growth model (Armingeon and Baccaro 2015).

⁷⁶ This excerpt is taken from Federal Chancellor Angela Merkel's speech at the Museum of Islamic Art in Doha on May 27th 2010.

⁷⁷ For more information on the Fiscal Compact and other post-euro crisis fiscal governance measures in the EU see:

http://ec.europa.eu/economy_finance/articles/governance/2012-03-14_six_pack_en.htm

⁷⁸ This excerpt is taken from German Federal Minister of Finance Wolfgang Schäuble's speech *A Comprehensive Strategy for the Stabilization of the Economic and Monetary Union*, delivered at the Brussels Economic Forum 2011 on 18th May 2011.

⁷⁹ This excerpt is taken from *The Merkel Plan*, which appeared in *The Economist* magazine on June 15th 2013.

The evidence presented in this subsection shows the important supporting role that fiscal policy played in growth models during the Great Moderation, particularly in the export-led CMEs. As shown in the open economy macroeconomic models in Section 4.4, *ceteris paribus*, a reduction in government spending, $\Delta g < 0$, leads to a depreciation of the exchange rate and a reduction in real wages, $\Delta q > 0$; $\Delta w < 0$. Both of these outcomes are beneficial for the exposed sectors of the economy and governments in CMEs can consistently pursue these policies should they wish to. An expansion of government spending has the opposite effects and therefore can be used to promote a domestic demand-led growth model as we saw in the LMEs in the 2000s. However, the use of fiscal policy for expansionary purposes is restricted by implicit and/or explicit fiscal sustainability rules. The 1990s show that fiscal policy is also clearly not a pre-requisite for running a consumption-led growth model, as the governments has other policy levers, such as loosening credit constraints, which it can freely use to expand the domestic economy.

4.7 Conclusion

The Great Moderation was such a period of macroeconomic tranquillity that the economy and macroeconomic policy fell well down the political agenda. Then the global financial crisis hit, which led to the worst downturn in the world economy since the Great Depression of the 1930s and a sovereign debt crisis that nearly tore the Eurozone apart. These events have thrust macroeconomics, and macroeconomic policy in particular, back into the spotlight; debates about fiscal stimulus and consolidation, the role of independent central banks, and financial regulation now sit firmly at the top of the political agenda. Given the immense importance of macroeconomic developments in the last decade, it is both surprising and disappointing that political science research using modern macroeconomic modelling has been almost non-existent. This paper aims to fill that gap by providing a set of simple, tractable macroeconomic models, which political scientists can use to shed light on a whole host of policy issues facing advanced democracies today.

The macroeconomic models presented in the paper are *open* economy and incorporate the main elements of frontier New Keynesian macroeconomics while moving away from the unrealistic assumptions that have led modern macroeconomics to become so technically complex and impenetrable to outsiders. Our model provides important insights into the dangerous macroeconomic imbalances that built up between advanced democracies during the Great Moderation, as well as contesting the dominant macroeconomic models used in political science (Persson and Tabellini 2000), which still suggest that government demand-side policies cannot have lasting effects on the economy.

The central implications of our macroeconomic model (developed from Carlin and Soskice (2015)) are that: (1) permanent changes in domestic demand can have lasting effects on real wages and real exchange rates (and potentially also output); (2) governments have the discretion to pursue policies that affect domestic demand, even when monetary policy has been delegated to an independent central bank; and (3) governments pursuing different demand-side policies can lead to persistent current account imbalances in the medium run.

The model helps explain the macroeconomic trends of the Great Moderation, where export-led CMEs saw real exchange rate depreciation and the build up of current account surpluses and consumption-led CMEs saw exchange rate appreciation and the build up of current account deficits. It shows how government demand-side policies, such as credit encouragement in the LMEs and restrictive fiscal policies in the CMEs, can lead to persistent current account divergences within a system of independent inflation targeting central banking and open financial markets. We argue that governments on both sides of the partisan divide pursued demand-side policies that supported national growth models because it paid dividends at the ballot box.

Another important implication of our model is that it provides a plausible alternative explanation to Barro and Gordon's (1983) influential argument for central bank independence based on the time-inconsistency problem. Their argument implies governments have an incentive to tie their own hands because they cannot

affect the economy in the medium run and want to minimise inflation bias. We show that governments in open economies can have lasting effects on the economy, and argue, *paradoxically*, that central bank independence is a critical *enabler* for expansionary policies. This is because it enhances government credibility in financial markets and anchors inflation expectations. The discretion central bank independence offers governments over policies to stimulate demand provides a very clear incentive for governments that desire output above equilibrium to give up the reins of monetary policy.

This paper hopes to provoke discussion, and ultimately, aims to revive the research agenda at the intersection of political science and macroeconomics. It is only a starting point but provides many exciting avenues for future research. Directly building on the paper, our macroeconomic model clearly requires proper econometric testing using OECD macroeconomic data from the Great Moderation. Two plausible modelling approaches would be a dynamic simultaneous equations model (SEM) or a structural vector autoregressive (SVAR) model. The political side of our argument is also underdeveloped and would benefit from some formalisation.

The other clear avenue for future research is to take our model of the macroeconomy and use it to shed light on other time periods and contexts. The post-crisis period, where restrictive fiscal policies have been pervasive, seems like an obvious and interesting place to start.

Conclusion

The papers in this thesis shed new light on the globally significant current account imbalances that built up between OECD countries prior to the global financial crisis of 2008-09. They fill a prominent gap in the literature by focusing on the political (and political economic) drivers of the imbalances. More specifically, they investigate the role of *institutions*, *political systems* and *electoral politics*, and *government demand-side policies* in the imbalances.

The empirical analysis in first paper (Chapter 2) finds causal evidence that the introduction of the European Monetary Union (EMU)—an unprecedented change in the *institutional* frameworks of the countries that joined—drove the current account imbalances between the north and south of the currency union during its first decade. The second paper (Chapter 3) maps out the complex set of interrelationships between political-economic *institutions* (varieties of capitalism), growth models, and *political systems* in advanced democracies. The new approach to comparative political economy (CPE) that I develop in the paper provides a theoretical framework that can help explain the current account divergence between the export-led coordinated market economies (CMEs) and the consumption-led liberal market economies (LMEs) during the Great Moderation. The third paper (Chapter 4) brings modern macroeconomics back into political science. The paper sets out a suite of simple open economy macroeconomic models and uses them to show how governments pursuing different *demand-side policies* can result in

persistent current account imbalances between countries, even within a system of independent inflation-targeting central banking.

In this final chapter of the thesis, I start by summarising the substantive contributions of my three papers, as well as highlighting their policy implications. I then go on to look at the current account balances of OECD countries in the post-global financial crisis phase in order to show that my research can also provide valuable insights outside of the Great Moderation period. I bring the thesis to a close by discussing the limitations of my analyses and suggesting possible avenues for future research.

