London School of Economics and Political Science

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# Essays on Labour Frictions in Interwar Britain

*The First Western Deindustrialisation*

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of the London School of Economics and Political Science for the degree of Doctor Philosophy

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# Declaration of Authorship

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## Abstract

This thesis examines the determinants of the high levels of structural unemployment in interwar Britain by following a 'search and matching' approach. After an extensive literature review in Chapter 1, Chapter 2 estimates the matching function of the British labour market for the period 1921-1934. The changes in matching efficiency can explain the high and persistent unemployment observed from the second half of the 1920s onwards, and this was accelerated by the onset of the Great Depression. Early in the 1920s, matching efficiency improved due to the development of the retail industry. However, the econometric results show a structural break in March 1927, related to a major industrial reshuffling that reduced demand for workers in the staple industries. Due to the regional polarisation of the British labour market, spatial mismatching has the potential to explain the high level of unemployment during the interwar years. Chapter 3 uses the regional returns of the Unemployment Insurance administration to estimate the aggregate and regional Beveridge curve shifts with a vector error correction model (VECM). This estimation finds that spatial mismatching and frictions within regions, accounted for 21% and 79% of structural unemployment, respectively. Within the frictions inside the regions, the case of the north of England was particularly important, and this area accounted for 42% of the national labour frictions. Chapter 4 estimates the drivers behind structural unemployment for the counties located in the north of England and Scotland between January 1928 and November 1931, using Arellano-Bond's Generalized Method of Moments estimator for a dynamic panel model.

The results find that high labour frictions in the north of England were related to an important increase in the ratio of average paid unemployment benefits to nominal wages

in the most populated counties in this region, which also contained a large share of unemployed female workers and suffered a high frequency of temporary stoppages within the unemployed pool.

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# Introduction

Unemployment was probably the greatest economic challenge that Britain faced in the interwar years and represented a source of great suffering for the population. By the mid-1920s, Britain, the "workshop of the world" in the nineteenth century, faced an excess of industrial capacity and mass unemployment in the formerly prosperous and dynamic industrial districts which persisted throughout the entire interwar period. This situation was particularly concentrated in the great staple industries, or what were also considered the "Industrial Revolution" industries: coal mining, metal works, shipbuilding, and textile production. The decline of these industries that had been the dominant employers during the Victorian and Edwardian eras brought about mass unemployment, which resulted when mobilisation for the First World War concluded.

The excess of industrial capacity, shaped by many underused factories in the former prosperous and dynamic industrial districts was a fundamental element in Keynes' analysis of the unemployment problem. This is reflected in his masterpiece the *General Theory of Employment, Interest and Money*, published in 1936. For generations, the discussion on interwar unemployment was dominated by the Keynesian paradigm (Matthews, 1968; Casson, 1981; Garside and Hatton, 1985), which saw unemployment as a result of depressed labour demand interacting with wage rigidity, which prevented the market clearing mechanism from working. In the Keynesian paradigm, unemployment is essentially demand-driven, which is why those policies aimed to boost the aggregate demand has the potential to restore full employment equilibrium.

Due to the strong Keynesian influence, for several decades, other factors affecting unem-

ployment, such as labour frictions brought about by spatial or industrial mismatching between unemployed workers and employers, were generally considered 'bottlenecks', without the magnitude to explain the mass unemployment in the interwar period (Matthews, 1968). This thesis moves away from that long-held view by examining the actual impact of labour frictions on interwar unemployment, using a 'search and matching' approach. Even though the more econometric-oriented literature from the 1970s onwards recognises the importance of labour frictions (Benjamin and Kochin, 1979; Eichengreen, 1986; Hatton, 1986; Hatton, 1988; Hatton et al., 1988; Eichengreen and Hatton, 1988; Crafts, 1989), previous works focused exclusively on unemployment and ignored job vacancies.

Behind the high unemployment in interwar Britain, however, were elements that went beyond the reduction in labour demand. The nature of the unemployment was related to structural change. This might be labeled the first case of Western deindustrialisation, shaped by the decline of the nineteenth-century industries and the rise of the service sector and other "new" industries (Scott, 2007). While export industries declined as international trade shrank, the implementation of great technological breakthroughs, such as the American system of mass production or electricity, boosted productivity in some industries and led to the emergence of a new service sector. These fast-growing newly emerging industries were also propelled by the consolidation of a larger middle class, who were buying vehicles, processed food, and retail items. The expansion in these areas impacted the labour market by generating a large volume of job vacancies. In some cases, however, this labour demand remained unmet despite the high rate of unemployment at that time, which points to a mismatch between the two sides of the labour market.

This dual economy, consisting of industrial decline and mass unemployment in the "Industrial Revolution" trades, in contrast to the prosperity in national consumer-oriented industries, shaped Britain's interwar labour market and brought about persistent unemployment. The purpose of this thesis is to discover the labour frictions, or mismatching, between these two sides of the labour market: unemployed workers and job vacancies.

Disentangling the labour frictions in interwar Britain leads to a "search and matching"

methodological approach to study unemployment, a perspective mostly omitted from the economic history literature in the case of Britain. This thesis analyses the labour market from the perspective of labour frictions, which assumes that unemployment and vacancies face transaction costs that prevent them from automatically matching up in the labour market. This concept is associated with the structural unemployment rate, which can be defined as the share of unemployment that cannot be explained by the low demand for labour but rather by the existence of labour frictions, such as geographical or skill mismatches between unemployed individuals and job vacancies. In this sense, this thesis examines a problem intricately studied by a different generation of scholars, but used a different approach and methodology, and was therefore able to obtain different results. As discussed in Chapter 1, the previous literature made enormous contribution to understanding the interwar unemployment problem but focused mainly on unemployment and did not explore labour demand.

The industrial divide between the decline of the Industrial Revolution trades and the rise of the new industries and the service sector displayed an important regional dimension. The former were located mainly in northern England, Scotland, and Wales, in so-called outer Britain, while the latter developed mainly in southern England and to a lesser extent in the Midlands, so-called inner Britain. For this reason, in addition to industrial mismatching, geography—or spatial mismatching—was another important source of labour friction that contributed to the high levels of structural unemployment.

This important transformation in labour frictions occurred in turbulent circumstances and was shaped by two major economic shocks: the General Strike and the Coal Lockout of 1926 and then the Great Depression. Each of these shocks had deep consequences for the labour market, not only by reducing the demand for labour but also by triggering labour frictions associated with industrial recomposition. These shocks certainly reduced employment and raised labour frictions, although their magnitude and the specific sectors that were impacted differed.

The coal industry in outer Britain never properly recovered from the General Strike and

Coal Lockout of 1926, but their effects were transitory except for the mining counties. For the rest of the interwar period, unemployment rates remained high in counties such as Durham and Northumberland, but in general terms jobless declined between 1927 and 1929.

The second rise in labour frictions, triggered by the Great Depression, was much larger and probably remained until the onset of the Second World War. During the Depression, declines in the textile industry spread to the entire labour market because they affected the most populated counties in northern England and outer Britain—Lancashire and the West Riding of Yorkshire. The employment positions lost during the early years of the Great Depression proved difficult to recover when the situation improved by the mid-1930s due to the industrial and spatial mismatching. The monetary policy and labour regulations that were in force during the interwar period also played an important role.