Substantive contributions and policy implications

Chapter 2 of the thesis makes a major contribution to the empirical literature on the Eurozone's current account imbalances. The existing literature has yet to come to a consensus about whether the introduction of the EMU was responsible for the current account divergence between the north and the south (Arghyrou and Chortareas 2008; Belke and Dreger 2013; Schmitz and von Hagen 2011), or whether factors external to the currency union also played an important role (Chen, Milesi-Ferretti, and Tressel 2013; Guerrieri and Esposito 2013).

The synthetic control method used in Chapter 2 is an improvement on much of the existing empirical literature for two reasons. First, it does not rely on the model-dependent extrapolation that is common in regression-based analyses (Abadie, Diamond, and Hainmueller 2015, 3; King and Zeng 2006); and second, it is a *counterfactuals-based* approach, so allows me to directly estimate the *causal* effect of the EMU on the current account balances of individual member states.

The results of the synthetic control analysis show that the average effect of the EMU on the current account balances of France, Greece, Italy, and Spain from when they joined until 2010 was -4 percentage points of GDP. This suggests that joining the EMU drove the accumulation of current account deficits in southern Europe. The equivalent figure for Austria was 3.6 percentage points, which shows that the EMU helped improve the Austrian current account balance. The Austrian result also

suggests that the EMU drove the current account surpluses of the other northern European countries in the single currency (Belgium, Finland, Germany and the Netherlands), due to the similar ways in which their political economies are organised. Chapter 3 of the thesis, which argues and empirically demonstrates that the northern European countries in the Eurozone are all CMEs with export-led growth models, adds further weight to this assertion.

The substantive contribution of Chapter 3 of the thesis is the development of a new approach to CPE. Baccaro and Pontusson (2016) recently set out their growth models approach to CPE, which pitches itself as a demand-side alternative to Hall and Soskice's (2001) highly influential, supply-side dominated, varieties of capitalism approach. The alternative approach set out in Chapter 3 is built around the idea that you need to incorporate both the demand side (demand drivers of growth and government demand-side policies) and the supply side (political-economic institutions) of the economy, as well as political systems, in order to understand the macroeconomic trajectories of advanced democracies during the Great Moderation.

The simple modern open economy macroeconomic model that sits at the heart of Chapter 4 shows how governments can use demand-side policies to affect real exchange rates and real wages (and potentially output) in the medium run. The model also shows how persistent current account imbalances and successful inflation-targeting central banking are perfectly consistent with one another in advanced democracies. The chapter brings modern macroeconomics back into political science at a time when macroeconomic policy is back at the top of the political agenda. The simple, tractable models set out in the chapter provide political scientists with a toolkit for exploring a whole range of salient political economic questions.

The overarching policy implication of my thesis is that politics, institutions, and policies need to be taken into account if policymakers hope to avoid the build up of current account imbalances in future. In the remainder of this subsection, I will briefly discuss the key policy implications of each of my papers.

Chapter 2 provides reason to be sceptical that the Macroeconomic Imbalances Procedure (MIP) put in place following the euro crisis will be enough to stop

imbalances re-emerging between the north and south of the Eurozone. The MIP aims to identify, prevent and address potentially harmful macroeconomic imbalances, including those in current accounts.⁸⁰ The results of the synthetic control analysis in Chapter 2 suggest that fundamental changes to the EMU institutional framework—which are not currently on the table—may be required to avoid imbalances arising in the future, and not just better monitoring of imbalances and the threat of sanctions (an approach that has already proved itself to be wholly ineffective with the Stability and Growth Pact).

Chapter 3 argues that political systems and political-economic institutions reinforce one another to provide strong electoral incentives for governments to pursue policies that support the national growth strategy. We have seen that this leads to current account divergence between the export-led CMEs and the consumption-led LMEs. The framework laid out in the chapter suggests that elected policymakers will not unilaterally take action to correct current account imbalances. International cooperation in demand-side policies would likely be required to reduce imbalances, although the chances of that happening are slim because these policies currently remain firmly in the hands of national governments (aside from in the Eurozone periphery).

Chapter 4 argues that independent central banking and open financial markets have not tied the hands of governments as earlier theories (e.g. Barro and Gordon 1983) predicted they would. In fact, *paradoxically*, these institutional changes have been critical *enablers* of expansionary demand-side policies such as boosting consumption by loosening credit constraints. Further restrictions on government behaviour (over and above a consistent fiscal plan) may be needed if the advanced democracies are to avoid persistent external imbalances in the future. Although, the political will to voluntarily restrict the use of demand-side policies is likely to be low

⁸⁰ For more information on the Macroeconomic Imbalances Procedure see: http://ec.europa.eu/economy_finance/economic_governance/macroeconomic_imbalance_procedure/index_en.htm

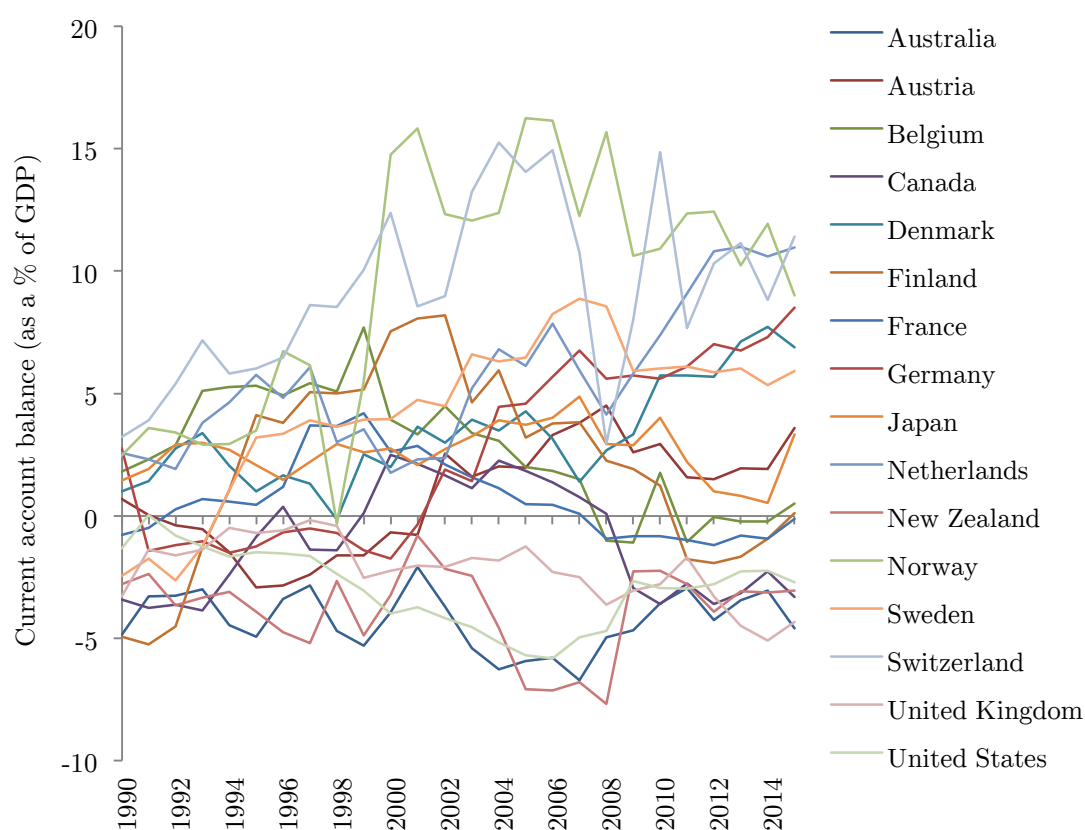
considering that pursuing policies that support the national growth model is so crucial for electoral success.