In addition to structural change and the two major economic crises, the interwar labour market was characterised by important changes in labour market regulations. The most important was the implementation of the Unemployment Insurance Act (1920), which extended a more limited program that had been in operation since 1911. The unemployment insurance scheme was in force during the entire interwar era, although it experienced significant changes and reforms within that period, changing its impact on labour frictions and structural unemployment. Between 1920 and 1931, the system was relatively flexible regarding eligibility for receiving the established benefit rates, which experienced some change, but on average remained relatively stable in nominal terms. This period was named by Eveline (Burns, 1941), who had been commissioned by the government of the United States to study the British unemployment scheme, as the Extended Unemployment Insurance.

The purchasing power of wages and unemployment benefits were also strongly influenced by the restoration of the gold standard. In addition to having a negative impact on export-oriented industries, the restoration introduced a deflationary monetary policy that accelerated during the early years of the Great Depression, leading to a substantial

reduction in nominal wages. This monetary policy, overlapping with the period of the Extended Unemployment Insurance between 1925 and 1931, which is why benefits gained purchasing power during this period.

The challenge for this thesis in addressing how labour frictions determined structural unemployment, is to understand the interaction between deindustrialisation, the development of consumer industries, economic crises, deflationary monetary policy and changes in unemployment insurance. Each element has influence but is their interaction that ultimately explains the persistent unemployment during the interwar period.

To achieve the research objectives of the thesis, Chapter 1 presents a literature review on unemployment in interwar Britain and discusses how the search and matching approach could be useful for establishing the reasons behind structural unemployment. Chapter 2 estimates the matching function for the interwar labour market to identify the magnitude of labour frictions and their evolution throughout the period. Such an estimation is necessary to establish if labour frictions were actually significant, or just a set of marginal 'bottlenecks' with very limited impact on unemployment. The estimation shows that labour frictions were indeed significant, although there were substantial changes throughout the period. It identifies a structural break in March 1927, when the aggregated matching efficiency, the opposite of labour friction, commenced on a declining path that was accelerated by the onset of the Great Depression.

Chapter 2 also finds evidence of a significant increase in labour frictions during the interwar period. The frictions were shaped by the relatively low frictions in the first half of the 1920s, associated with the rapid development of the retail industry, and the high frictions from early 1927 onward related to the decline of the Industrial Revolution industries. The uneven recovery from the 1926 coal lockout accelerated the deindustrialisation process, leading to an increase in industrial and spatial mismatching. Because the rising and declining industries were primarily located in different regions, a regional polarisation developed midway through the 1920s onward. Unemployed workers were concentrated in the north of England, Scotland, and Wales while the job vacancies existed mainly in the

south of England.

Chapter 3 examines how much geographic mismatches contributed to the high level of labour friction during the interwar period. If unemployed workers and job vacancies were located in different regions, there are obvious transaction costs between the two sides of the labour market, which may explain the high degree of labour friction that existed in interwar Britain. Using an original dataset from the regional returns of the Unemployment Insurance administration, Chapter 3 estimates the aggregate and regional Beveridge curve shifts using a set of vector error correction model (VECM) models. This estimation allows for the breakdown of labour frictions into spatial mismatching between regions and frictions within regions, finding that they accounted for 21% and 79%, respectively, of structural unemployment. More dynamic regional mobility from the depressed regions in outer Britain toward the more prosperous areas may have substantially reduced unemployment by leading to a decline in labour frictions. However, important as spatial mismatching was, the results reached in Chapter 3 also reveal that labour frictions within the regions were the main determinant of structural unemployment.

Regional mismatches contributed to structural unemployment, but labour frictions within the regions had more explanatory power. The internal frictions varied and were greatest in northern England, which explained 42% of the aggregated labour frictions, being the main determinant of high structural unemployment in interwar Britain. Unlike other depressed regions, such as Scotland and Wales, where high unemployment rates were due to a collapse in the demand for labour, the rise in unemployment in northern England in the second half of the 1920s coexisted with relative stability in the job vacancy rate.

To understand the reasons behind the high internal labour frictions within northern England, Chapter 4 examines the drivers behind structural unemployment for the 18 counties located in northern England and Scotland by estimating a dynamic panel model using the Arellano-Bond Generalized Method of Moments technique. The estimation treats as an independent variable the replacement rate, defined as the ratio of the average of a county's paid benefits to the average wage in the county. Replacement rates varied

across counties due to differences in the industrial composition, the categories for the established benefits, and the adherence to rules regarding the required contributions. The results show a positive relationship between the replacement rate and structural unemployment in northern England but not in Scotland, indicating a differentiated impact of the unemployment insurance policy across Britain.

The results revealed in Chapter 4 are essential in explaining why labour frictions were relatively high in northern England, particularly after 1929. Within this region, the replacement rate grew particularly rapidly in the most highly populated counties—Lancashire and the West Riding of Yorkshire—that were strongly affected by the Great Depression due to the collapse of the textile industry. The main reasons behind the increase in the replacement rate in those counties are related to the particularly low wages in the textile industry and the deflationary policy of the early years of the Great Depression.

In addition to the substantial increase in their replacement rate, Lancashire and West Riding of Yorkshire were shaped by a large share of unemployed females and temporary stoppages within their unemployment pool, which was also associated with higher structural unemployment. According to the results found in Chapter 4, temporary stoppages or furlough conditions bring about a "deterrence" effect among unemployed workers in their migration toward industries or locations with better employment prospects, which contributed to the particularly high internal labour frictions in northern England.

This thesis approaches the long-studied problem of unemployment in interwar Britain, not only by using a new methodology—the search and matching model—but also by emphasizing regional perspectives. Behind the high incidence of unemployment registered through national averages, there was substantial regional heterogeneity. In the case of northern England, mass unemployment is explained by high labour frictions. Meanwhile, the Midlands experienced a substantial reduction in its labour frictions as its structural unemployment moved from the high levels of outer Britain toward the lower levels in inner Britain throughout the 1920s. Each region offers a distinct experience and is useful in examining how the labour market reacted differently to major shocks due to their

particular characteristics.

The results in this thesis are useful because they show how labour markets adapt to profound economic shocks that accelerate inevitable structural changes. During this period, the British labour market faced not only the Great Depression but also a major change in its industrial composition, comparable only with the transformation that was observed during the Industrial Revolution. Such a change occurred in the context of unemployment insurance, an important institutional transformation for the British labour market that made the topic explored in this thesis even more interesting.

# Chapter 1

## Literature review

## 1.1 Several generations of scholars and their explanations for the interwar unemployment.

The problem regarding unemployment in interwar Britain has attracted the attention of different generations of scholars and is even at the core of the emergence of macroeconomics as a field within economics. Keynes' masterpiece, *General Theory of Employment, Interest and Money*, published in 1936, is motivated by the mass unemployment brought about by the Great Depression. However, mass unemployment had actually been in existence in Britain from the 1920s. As has been widely studied in the literature, in Keynesian economics, unemployment exists as a result of the underutilisation of resources, which leads to the goods market operating below its potential, or its *full employment* level. According to this view, unemployment is essentially determined by a low demand for labour, which alongside 'sticky wages' prevent the labour market from clearing. As is widely known, in the Keynesian model, the way out of unemployment is to stimulate the aggregate demand via expansionary policies.

Another important contemporary observer of the interwar unemployment phenomena was the influential economist William Beveridge, who also favoured active government intervention. However, unlike Keynes, he identified structural elements in the interwar

unemployment. In his most famous work; *Full employment in a free society*, Beveridge maintained that the intersection between the decline of important employers and imperfect labour mobility (in terms of location and industry), leads to persistent unemployment. Beveridge emphasised the concept of labour frictions, and that more than just declines in labour demand were a large contributing factor to the high unemployment arose.

The influence of Keynesian economics, and the low level of unemployment registered in the decades following the Second World War, under a different monetary regime, and the implementation of expansionary policies, led to Keynes' view becoming predominant among scholars. The conclusion that a combination of depressed aggregate demand plus sticky wages in a deflationary context, was at the core of the common wisdom in the post-war years. Therefore, the role of labour frictions received less attention and it would only be in the late 1970s, under the so-called 'End of the Keynesian era' (Skidelsky, 1977), that the economic literature began to explore alternative explanations for the high levels of interwar unemployment.

The relationship between unemployment and labour frictions captured the attention of several observers, as at the same time the real income and purchasing power expanded at unprecedented levels in British history, interwar unemployment remained high (Booth and Glynn, 1975). For this reason, it could be assumed that interwar unemployment was influenced by factors beyond the fluctuation of aggregate demand. While real income expanded 32% between 1920 and 1938 (Benjamin and Kochin, 1979, p. 445), faster than any other previous period in British history, the unemployment rate never declined below 9.5% between 1921 and 1938 (Benjamin and Kochin, 1979, p. 444).

The disconnection between the performance of income and the labour market led many scholars to think that this latter was influenced by structural factors such as labour frictions (Booth and Glynn, 1975) (Eichengreen, 1988) (Hatton and Thomas, 2012). Labour frictions could be defined as the transaction cost between the two sides of the labour market: the unemployed and job vacancies. This transaction cost could arise from labour market institutions, such as regulation of minimum wage or unemployment

insurance. For example, if unemployment insurances establish generous benefits, they could reduce the efforts of the unemployed to search for a job, increasing the distance between the unemployed and job vacancies.

Labour frictions could also be consequences of differences between unemployed endowments and firms' requirements, such as geographical or skill mismatch between the unemployed and firms. For example, if an economy has job opportunities for skilled workers, but the unemployed pool is composed mainly of unskilled workers, then a situation with coexistence of high unemployment and a lot of job offers could occur.

One of the first studies about the effect of labour frictions in interwar Britain was done by (Benjamin and Kochin, 1979), who associated the high unemployment observed in interwar Britain with the generosity of the Unemployment Insurance, which according to the authors' hypothesis reduced the unemployeds' efforts to look for a job. The Unemployment Insurance of 1920 and significantly increased the payments and coverage of a previous framework operating in Britain since 1911. (Benjamin and Kochin, 1979) compare the incidence of unemployment with the amount of the unemployment benefit by building a time series of the ratio of the weekly unemployment benefit[1] to the weekly wage.

The unemployment benefits experienced some changes during the interwar period such as an increase early in 1931, followed by a reduction of around 10% in October of the same year, which was again reversed in 1934. In 1935 and 1938 there were further increases. Using an ordinary least square estimation and controlling for the business cycle, the authors found that the unemployment rate had a positive and statistically significant relationship with the ratio of benefits to weekly wages. However, the main problem with this result is that the estimation for the replacement rate is based on the established rates from the Unemployment Insurance administration for gender and age. As is thoroughly explained in Chapter 4, the average paid benefit was actually determined by a set of

[1]The weekly unemployment benefit is estimated for an adult male with an adult dependent and two children.

circumstances, such as the number of a person's dependents, or the degree of flexibility of the Unemployment Insurance scheme and the local administration regarding the requirements for accepting benefit claims. In other words, the theoretical benefit was not necessarily proximate to the actual paid benefit. Likewise, Benjamin and Kochin (1979) used a national wages series for estimating the replacement rate, but they did so without considering the regional differences. If both the paid unemployment benefits and wages varied substantially according to region, Britain actually faced multiple replacement rates rather than a single national replacement rate.

Based on data from the *New Survey of London Life and Labour, 1929-1931*, Eichengreen (1986), and Hatton and Bailey (2002) found that there is no micro-econometric evidence supporting a strong positive relationship between the replacement rate and the incidence of unemployment. These articles, which hold the main advantage of having used individual observations for their estimations, achieved conclusions that were opposed to those of Benjamin and Kochin (1979), finding that unemployment benefit had little, or no impact, on the unemployed workers' search efforts. These results however had a significant constraint, which is the fact that the data sample only covered London, which had a relatively low unemployment rate. Outer Britain, where the core of the unemployment problem existed, was not covered by Eichengreen (1986), and Hatton and Bailey (2002). As mentioned in the introduction and will be explained in more detail in Chapter 4, Britain actually faced several different regional replacement rates, which is why the impact of the Unemployment Insurance scheme also varied according to region.

Also contrary to Benjamin and Kochin (1979) hypothesis about the adverse effect of Unemployment Insurance, Eichengreen (1988) maintains that the actual nature of unemployment is more complex due to the diversity of the unemployed pool. The author stresses that interwar unemployment in Britain was characterised by the coexistence of two main groups. The first group was those unemployed who experienced such a condition for a short spell. Thomas (1988) estimated that a large number of individuals go in and out of unemployment for short periods of time. Thomas (1988) estimated that

around 1 in 15 unemployed used to find a job within a week, which is three times faster than the 1980s, when Britain again experienced a period a sustained high unemployment (Eichengreen, 1988).

This high mobility in the unemployment flows could be related to the presence of *temporary stopped* within the unemployed pool. The Unemployment Insurance split the unemployed between *wholly unemployed* and *temporary stopped*. This latter preserved some connection with the firm and were called to work again once the situation improved. In many cases unemployment was a shared condition, where workers share the work available, reducing the number of hours worked by each individual implicated in the situation (Eichengreen, 1988).

The second group of unemployed mentioned by Eichengreen (1988) was the long-term unemployed, who became important after the Great Depression. In July 1929 the long term-unemployed accounted for only 5% of the unemployed, while in 1933 this share increased up to 22% in 1933 (Eichengreen, 1988). This made it difficult to reduce the unemployment rate in the 1930s due to the deterioration of skills of those individuals with a long period out of work.

On the other hand, Eichengreen (1988) also indicates the importance of structural unemployment generated by the mismatch between the endowments of the unemployed and job offer requirements, which supported the role of the labour friction on the high unemployment in this period. The author mentions two main reasons behind this phenomenon. The first is the significant structural change in the industrial composition as a consequence of the 1921 crisis, which led to a decline of the great staple trades (coal mining, cotton, shipbuilding, mechanical engineering and iron) and the emergence of other sectors with performance in light engineering and services. The employment in five staple industries fell by around 1 million workers between 1920 and 1925. Because re-employment was no longer automatic, this process contributed to the high unemployment rate in the 1920s despite the good economic performance.

The second factor behind the high structural unemployment cited by Eichengreen (1988) was the concentration of unemployment in certain areas such as Wales, Scotland or the North-East. This situation contrasted with the relatively low unemployment rate in the South. The reasons behind this low internal migration are part of the puzzle of the high and persistent unemployment rates in interwar Britain, and there is still no robust explanation for that, although the existence of subsistence income provided by the Unemployment Insurance could have reduced the incentives for internal migration.

Independently of reasons behind the low internal mobility, unemployment in interwar Britain had a very important regional dimension. Booth and Glynn (1975) considered interwar unemployment to be essentially a regional problem. According to the authors, outside the depressed areas in the north of England, Scotland and Wales, the rest of the country saw unemployment rates probably not very different from those at the pre-1914 time.