Current account balances in the post-crisis phase

Figure 5.1 shows the path of current account balances in the advanced democracies from 1990 to 2015. We can see that current account balances went through a brief period of rebalancing during the crisis. This is unsurprising. In a severe economic downturn, current account balances tend to move toward balance in both surplus and deficit countries. In the deficit countries, import demand falls and foreign borrowing often becomes more difficult, and in the surplus countries, export demand falls as a result of the contraction in world demand. This is not to say that the global financial crisis permanently corrected the external imbalances among advanced democracies, far from it. Figure 5.1 shows that after the initial phase of rebalancing, current account balances have re-emerged.

Looking first at the LMEs in the figure, we notice that they are all still running substantial current account deficits in the post-crisis period. This suggests that the global financial crisis has not permanently damaged the LMEs' credibility in financial markets; they retain the ability to borrow internationally. In addition, it speaks to the strong political incentives that governments in the LMEs have to pursue consumption-led growth models (as set out in Chapter 3). The post-crisis phase in the UK also reflects a point made forcefully in Chapter 4 that deficit-financed fiscal expansion is not a pre-requisite for pursuing a consumption-led growth model. Fiscal policy has been restrictive during the post-crisis period of austerity in the UK, but their current account deficit was bigger in 2015 than it was on the eve of the financial crisis in 2007.

Figure 5.1. Current account balances, 1990-2015



Source: IMF World Economic Outlook Database, April 2016.

Note: The southern European economies and Ireland are not included in the figure to make it clearer.

Turning our attention to the CMEs, we can see that they are still characterised by large current account surpluses. What is particularly striking is that current account surpluses have been on a steep upward trajectory in the post-crisis phase in some of the northern European CMEs—e.g. Denmark, the Netherlands and Germany. The large surplus in Germany, by far the most economically important Eurozone member, has led to criticism from some prominent economists. Krugman (2013a, 2013b) argues strongly that Germany has intellectually misunderstood macroeconomics because it will not aid adjustment in the south by taking steps to expand domestic demand (Iversen, Soskice, and Hope 2016). However, the new approach to CPE set out in Chapter 3 of the thesis points to an alternative view of the post-crisis surplus in Germany. As Germany is a CME with a consensus political system, Angela Merkel's government has a strong electoral incentive to pursue

restrictive demand-side policies (e.g. austerity) that support the country's export-led growth model. It is certainly not the case that Germany's policies are in line with what is best for the Eurozone as a whole, but Germany is at least rationally pursuing its own self interest as an export-led CME (Iversen, Soskice, and Hope 2016). The deeply ingrained preferences for restrictive demand-side policies in the northern European economies provides further reason to be pessimistic that governments in these economies will actively take steps to reduce their current account surpluses.

The southern European economies and Ireland (who are excluded from Figure 5.1 for clarity) are the one set of countries to have been through major rebalancing in the post-crisis phase. The current account balances of France, Greece, Ireland, Italy, Portugal, and Spain were all in or very close to surplus in 2015, which is a staggering turn around considering the size of their current account deficits just prior to the global financial crisis (see Figure 1.1 in the introduction to the thesis).⁸¹ The rebalancing is partly because they have not been free to choose their own demand-side policies, and consequently growth models, since the euro crisis. This has happened for two reasons. First, fiscal policy has been largely dictated (often explicitly through Troika adjustment programmes) by actors outside their domestic political systems, most prominently the northern European creditor economies. Second, the euro crisis has badly damaged the southern European economies credibility in financial markets, which pushes up borrowing costs and reduces their ability to borrow from abroad to pursue expansionary demand-side policies.

The path of current account balances in the southern European economies since the crisis provides support for the argument set out in Chapters 3 and 4 that financial market credibility is a critical *enabler* of consumption-led growth models because it facilitates international borrowing. The path fits less well with the large negative effect of the EMU on current account balances of the southern European economies found in the synthetic control analysis in Chapter 2. It is not yet clear

⁸¹ Source: IMF World Economic Outlook, April 2016.

whether the post-crisis rebalancing in the south will be permanent. As they emerge from their prolonged economic slumps and government balance sheets are put back on a sustainable footing, they will reclaim some control over fiscal policy. Whether the EMU has a similar effect on current account balances in southern Europe as it did in the pre-crisis period in the future, however, is likely to largely depend on whether these economies can regain the financial market credibility they possessed during the first decade of the single currency.

Limitations and future research

It is important to acknowledge the limitations of my thesis, as this helps to identify important areas for future research. The synthetic control analysis in Chapter 2 provides valuable causal evidence that the EMU drove the current account balances in the single currency's first decade but is unable to explicitly test the causal mechanisms. It is essential for effective policymaking in the post-crisis world that future empirical research uncovers the mechanisms at work. The variation in the current account balances gaps in the southern European economies in my analysis provides a starting point by suggesting that multiple mechanisms were involved. The methodology is also unable to produce good synthetic control units for all member states, which leaves a gap for a rigorous piece of quantitative analysis that tests my claim that the Austrian result in my analysis can be extended to the other northern European member states.

The new approach to CPE presented in Chapter 3 of the thesis provides a platform for a range of important future work. A clear starting point would be to look at whether the same set of interrelationships I have identified for the Great Moderation are driving the re-emergence of imbalances in the post-crisis period (see Figure 5.1). Chapter 3 would suggest that they are likely to be, due to strong complementarities identified between varieties of capitalism, growth models, and political systems. Another interesting research question that comes out of the analysis in Chapter 3 is why Japan, classified as a CME in Hall and Soskice's (2001) framework, has not pursued an export-led growth model during the post-Fordist

era? This question may be best answered with an in-depth case study of the Japanese political economy. Lastly, the discussion of institutional change in the chapter clearly needs elaboration. One particularly pertinent question is whether the coordination and strategic interaction that underpin the CMEs export success in manufactured goods is also driving their emerging export capacity in knowledge-intensive services? This will get to the heart of one of the major questions on the CPE research agenda: will the coordinated model of capitalism survive in the long term?

The macroeconomic models set out in Chapter 4 of the thesis help to dispel some long-standing beliefs about the role of the government in the macroeconomy in the political economy literature. The paper is meant as a starting point and is aimed at reinvigorating the research agenda at the intersection of macroeconomics and political science. The chapter shows that the models fit well with the high-level macroeconomic data for the Great Moderation but does not test the model empirically. The logical next step would therefore be to use quarterly macroeconomic data from the OECD countries to do some rigorous econometric testing—such as a SVAR model or a dynamic SEM—to show that the relations in the model hold up on an equation-by-equation basis. More formal testing of the divergence in demand-side policies between the LMEs and the CMEs during the Great Moderation would also help increase confidence in the central argument of the chapter. A major aim of the chapter was to provide political scientists with a simple, tractable model of the macroeconomy that they could use to investigate a range of political economic questions. We expect that taking the model and using it to provide a fresh perspective on time periods and contexts outside of the one investigated in the chapter will be a fruitful and important avenue for future research.

Overall the papers in this thesis provide important new insights on the political (and political economic) drivers of the pre-crisis current account imbalances. They also supply a new approach the CPE and a simple macroeconomic model that can form the basis of a wealth of valuable political science research in the future.

Appendix A

A1. Additional tables and figures

Table A.1. Variable definitions and data sources

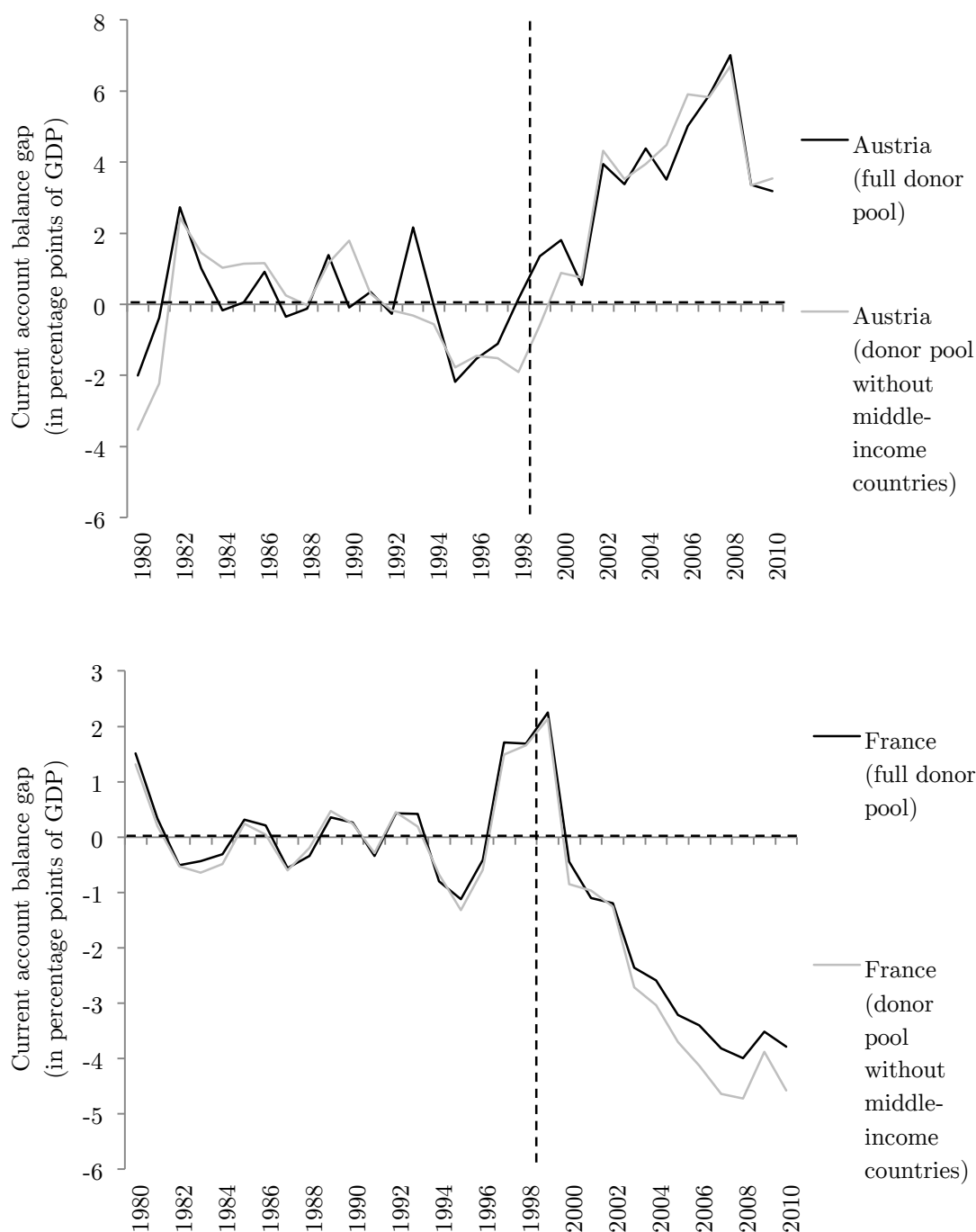
Variable	Data source
GDP per capita (PPP, current international dollars)	IMF World Economic Outlook Database, October 2015
Trade openness (%) = merchandise exports and imports as a share of GDP at current PPPs	Penn World Tables 8.1 Feenstra, Robert C., Robert Inklaar, and Marcel P. Timmer. 2015. "The Next Generation of the Penn World Table." <i>American Economic Review</i> , 105(10): 3150-82, available for download at www.ggdc.net/pwt
Domestic absorption growth (constant prices, 2005 \$US, annual percentage change)	Penn World Tables 8.1 Feenstra, Robert C., Robert Inklaar, and Marcel P. Timmer. 2015. "The Next Generation of the Penn World Table." <i>American Economic Review</i> , 105(10): 3150-82, available for download at www.ggdc.net/pwt
Price level of exports (relative to US prices, price level of US GDP in 2005 = 1)	Penn World Tables 8.1 Feenstra, Robert C., Robert Inklaar, and Marcel P. Timmer. 2015. "The Next Generation of the Penn World Table." <i>American Economic Review</i> , 105(10): 3150-82, available for download at www.ggdc.net/pwt
GDP growth (constant prices, annual percentage change)	IMF World Economic Outlook Database, October 2015
Total investment (as a % of GDP)	IMF World Economic Outlook Database, October 2015
Public debt (as a % of GDP)	IMF Historical Public Debt Database, September 2012 Abbas, S.M. Ali, Nazim Belhocine, Asmaa El-Ganainy and Mark Horton (2010) "A Historical Public Debt Database", IMF Working Paper WP/10/245, Washington, DC, available for download at https://www.imf.org/external/pubs/cat/longres.aspx?sk=24332.0
Government primary balance (as a % of GDP)	IMF Historical Public Finance Dataset, 2013 Paolo Mauro, Rafael Romeu, Ariel Binder and Asad Zaman, 2013, "A Modern History of Fiscal Prudence and Profligacy," IMF Working Paper No. 13/5, International Monetary Fund, Washington, DC, available for download at http://www.imf.org/external/np/fad/histdb/
Domestic credit to private sector (as a % of GDP)	World Bank World Development Indicators, March 2015
Current account balance (as a % of GDP)	IMF World Economic Outlook Database, October 2015