Booth and Glynn (1975) also address the importance of linkages in the depressed areas. For example, in the North East, the decline in coal exploitation led to a reduction in shipping that affected the shipbuilding industry and finally the demand for iron. A collapse in these strategic industries had an adverse multiplier effect on the regional economy, which ultimately prevented a large expansion of consumers' purchasing power which was critical for the development of the service sector and which became the main employer in the prosperous part of the country. Booth and Glynn (1975) also indicate that within each depressed area there were relatively prosperous urban centres such as Manchester, Liverpool, Newcastle or Glasgow. Not only there were significant inter-regional differences, as seen in Chapter 3, but interwar unemployment also had apparent significant intra-regional differences, which still has not been explored and will be addressed in Chapter 4.

A new wave of interest in interwar unemployment came about with the Great Recession (2007-09), which led to increase in unemployment incidence in most of the advanced economies. One of the most complete summaries in the literature about unemployment

in the interwar period was done by Hatton and Thomas (2012). They compare the experiences of the United Kingdom and the United States in the 1921 crisis and the Great Depression. The former crisis had a deep impact in Britain and employment did not completely recover during the 1920s, but the magnitude of the Great Depression was relatively mild. In contrast, the United States quickly and fully recovered from the post-war crisis in 1921 but lived through a deep depression in the 1930s.

According to Hatton and Thomas (2012), the differences between the two countries are explained by the interaction between shocks and labour market institutions. At the beginning of the 1920s, significant institutional changes were introduced in Britain, such as the Unemployment Insurance and the increasing importance of the Trade Unions. These changes had an impact on the wage setting mechanism, increasing workers' bargaining power and ultimately enhancing the rigidity of the labour market. From the authors' perspective, the adverse effect on employment of the new set of institutions was triggered by the 1921 crisis. In the United States were no unemployment insurance schemes and the strength of labour unions declined after the War, allowing the labour market to recover from the early 1920s crisis fully. However, a new set of regulations was introduced in the United States with the New Deal, which influenced the high persistence of unemployment in the 1930s. As no major institutional changes were implemented in Britain in the 1930s, this labour market was able to recover relatively fast from the Great Depression of 1929.

Hatton and Thomas (2012) mention two shocks that could have triggered the negative effect of the institutional changes on the flexibility of the wage setting mechanism: geographical variation in the incidence of unemployment and long-term unemployment. These shocks arrived as a consequence of the 1921 crisis and the Great Depression, and could have affected the wage adjustment mechanism (flexibility in the wage setting) as it was required to reduce the unemployment rate to the pre-crisis level.

As is widely mentioned throughout this thesis, there were significant regional differences in the unemployment rate in interwar Britain. In general, the unemployment rates were lower than the national averages in London, the Southern districts and the Midlands,

while the unemployment incidence was high and persistent in the Northern districts, Scotland and Wales. The interwar period saw a divergence of the labour markets between *inner Britain* and *outer Britain* (Hatton, 1986). These regional differences were a consequence of the significant difference in industrial location. During the 1920s in Britain the unemployment incidence mainly affected those workers in the great staple industries (textile, iron and steel, engineering, shipbuilding and coal) (Hatton and Thomas, 2012, p. 15), which were concentrated in *outer Britain* regions and were significantly affected by the 1921 crisis.

These regional differences could have had a negative impact on the wage setting mechanism if the wage bargainers were taking as reference those industries or regions with the lowest unemployment rate (Thomas and Stoney, 1971). On the other hand, the regional differences could also be seen as a source of labour friction since they created a mismatch between these depressed regions with a large amount of the unemployed and those resilient regions with job opportunities. In other words, regional differences in employment made it more difficult to match the unemployed with job vacancies.

The second set of shocks explored by Hatton and Thomas (2012) is on the long-term unemployment. The authors mention that Crafts (1989) estimated that male long-term unemployment was probably less than 10% of the unemployed in the 1920s, but the share rose to more than 25% in 1936. Due to the loss of motivation or skills' depreciation, the long-term unemployed could exert only a very modest downward pressure on the wage setting. In that case, the wage was set without considering a significant share of the unemployed, which is why the equilibrium wage would be higher than expected due to the aggregated unemployment rate. However, Crafts (1989) estimated that long-term unemployment had no significant effect in reducing wages.

Another plausible explanation about the influence of long-term unemployment on labour friction is the lower job-finding rate of this group as a consequence of employment skills deterioration, and its share of the unemployed pool. After an economic crisis, this group become over-represented within the unemployed pool, reducing the average unemployed

job-finding rate and explaining the rising labour frictions and persistence of unemployment for long periods of time. Barnichon and Figura (2015) estimate that between 1976 and 2006, long-term unemployment was the main determinant of matching efficiency, a measurement of labour frictions, in the American labour market.

Another factor to consider in the interwar British labour market was the significant reduction in the number of hours worked by the labour force during the trans-war period (1913-1919), which according to Broadberry (1990) was around 13%, which was not matched by a reduction in total wages. This supply shock, fuelled by the significant increase in workers' real income, had a deeply negative impact on labour productivity. As there was not the same cut in wages, the market necessarily adjusted by a reduction in employment, which contributed to high and persistent unemployment in interwar Britain.

In conclusion, the literature about unemployment in interwar Britain offers different explanations about why the unemployment rate was so high and persisted so long. In this context, labour frictions may have played a major role. However, Hatton and Thomas (2012) maintain that exact magnitude of such frictions and how much they affected the unemployment rate is still unknown. All studies hitherto focus almost exclusively on only one side of the labour market without addressing the relevance of the existence of the job offers or vacancies. This thesis fills this gap in the literature by considering the two sides of the labour market and how the transactions cost between them influenced the unemployment rate in interwar Britain.

## 1.2 The search and matching approach

One of the most important revolutions in the labour economics literature was the emergence of 'search and matching' models developed by Diamond, Mortensen and Pissarides. These frameworks address the importance of the transaction costs associated with matching workers and jobs in determining the natural unemployment rate. Within this literature, the matching function framework has been largely used to analyse the labour

market in the recent period (Barnichon and Figura, 2015) (Patterson et al., 2016). The matching function is essentially a production function, where the unemployed and vacancies are inputs, and the number of matches (new labour relationships) is the output. The technology at which the labour market transforms the unemployed and job vacancies into matches is the matching efficiency, which is a measurement of the degree of the labour frictions.

The traditional literature in the labour market, especially in macroeconomics, explains the unemployment phenomena regarding the behaviour of wage setting. In this approach, wages have a certain degree of rigidity that determines at the same time the level of friction of the labour market and ultimately the unemployment. According to this literature, legislation about minimum wages, trade unions affiliations or nominal rigidities (in the case of Keynesian economists) introduced a level of friction, which made the observed equilibrium wage differ from the market-clearing equilibrium wage. In general terms, wages are the main driver of unemployment in the traditional labour literature, even in most of the current macroeconomic research (Galí, 2011).

The 'search and matching' approach is an alternative method that can be used to study unemployment. It is true that wage is a powerful driver of the performance of the labour market and cannot be excluded from a complete analysis, but there are also other determinants of the labour market's degree of friction such as skill or spatial mismatch as well as long-term unemployment. Despite this kind of model only being developed properly in recent decades, there is an important historical precedent which has been in the labour literature since the 1950s; the Beveridge curve, named after William Beveridge due to his conceptual development of labour frictions, but was properly formalised by Dow and Dicks-Mireaux (1958).