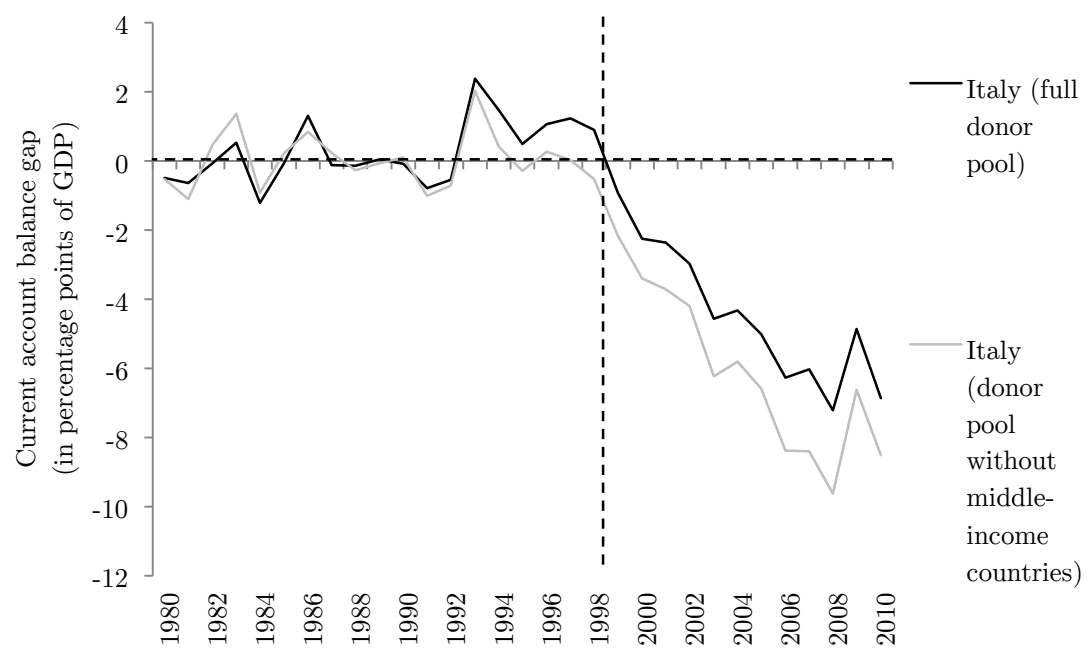
Table A.2. Weights for current account balance predictors in synthetic control units

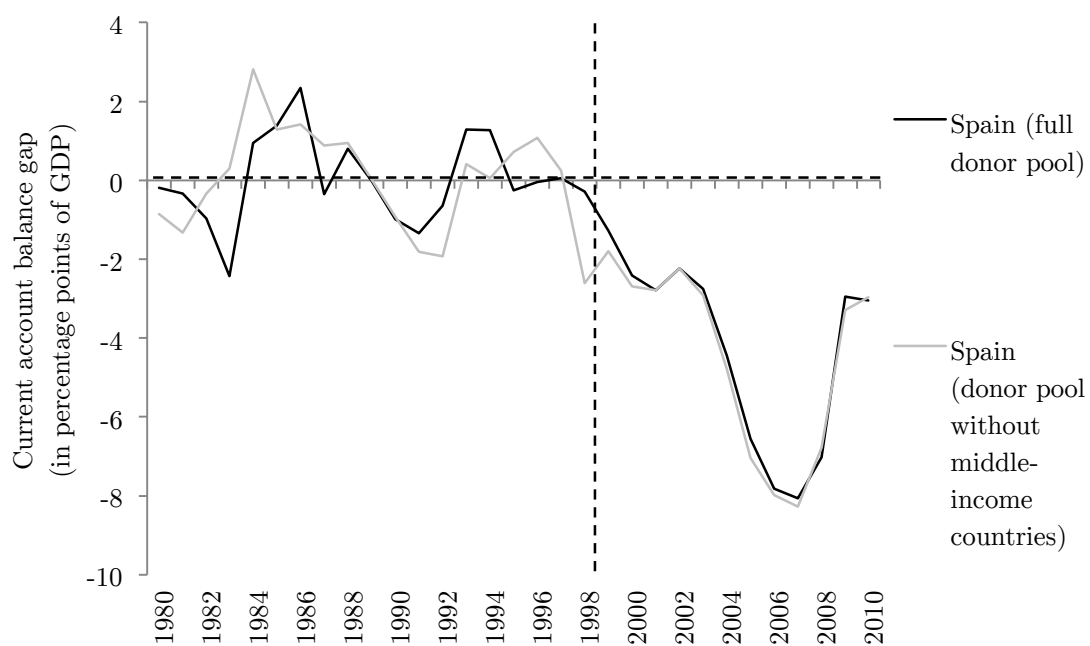
	Synthetic control unit				
	Austria	France	Greece	Italy	Spain
GDP per capita (PPP, current international dollars)	-	7.1%	17.8%	0.1%	0.4%
Trade openness (%) = merchandise exports and imports as a share of GDP at current PPPs	-	0.7%	25.7%	1.0%	11.5%
Domestic absorption growth (constant prices, 2005 \$US, annual percentage change)	0.1%	1.8%	0.7%	11.3%	10.3%
Price level of exports (relative to US prices, price level of US GDP in 2005 = 1)	0.4%	47.5%	8.1%	-	5.7%
GDP growth (constant prices, annual percentage change)	11.1%	1.8%	0.7%	28.3%	19.9%
Total investment (as a % of GDP)	50.5%	0.2%	1.6%	27.4%	17.9%
Public debt (as a % of GDP)	3.9%	1.4%	-	2.8%	12.2%
Government primary balance (as a % of GDP)	4.5%	1.2%	41.9%	-	-
Domestic credit to private sector (as a % of GDP)	2.3%	1.8%	-	0.3%	5.4%
Current account balance (as a % of GDP)	27.2%	36.5%	3.6%	28.9%	16.6%

Source: Author's calculations.

Figure A.1. Current account balance gaps (in percentage points of GDP) between Austria, France, Greece, Italy and Spain, and their synthetic control units, with full donor pool and donor pool excluding middle-income countries: 1980 to 2010