The Beveridge curve is a graphical representation of the relationship between the unemployed and the job vacancy rate. The main idea behind the Beveridge curve model is that unemployment is essentially explained by a mismatch between the two sides of the labour market. Different types of shocks could increase the mismatch between the

unemployed and the vacancies, leading to an outward shift in the Beveridge curve. This graph has become very popular in the case of the United States and other countries with information on job vacancies after the Great Recession of 2007-2009 (Diamond and Şahin, 2015). At that time, a notable outward shift was observed which meant an increase in the labour market mismatching. In other words, the unemployment rate relative to the job vacancy rate was higher after the crisis than before, indicating an increase in the degree labour market frictions.

In the same vein of the Beveridge Curve, the matching function is a concept analogous to the production function. The unemployed (or the job seekers) and the vacancies are the inputs, while the matches (new labour relationships) are the output. In other words, the matching function presents the number of matches produced in the labour market, as a function of the unemployed and vacancies. In the following equation, M represents the number of matches:

$$M(U_t, V_t) = \Omega U_t^{\xi} V_t^{1-\xi} \tag{1.1}$$

Where $U_t$ is the number of unemployed, $V_t$ the number of vacancies, $\Omega$ an efficiency factor and $\xi$ is the elasticity of the unemployed over the number of matches.

Equation 1.1 is a Cobb-Douglas version of the matching function, widely used in the literature (Shimer, 2005) (Anderson and Burgess, 1995) due to the properties of decreasing marginal productivity and constant return to scale. In other words, to increase the number of matches, it is necessary to increase both inputs (unemployed and vacancies), and if both inputs are increased in the same proportion, the number of matches also grows proportionally. For example, if the number of unemployed and vacancies is doubled, the number of matches is also doubled. Several econometric estimations support the existence of constant returns to scale (Petrongolo and Pissarides, 2001).

In addition to the inputs and the output variables, the matching function is also shaped by two constants: $\xi$ and $\Omega$. The former, the elasticity of the unemployed over the number of matches, measures the sensitivity of the number of matches to changes in the number

of unemployed. The latter, the matching efficiency factor, measures the degree of labour frictions or the technology at which the market transforms the unemployed and vacancies into new labour matches. In other words, $\Omega$ is the matching efficiency and the primary interest of this dissertation.

Since to the matching efficiency measures the degree of frictions in a labour market, it has received a lot of attention in the recent labour literature (Shimer, 2012)) (Patterson et al., 2016). These frictions can make it easier or harder to reduce unemployment in the presence of a negative economic shock and indicate why some countries have a higher structural unemployment rate even in a situation of economic growth.

The matching function and Beveridge curves are the main methodologies within the search and matching models. The main difference between them, is that the former uses a dynamic approach, based on unemployment flows, while the latter follows a static approach, focusing only on the stock of unemployed citizens and job vacancies. However, they are both complementary and will be the methodological strategies used in Chapters 2 and 3.

Despite the importance and the benefits of the search and matching models, they are only the first step in diagnosing the reasons behind the unemployment in interwar Britain. They are useful in establishing whether the kind of unemployment observed during the interwar period was either demand-driven, or due to labour frictions. Fundamental as this question is, its answer does not reveal the final determinant(s) of structural unemployment. A search model without any complementary analysis is merely a 'black box' that shows if structural unemployment is either growing or declining, but does not explain the reasons why.

The previous literature has identified multiple drivers of labour market mismatching, which is why the topic remains an ongoing debate. Some of the drivers found by the literature are: industrial or skills (Entorf, 1994; Rogers, 1997; Jackman and Savouri, 1999; Barnichon, Elsby, et al., 2012), the level or duration of unemployment benefits

(Benjamin and Kochin, 1979; Katz and Meyer, 1990; Farber and Valletta, 2015), and long-term unemployment (Mathy, 2018; Barnichon and Figura, 2015). In the particular case of interwar Britain examined in this thesis, the labour frictions were multi-layered, operating simultaneously with industrial and spatial mismatching, the unemployment benefits in a context of wage deflation, and long-term unemployment, especially during the 1930s.

Finally, it is worth mentioning that one of the few studies on the matching function during the interwar period was performed by Lee (2016) for the United States during the period 1924 to 1932, using information from the Public Employment Offices, which covered around 5% of the labour force. Using a different methodology, Lee (2016) confirmed the view of Hatton and Thomas (2012) that labour frictions in the United States were relatively low, and probably lower compared to that of Britain found in this thesis.

# Chapter 2

## Labour Frictions in Interwar Britain:

## *Industrial Reshuffling and the Origin of Mass Unemployment*


## Abstract

This chapter estimates the matching function of the British labour market for the period of 1921-1934. The changes in matching efficiency can explain the high and persistent unemployment observed from the second half of the 1920s onwards, and this was accelerated by the onset of the Great Depression. Early in the 1920s, matching efficiency improved due to the development of the retail industry, which opened many job opportunities for low-skill workers. However, the econometric results show a structural break in March 1927, related to a major industrial reshuffling that reduced the demand for workers in staple industries and an uneven recovery from the 1926 Coal Lockout. Since these industries were geographically concentrated, there was an increase in the average distance between the unemployed and vacancies, and matching efficiency declined.


## 2.1 Introduction

The labour market in interwar Britain is puzzling. On one hand, it showed a great degree of resilience during the Great Depression, as unemployment did not reach the

huge level seen in other industrialised countries such as the United States or Germany, and it recovered from 1933 onward. On the other hand, unemployment was persistently high throughout the period despite a strong expansion of real income, consistent with significant structural unemployment. This dual scenario has led observers to put forward explanations such as labour frictions. These are the transaction costs between the two sides of the labour market: unemployment and vacancies.

Scholars pinpoint several potential frictions: high unemployment benefits (Benjamin and Kochin, 1979), institutional changes in the early 1920s (Hatton and Thomas, 2012), regional divergence (Booth and Glynn, 1975), and structural change in the composition of industry (Eichengreen, 1988). The nature and magnitude of such frictions, however, have not yet been quantified.

The primary purpose of this chapter is to answer the following two questions: firstly, how did matching efficiency in interwar Britain evolve, and secondly what were its main drivers?

This Chapter uses a matching function framework to estimate the level of labour frictions in Britain for the period April 1921- June 1934. The matching function is a concept analogous to the production function. In this case, the unemployed and job vacancies are inputs to the number of matches (successful vacancies filled), which constitute the output. Matching efficiency is the capacity of the labour market to transform the unemployed and vacancies into labour matches. In other words, matching efficiency is a measure of labour market frictions (Petrongolo and Pissarides, 2001).

The econometric results show that matching efficiency was highly variable between 1921 and 1934, what means different levels of structural unemployment. In general terms, the early 1920s was shaped by a substantial improvement in matching efficiency, which reached a plateau in 1924. However, in March 1927 the matching efficiency series displayed a structural break, moving more towards a declining trend and reaching its nadir in the early years of the Great Depression. This change in the evolution of the matching

function is associated with a significant industrial 'reshuffle', which came about as a result of the decline of the export-oriented staple industries, and an increase in industries oriented towards the domestic market (such as the services sector). The lack of mobility of workers from the former to the latter was the driver behind the deterioration of the matching efficiency, and the high structural unemployment throughout the whole period. The ultimate determinants of this low labour mobility from the depressed towards the prosperous sectors of the economy, however, will be examined in Chapters 3 and 4.