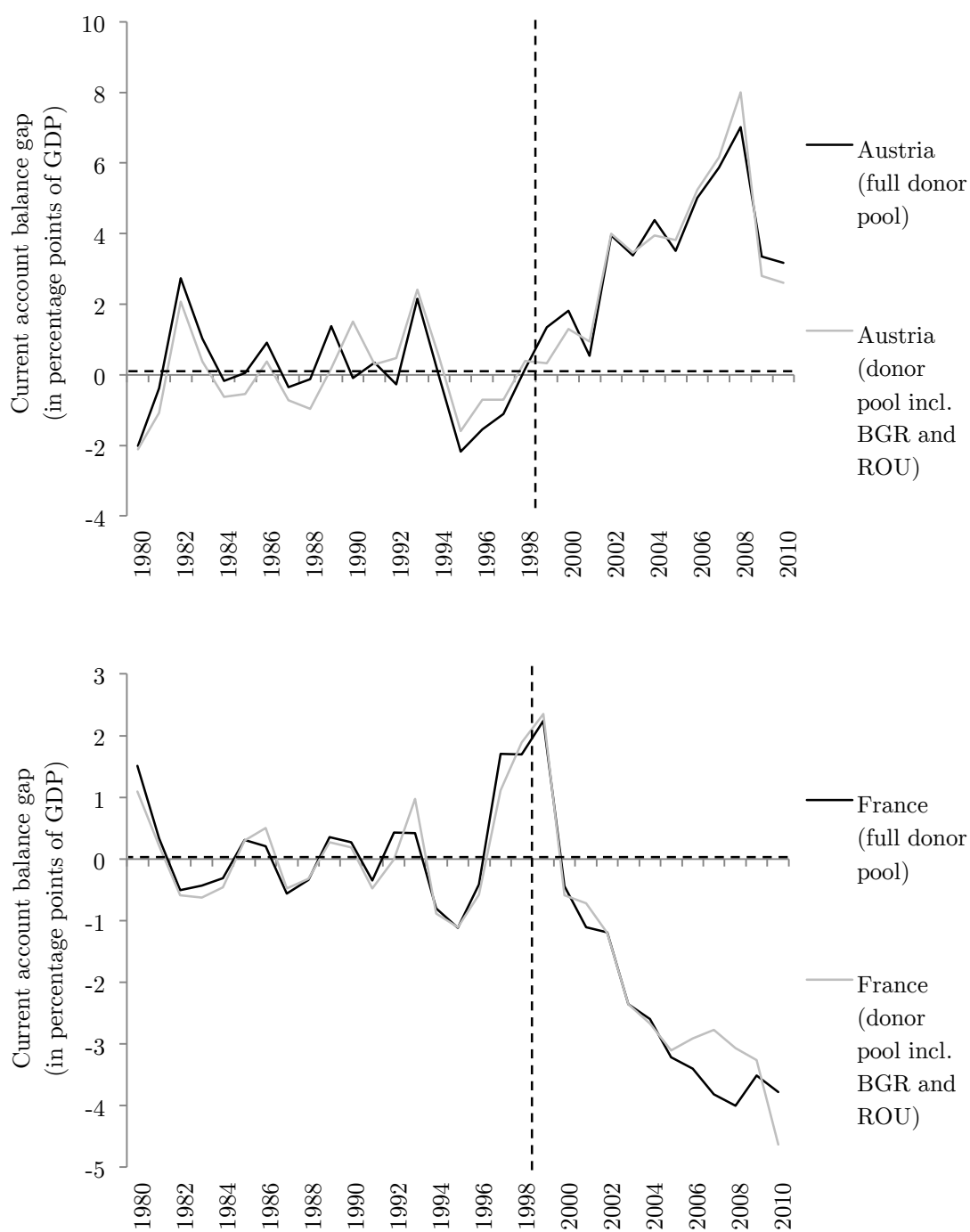


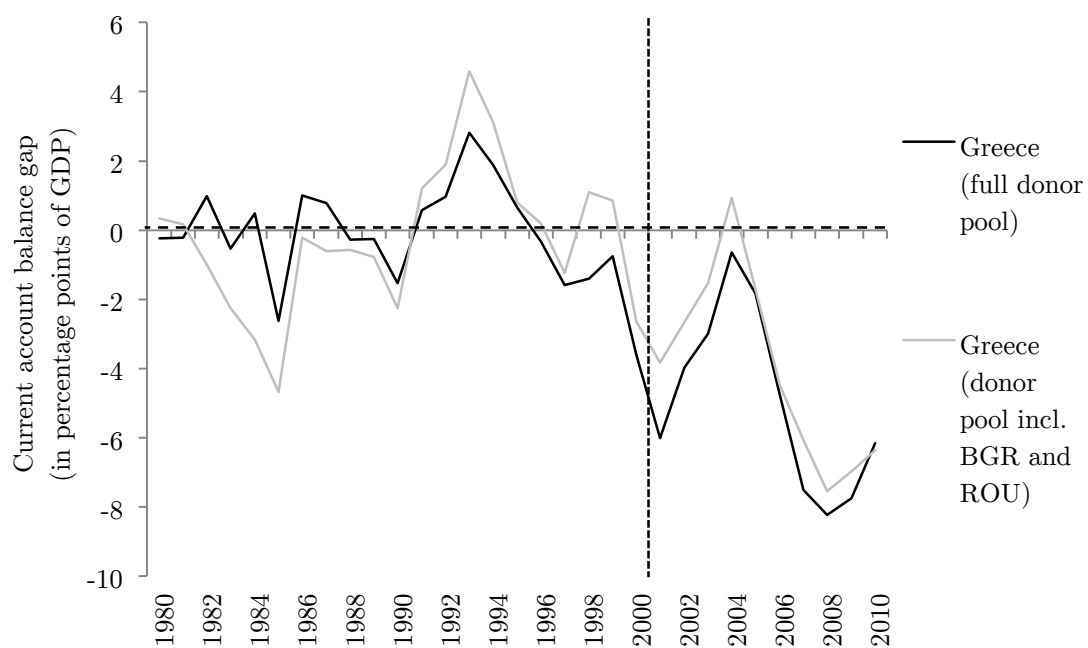


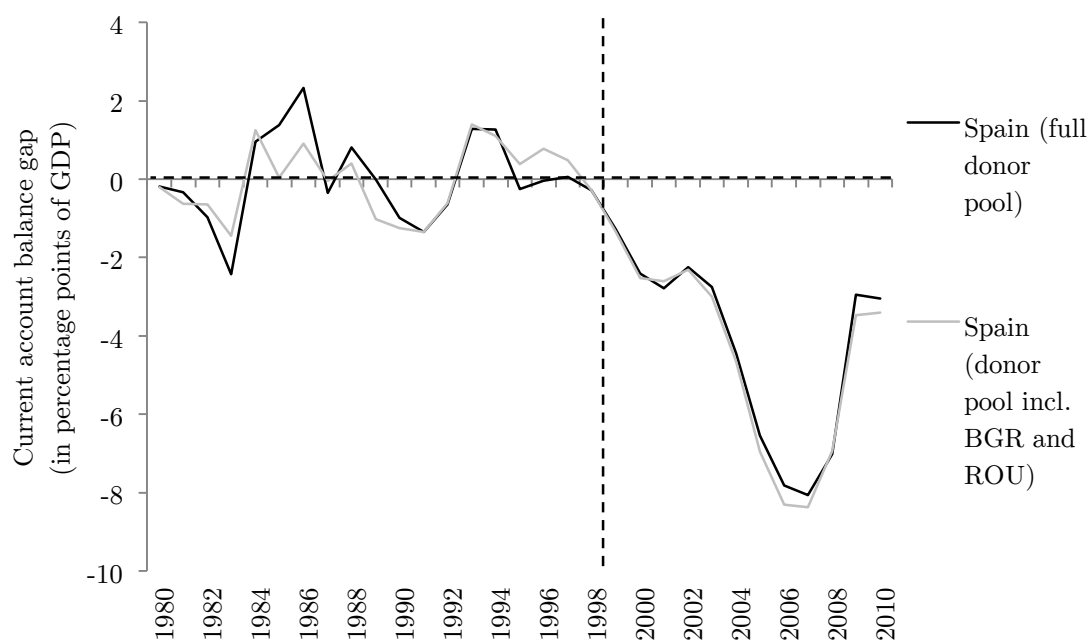
Source: Author's calculations.