This chapter analyses a structural break, aiming to find the specific point at which the matching efficiency's trend changed. The econometric results found that March 1927 was a tipping point for the matching efficiency, and it was from this month when a sustained decline in the labour market's capacity to generate new matches between the unemployed workers and the unfilled vacancies was observed. This structural break came about as a result of the uneven recovery from the 1926 coal stoppage (May-December), a watershed phenomenon that accelerated an already ongoing structural change; the first western deindustrialisation. The 1926 Coal Lockout mainly affected the 'Industrial Revolution' industries, which in many cases were powered-supplied and were located in *outer* Britain. However, the lockout only had a minor impact on the south of England, which became a consolidated and important hub for the emerging services sector and other 'new' industries.

This chapter is comprised of six sections in addition to the current introduction. The first section presents some stylised facts about unemployment in interwar Britain. The second section presents a literature review concerning matching efficiency and British interwar unemployment. The third part presents the theoretical and econometric framework of the aggregate matching function, while the fourth section displays the econometric results. The fifth section analyses the reasons behind matching efficiency fluctuation following the conceptual framework developed by Barnichon and Figura (2015). Finally, the sixth section presents the conclusions.

## 2.2 Stylised facts

### 2.2.1 Unemployment in the interwar period

British interwar unemployment featured persistently high rates compare to pre-1914 and post-1945 eras (Boyer and Hatton, 2002). During the 1920s and 1930s, there were cycles of rapid expansion in GDP per capita without achieving full employment, suggesting the existence of substantial structural unemployment. The macroeconomic literature links this phenomenon to rigidities in the wage setting mechanism, which meant that real wages did not fall enough to allow for full employment (Galí, 2011).

A prominent concept here is the non-accelerating inflation rate of unemployment (NAIRU). The NAIRU measures the minimum level of unemployment below which inflation would accelerate as a consequence of higher wages, which can be thought at as an indicator of the natural unemployment rate. According to Hatton and Thomas (2012), Britain saw a significant increase in the NAIRU in the interwar period. This is in line with the persistent high unemployment throughout these decades. They also show that the main adjustments in wages and prices were observed between 1920 and 1922, with only moderate fluctuating over the rest of the period. This pattern indicates that unemployment variations were likely due to other forces.

A second important characteristic of British interwar unemployment is its behaviour during the Great Depression. Due to the magnitude of the crisis, the unemployment rate jumped from 8% in 1929 to 17% in 1932 (Boyer and Hatton, 2002), thereby reaching its highest level of the entire interwar period. Despite the harsh impact of the Great Depression, Britain displayed a high degree of resilience in the years immediately after 1929, displaying unemployment rates lower than those of the United States (Hatton and Thomas, 2012). Britain certainly suffered a milder impact on unemployment caused by the depression than other leading industrialised countries suffered. In 1932, the worst year

of the Great Depression, the industrial unemployment rates (not including the agricultural and service sector) were 22.1%, 36.2% and 43.8% for Britain, the United States, and Germany, respectively (Eichengreen and Hatton, 1988).

Behind Britain's relative resilience against the Great Depression laid profound regional differences. Due to the collapse of international trade, the Great Depression mainly affected the areas where the Industrial Revolution industries were predominant and the main employers, while it had a much more moderate impact on regions that were focused on consumer-oriented trades. While the unemployment rate in 1932 was 38% and 29% in Wales and Scotland respectively, in the south of England it was only 13.8%. The relative resilience displayed by Britain during the Great Depression was actually, the result of the incidence of low unemployment in one specific region; the south of England.

### 2.2.2 Institutional changes

The first potential driver behind labour frictions in interwar Britain was the institutional changes that were occurring during this period. However, the actual magnitude, and exactly how the mechanism impacted the unemployment rate has not yet been established. Most of the major institutional changes took place at the beginning of the interwar period- between 1919 and 1920. As a result, these reforms will have needed an interaction with other elements, or a trigger that might explain the labour frictions' variability throughout the interwar period, and not only the higher structural unemployment with regards to the period prior to 1914.

Interwar institutional changes can be divided in two types: those related to the costs of job search for the unemployed, and those that affected wage setting mechanisms. The most important in former category is the Unemployment Insurance Act of 1920, which established unemployment benefits for insured workers. The new framework replaced an older scheme which had been in force since 1911, expanding both weekly payments from 15 to 39 weeks (Garside, 1990) and the number of workers insured. The coverage

of Unemployment Insurance was extended to approximately 66% of the labour force (Thomas, 1988), and this level persisted for the whole interwar period[1].

The general structure of the Unemployment Insurance scheme remained unchanged between 1920 and 1931 when a framework that operated- labelled by Burns (1941) as the Extended Unemployment Scheme, was replaced with a more restrictive framework. However, Chapter 4 will explain how between 1920 and 1931, Unemployment Insurance was shaped by relative stability in paid benefits, even though there were minor increases in benefit payment in that period. In addition, and probably more important than the established benefit rates, what essentially characterised this period was a high degree of flexibility by the administration and the local offices regarding the requirements for accepting unemployment claims, which came about as a result of multiple exceptions and provisional regulations.

In this initial phase of Unemployment Insurance, there was a substantial difference between the theoretical, and actual paid benefit. However, in general terms, the unemployment benefits gained purchasing power between the second half of the 1920s and 1931, mainly due to the deflationary monetary policy that was in place. This fact led some observers to conclude that the unemployment benefit generosity was the reason behind the structural unemployment in the 1930s (Benjamin and Kochin, 1979). Micro-econometric estimations for the case of London, however, shows no evidence of a link between unemployment benefits and the incidence of unemployment (Hatton and Bailey, 2002; Eichengreen, 1986).

The second set of relevant institutional changes are those related to trade unions and trade boards, which could have affected employment performance thanks their influence on wage bargaining agreements.

Trade unions experienced an important transformation during the trans-war and early interwar period. According to Hatton and Thomas (2012), there was a significant increase

[1]Some sectors, such as agriculture or domestic service, were excluded because they were not considered sensitive to the business-cycle fluctuations.

in the trade union density (members as a share of the labour force), between 1913 and 1920 (from 22% to 44%), before a decline to the pre-war levels (24% in 1931) (Bain and Price, 1983). If the rise of the trade union density had an impact on employment, it is plausible to assume that this influence was dissipated as membership declined through the 1920s, although these years are precisely when the matching efficiency displayed its best performance. For this reason, the direct impact of trade union density on labour frictions is not evident.

Finally, another important institutional change arrived with the Trade Boards Acts of 1918. According to Hatton and Thomas (2012), in trades and occupations without proper structure (i.e. without trade unions), the trade boards acted to fix a minimum wage. They record that there were 63 trade boards in 1921 which covered 3 million workers. Considering both structures (trade unions and trade boards), Thomas (1992, p. 278) estimates that half of the workforce was covered by some kind of collective bargaining agreement in 1920. Yet their coverage declined to 44% in 1937.

Despite their potential importance, the effect of the trade unions and trade boards on wage setting was constrained by the large fragmentation of these institutions in many organisations, with limited capacity for coordination (Hatton, 1988; Thomas, 1992). As in the case of unemployment insurance, it is plausible to assume that the most significant impact of these institutions occurred during the trans-war period rather than the interwar period.