Note: The middle-income countries in the sample are Chile, Hungary, Mexico, Poland and Turkey. The vertical dotted lines show when countries joined the EMU. All countries joined in 1999 except Greece, which joined in 2001.

Figure A.2. Current account balance gaps (in percentage points of GDP) between Austria, France, Greece, Italy and Spain, and their synthetic control units, with full donor pool and donor pool including Bulgaria and Romania: 1980 to 2010.







Source: Author's calculations.

Note: Bulgaria and Romania have poor data availability for some current account predictors, therefore public debt is only included in the analysis from 1992, the government primary balance is only included from 1995 and domestic credit to the private sector is only included from 1996. The vertical dotted lines show when countries joined the EMU. All countries joined in 1999 except Greece, which joined in 2001.

Appendix B

B1. Additional tables and figures

Table B.1. LMEs vs. CMEs: Average annual contributions of consumption and exports to GDP growth, and the average annual GDP growth rate, 1961-1979

	Average annual contribution of consumption to GDP growth (%) 1961-1979	Average annual contribution of exports to GDP growth (%) 1961-1979	Average annual GDP growth (%) 1961-1979
Liberal market economies			
Australia	2.3	0.8	4.1
Canada	2.5	1.3	4.7
New Zealand	1.7	0.9	3.0
United Kingdom	1.6	1.1	2.9
United States	2.6	0.3	3.9
Average	2.1	0.9	3.7
Coordinated market economies			
Austria	2.4	2.2	4.3
Belgium	2.5	3.4	4.1
Denmark	2.1	1.4	3.7
Finland	2.3	1.4	4.4
Germany	-	-	-
Japan	4.4	0.7	7.5
Netherlands	2.7	2.9	4.2
Norway	2.1	1.9	4.5
Sweden	1.6	1.4	3.4
Switzerland	2.0	1.4	2.9
Average	2.5	1.8	4.3

Source: European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update).

Note: German data is missing from the table because no AMECO GDP data is available for Germany during the pre-reunification period.

Table B.2. LMEs vs. CMEs: Average annual contributions of consumption and exports to GDP growth, and the average annual GDP growth rate, 1980-2007

	Average annual contribution of consumption to GDP growth (%) 1980-2007	Average annual contribution of exports to GDP growth (%) 1980-2007	Average annual GDP growth (%) 1980-2007
Liberal market economies			
Australia	2.0	0.9	3.4
Canada	1.6	1.6	2.7
New Zealand	1.6	1.3	2.7
United Kingdom	2.0	1.1	2.5
United States	2.2	0.5	3.0
Average	1.9	1.1	2.9
Coordinated market economies			
Austria	1.2	2.1	2.4
Belgium	1.0	2.9	2.2
Denmark	0.9	1.9	2.1
Finland	1.4	2.1	3.0
Germany	-	-	-
Japan	1.2	0.7	2.5
Netherlands	0.9	3.2	2.5
Norway	1.4	1.6	3.0
Sweden	0.8	2.1	2.4
Switzerland	0.9	1.7	1.9
Average	1.1	2.0	2.4

Source: European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update).

Note: German data is missing from the table because no AMECO GDP data is available for Germany during the pre-reunification period.

Table B.3. LMEs vs. CMEs: Current account balances, 1994-2015

	Current account balance (as a % of GDP)		
	1994	2007	2015
Liberal market economies			
Australia	-4.5	-6.7	-4.6
Canada	-2.4	0.8	-3.3
New Zealand	-3.1	-6.8	-3.0
United Kingdom	-0.5	-2.5	-4.3
United States	-1.7	-5.0	-2.7
Average	-2.4	-4.0	-3.6
Coordinated market economies			
Austria	-1.5	3.8	3.6
Belgium	5.3	1.5	0.5
Denmark	2.0	1.4	6.9
Finland	1.1	3.8	0.1
Germany	-1.5	6.8	8.5
Japan	2.7	4.9	3.3
Netherlands	4.6	6.0	11.0
Norway	2.9	12.2	9.0
Sweden	1.0	8.9	5.9
Switzerland	5.8	10.8	11.4
Average	2.2	6.0	6.0

Source: IMF World Economic Outlook Database, April 2016.

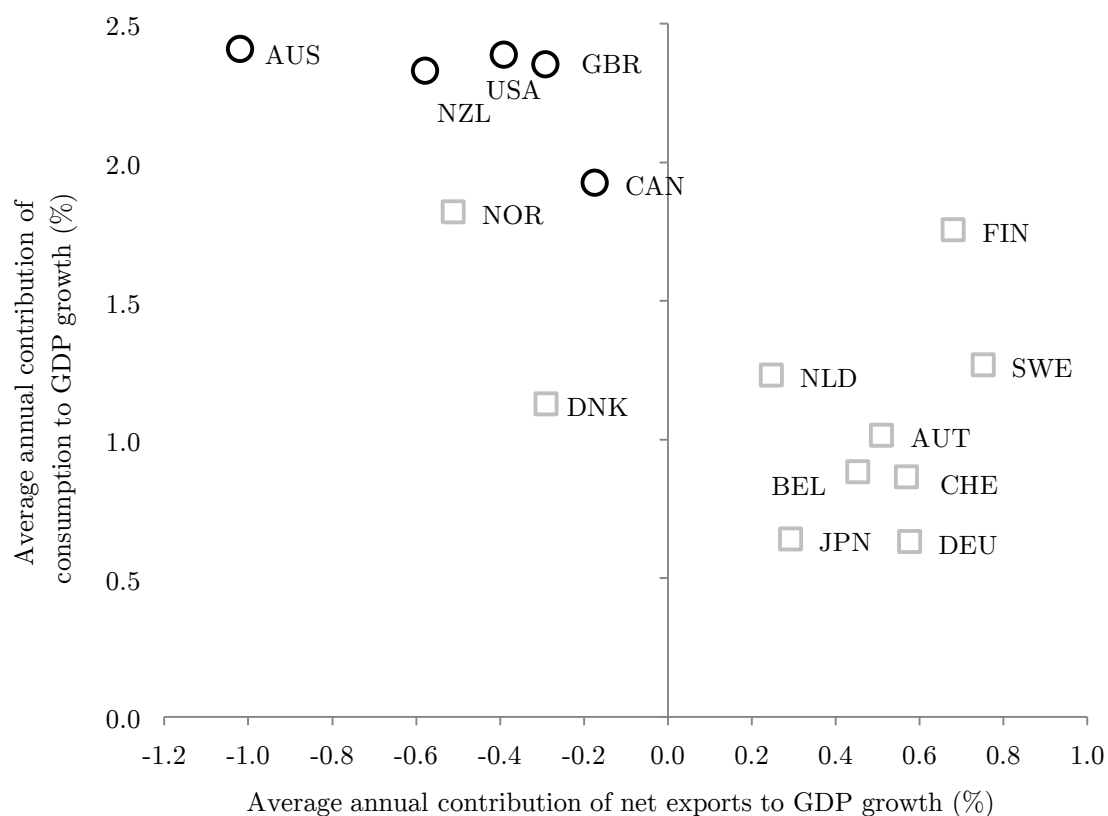
Table B.4. Electoral systems and the average proportionality of electoral outcomes, 1994-2007