Institutional changes could have interacted with other frictions, such as geographical or skill mismatch between employers and unemployed. Yet institutional changes themselves are unlikely to explain the complete story behind the dynamics of interwar unemployment, which is why other factors and their interactions need to be analysed.

### 2.2.3 Regional and industrial differences

Figures 2.1 and 2.2 map unemployment rates for insured workers in Britain's main regions for June 1924 and June 1930, respectively. Figure 2.1 shows a clear geographical divide in unemployment by 1924, which became significantly amplified in 1930. During this year, the highest unemployment rates were in the northern regions and Wales. London and the rest of the south, and to a lesser extent the Midlands, displayed much lower unemployment rates which evidently meant they had suffered a milder impact from the Great Depression. However in considering Figure 2.1, there were structural elements present previous to the 1929 shock. These regions recovered quickly after the worst years of the depression, in particular the South-East England, which was probably very near to full employment capacity in June 1936.

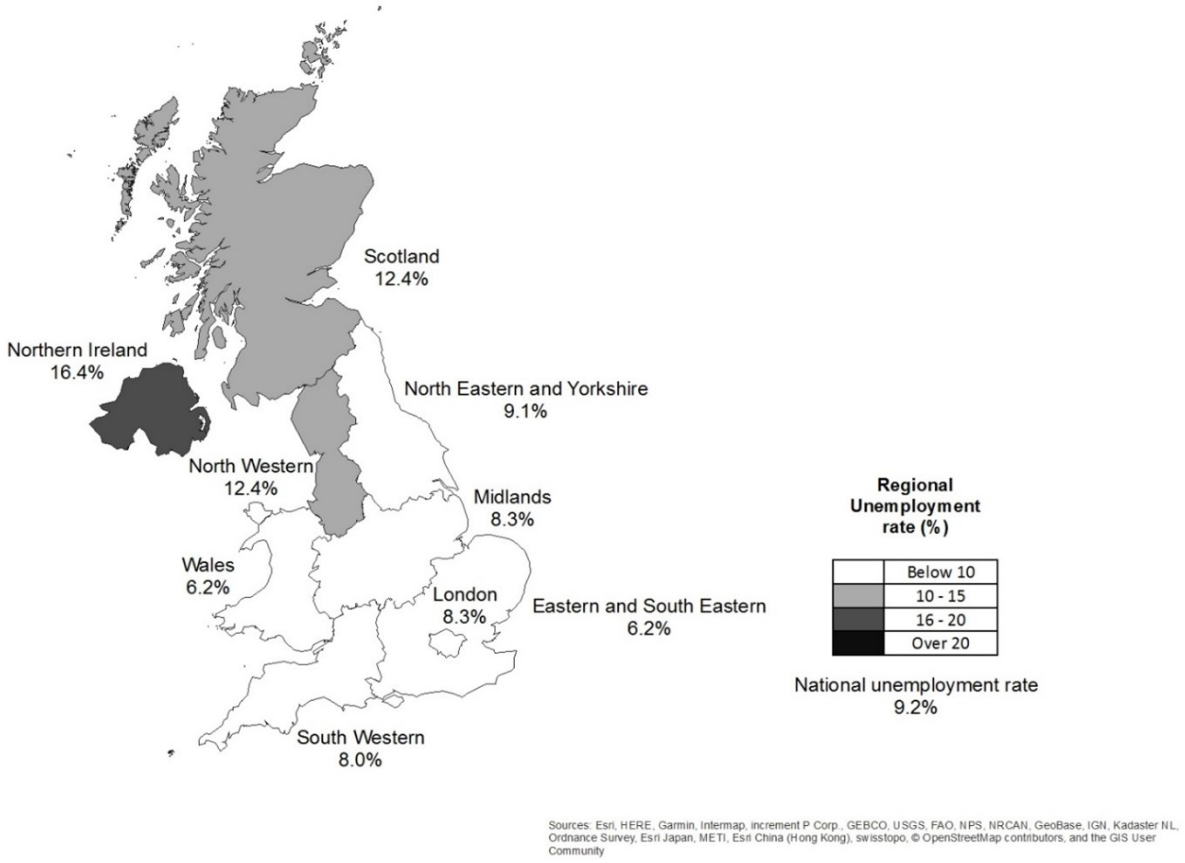


**Figure 2.1:** Unemployment rate by district (insured workers), June 1924

Source: 20th Abstract of Labour Statistics

That regional differences were amplified during the 1920s can be seen contrasting Figures 2.1 and 2.2, and is supported by the econometric results in section 2.5. High unemployment regions were associated with the importance of the five great staple industries (coal mining, cotton, shipbuilding, mechanical engineering and iron). The decline of these industries generated a mass of the unemployed that was not fully able to migrate to other sectors or locations.