	Electoral system for legislative elections 1994-2007	Average Gallagher disproportionality index (0-100 scale) 1994-2007
Liberal market economies		
Australia	Majoritarian	10.0
Canada	Majoritarian	11.3
New Zealand	Mixed	2.5
United Kingdom	Majoritarian	17.0
United States (Presidential)	-	7.6
United States (House)	Majoritarian	2.4
Coordinated market economies		
Austria	Proportional	1.9
Belgium	Proportional	3.6
Denmark	Proportional	1.2
Finland	Proportional	3.4
Germany	Mixed	3.0
Japan	Mixed	11.6
Netherlands	Proportional	1.1
Norway	Proportional	3.1
Sweden	Proportional	1.7
Switzerland	Proportional	3.1

Source: Bormann and Golder (2013); Author's calculations using Gallagher, Michael, 2015. Election indices dataset at: http://www.tcd.ie/Political_Science/staff/michael_gallagher/ElSystems/index.php, accessed July 2016.

Note: Lower values for the Gallagher disproportionality index indicate more proportional electoral outcomes. The average is taken across all national legislative elections between 1994 and 2007.

Figure B.1. Average annual contributions of consumption and net exports to GDP growth, 1994-2007



Source: European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update).

Note: See Appendix B2 for a guide on how to calculate annual contributions to GDP growth and more information on the data source for the figure. The markers in the figure correspond to varieties of capitalism. The grey squares are CMEs and the black circles are LMEs.

B2. Calculating annual contributions to GDP growth

Gross Domestic Product (GDP) (calculated via the expenditure approach) is equal to the sum of the four components of aggregate demand—consumption, investment, government spending and net exports (exports minus imports). Algebraically, GDP can be written as follows:

$$GDP = C + I + G + (X - M) \quad (B1)$$

where, C = consumption, I = investment, G = government spending, X = exports, M = imports, and $(X - M)$ = net exports.

The growth rate of GDP provides a measure of how quickly the economy is expanding. The annual growth rate of GDP is calculated using the following formula:

$$\text{GDP growth in period } t = \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}, \quad (B2)$$

where GDP_t = GDP in constant prices in period t , and GDP_{t-1} = GDP in constant prices in period $t - 1$.

The change in GDP between period t and period $t - 1$ (the numerator in Equation B2) is simply the sum of the changes in the four components of GDP. This means that the growth rate of GDP can also be expressed in the following form:

$$\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}} = \frac{C_t - C_{t-1}}{GDP_{t-1}} + \frac{I_t - I_{t-1}}{GDP_{t-1}} + \frac{G_t - G_{t-1}}{GDP_{t-1}} + \left(\frac{X_t - X_{t-1}}{GDP_{t-1}} - \frac{M_t - M_{t-1}}{GDP_{t-1}} \right). \quad (B3)$$

All variables in Equation B3 are in constant prices. The four terms on the right-hand side of the equation are the annual contributions of the different components of aggregate demand to GDP growth. The term for net exports is broken down into exports, which contribute positively to GDP growth, and imports, which contribute negatively.

The two variables at the centre of the paper are the contribution of consumption to GDP growth, $\frac{C_t - C_{t-1}}{GDP_{t-1}}$, and the contribution of exports to GDP growth,

$\frac{X_t - X_{t-1}}{GDP_{t-1}}$. The data source for these two variables is the European Commission's

Directorate General for Economic and Financial Affairs (DG ECFIN) AMECO Database (03/05/2016 update). The consumption contribution variable used is CVGD0, which is the contribution to the increase of GDP at constant market prices of private consumption. Private consumption covers the consumption expenditures of both households and non-profit institutions serving households. The exports contribution variable used is CVGD6, which is the contribution to the increase of GDP at constant market prices of exports of goods and services including intra EU-trade (percentage of GDP of preceding year). The AMECO Database calculates the contributions of consumption and exports to GDP growth using the method set out in Equation B3.

The AMECO Database can be accessed online at:

http://ec.europa.eu/economy_finance/db_indicators/ameco/index_en.htm

A full list of variable definitions for the AMECO Database can be accessed online at:

http://ec.europa.eu/economy_finance/db_indicators/ameco/documents/list_of_variables.pdf

Appendix C

C1. The international risk sharing condition

If this condition holds (as it is assumed to do in NK open economy models—e.g. Galí and Monacelli (2005)), it closes the open economy model, implying that c is given (i.e. fixed). The condition assumes that consumers have the same utility function everywhere, in the example with constant relative risk aversion; and access to the same capital markets. Thus, in a simple 2-period model, we have:

$$\begin{aligned}
 U_H &= \frac{(C/P)_t^{1-\rho}}{(1-\rho)} + \beta \frac{(C/P)_{t+1}^{1-\rho}}{(1-\rho)} \\
 \& U_F &= \frac{(C^*/P^*e)_t^{1-\rho}}{(1-\rho)} + \beta \frac{(C^*/P^*e)_{t+1}^{1-\rho}}{(1-\rho)} \\
 \rightarrow 1 &= \frac{\beta}{(1+r)} \frac{(C/P)_{t+1}^{-\rho}}{(C/P)_t^{-\rho}} \\
 \& 1 &= \frac{\beta}{(1+r)} \frac{(C^*/P^*e)_{t+1}^{-\rho}}{(C^*/P^*e)_t^{-\rho}} \\
 \rightarrow \left(\frac{C_{t+1}}{C_t} \right) &= \left(\frac{C^*_{t+1}}{C^*_t} \right) \left(\frac{q_{t+1}}{q_t} \right) \\
 \rightarrow \Delta c &= \Delta c^* + \Delta q,
 \end{aligned}$$

where the last line is in logs.

Thus the difference between countries is simply one of scale, say κ_H , so that:

$$\begin{aligned}
 c &= \kappa_H + c^* + q \\
 (\rightarrow \Delta c &= \Delta c^* + \Delta q), \\
 \text{and in equilibrium:} \\
 y_e &= c + \bar{g} - \alpha r^* + Bq \\
 &= \kappa_H + c^* + q + \bar{g} - \alpha r^* + Bq \\
 q_e &= (1+B)^{-1} [y_e - \kappa_H - c^* - \bar{g} + \alpha r^*].
 \end{aligned}$$

The foremost critique of the international risk sharing condition is that it is not borne out empirically. On these grounds, Obstfeld and Rogoff (2000) pick it out as one of the six major puzzles of international macroeconomics.

Analytically, it assumes that households have costless access to borrowing and saving at the world interest rate. In the open economy model used here, it is assumed that (at least most) households are ‘hand-to-mouth’ consumers; and this seems empirically the correct assumption to make (see Campbell and Mankiw (1989)).

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