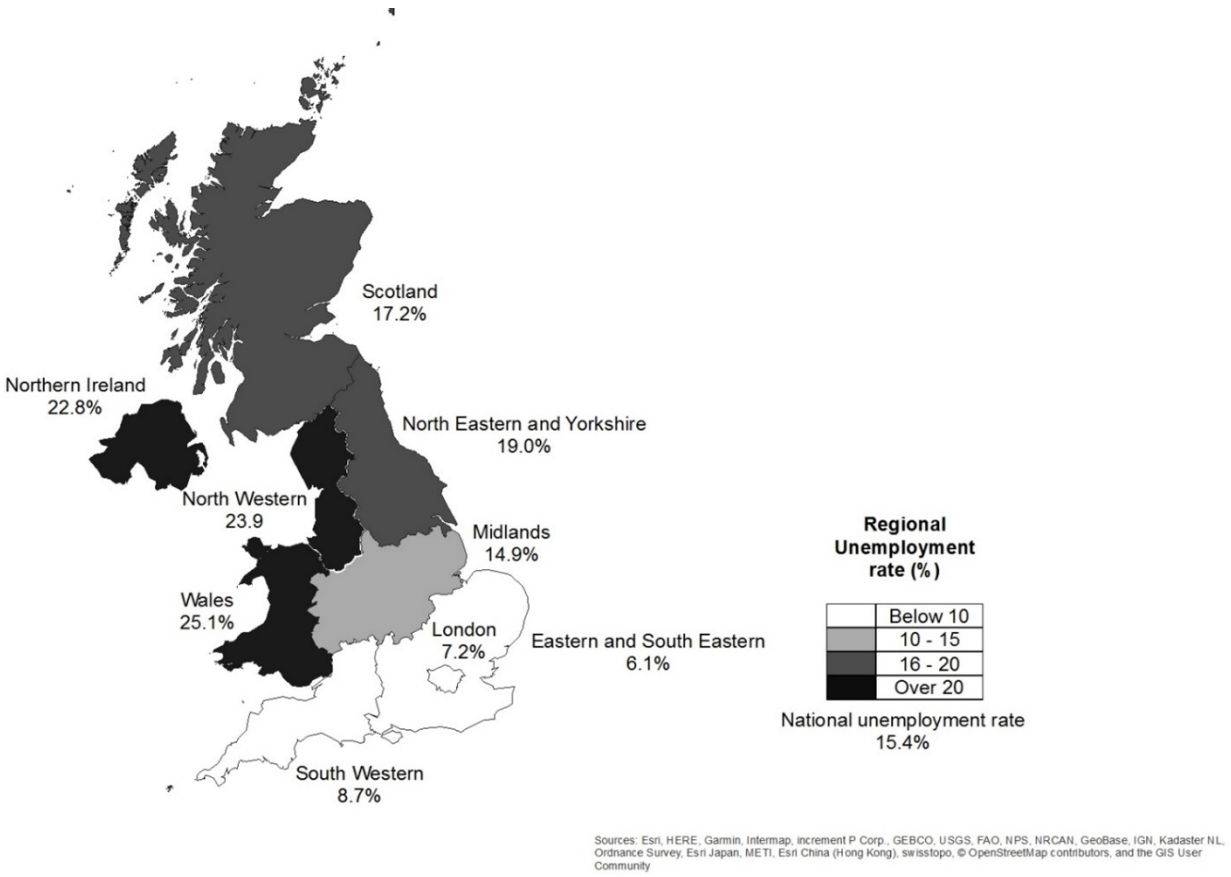


**Figure 2.2:** Unemployment rate by district (insured workers), June 1930

Source: 20th Abstract of Labour Statistics

Table 2.1 shows the unemployment rates for selected years (July) between 1921 and 1933 for the 17 biggest industries, in terms of insured workers, recorded in the National Unemployment Insurance scheme. An unemployed person was considered part of the industry of her last employment. In July 1932, the highest unemployment rate (63.8%) was observed in the shipbuilding and ship-repairing industries, which were heavily affected by the collapse of world trade. Unemployment rates were also high in metal manufacturing

and mining, at 44% and 40.1%, respectively.

**Table 2.1:** Unemployment rate by industry (insured persons), July 1921-1933[a]

| Industry | 1921 | 1925 | 1928 | 1929 | 1932 | 1933 |
|---|---|---|---|---|---|---|
| Building | 15.4% | 9.1% | 11.7% | 10.4% | 30.6% | 26.0% |
| Shipbuilding | 32.8% | 34.9% | 28.3% | 23.0% | 63.8% | 60.1% |
| Engineering, Ironfounding and metal trades | 25.4% | 13.7% | 11.5% | 9.8% | 29.8% | 23.4% |
| Construction of vehicles | 11.7% | 6.9% | 9.7% | 7.6% | 22.7% | 17.6% |
| Sawmilling | 15.2% | 8.2% | 7.3% | 7.0% | 21.9% | 18.3% |
| Chemicals | 14.5% | 8.1% | 6.0% | 5.9% | 13.8% | 12.2% |
| Hotel College, Club, etc, | 11.8% | 8.0% | 5.9% | 6.3% | 14.6% | 13.2% |
| Banking and Finance | 4.1% | 3.3% | 2.2% | 2.5% | 5.5% | 4.7% |
| Transport service | 18.0% | 15.0% | 14.1% | 13.0% | 21.6% | 20.3% |
| Mining | 9.7% | 14.3% | 26.8% | 17.5% | 39.6% | 36.8% |
| Printing and paper trades | 9.8% | 5.0% | 4.1% | 3.8% | 10.3% | 9.0% |
| Textile trades | 13.4% | 15.9% | 14.3% | 13.3% | 29.5% | 20.9% |
| Clothing | 10.9% | 9.0% | 9.8% | 7.3% | 15.6% | 13.1% |
| Food, Drink and Tobacco | 9.5% | 7.4% | 6.8% | 6.6% | 12.3% | 11.4% |
| Public utility services | 8.3% | 5.5% | 5.7% | 5.4% | 10.9% | 10.2% |
| Distributive trades | 6.7% | 5.8% | 5.2% | 5.4% | 11.6% | 11.3% |
| National and Local Governments | 7.1% | 7.3% | 7.0% | 7.3% | 16.0% | 16.9% |
| Others | 15.7% | 10.6% | 9.1% | 8.6% | 19.5% | 16.4% |

Source: Calculated based in the information registered in the Labour Gazette (1921-1933)
a: Some years were omitted. However, for the classification between driver or brake, it was considered the whole 14 years. The completed table is available at the complementary material in the electronic version of this article.

The industry with the lowest unemployment rate in July of 1932 was banking and finance, at 5.5%. Utilities and distributive trades also had a relatively good performance, with unemployment rates of 10.9% and 11.6%, respectively. In the main, the industries with low unemployed rates were either geographically spread or slightly concentrated in the South. This was a fundamental difference to important depressed trades, such as mining or textiles, which were located mainly in the North.

## 2.3 Literature Review on interwar labour frictions

Economic historians have presented different explanations for structural unemployment during interwar Britain, placing particular relevance on labour frictions, although without being properly quantified.

Hatton and Thomas (2012) estimate that NAIRU increased from 5.7% to 9.5% after 1921 and remained at this level for the rest of the interwar period, a finding that indicates the presence of labour frictions that were absent in the past.

The authors compare the experiences of the United Kingdom and the United States in the 1921 crisis and the Great Depression. According to Hatton and Thomas (2012), the differences between the two countries are explained by the interaction between shocks and labour market institutions. In their view, the institutional changes introduced at the beginning of the 1920s in Britain increased the level of labour frictions, and their adverse effect on employment was triggered by the 1921 crisis. As these institutional changes did not occur in the American economy, the United States labour market was able to fully recover from the early 1920s crisis. The opposite took place in the 1930s; the United States set up new regulations with the New Deal, while Britain did not adopt any additional institutional changes.

The interaction between labour institutions and shocks is an important element in understanding the evolution of unemployment. Yet the precise transmission mechanisms

and their magnitude remain unclear.

A potential mechanism is presented by Benjamin and Kochin (1979), who link the high unemployment observed in interwar Britain with the generosity of the Unemployment Insurance. The authors found that the replacement rate, the ratio of the weekly unemployment benefit to the average wage, was a positive and a significant determinant of unemployment for adult male workers. The main constraint with this work, is that the authors used estimated unemployment benefits according to the established rates from the Unemployment Insurance administration, which are not necessarily the same as the actual paid benefits due to the aforementioned reasons.

Eichengreen (1986) put forward a microeconometric estimation of the determinants of unemployment incidence for 27,000 male individuals from the New Survey of London Life and Labour (NSLLL), between 1929 and 1931. He found a positive and significant relationship between unemployment incidence and the replacement rate, although too small to explain the mass unemployment of the interwar period. In the same vein, Hatton and Bailey (2002) followed Eichengreen's approach but with a larger dataset with more variables. They did not find a significant relationship between the replacement rate and unemployment incidence once occupation and skill level are controlled for. This result indicates how relevant these latter variables are in accounting for individual job-finding rates. Important as these results are, the main constraint in the literature by Eichengreen (1986), and Hatton and Bailey (2002) is that their analyses are geographically limited to London, which is not representative of the whole of Great Britain.

Interwar unemployment was geographically concentrated, which is why Booth and Glynn (1975) considered it essentially a regional problem. They emphasize that outside of the depressed regions, Britain saw unemployment rates probably not very different from the pre-1914 period.

A potential relief for regional depressed labour markets could have been a significant migration to the South, but this did not occur. The reasons behind the low internal

migration are part of the puzzle of the persistent regional unemployment differentials in interwar Britain, and there is still no convincing explanation. The existence of subsistence income provided by unemployment insurance could have reduced the incentive to migrate, but other factors, such as skills or housing, need to be considered. However, Chapter 3 finds that spatial mismatching, a concentration of unemployed workers and job vacancies in different regions, only accounted for 21% of the observed labour frictions between 1922 and 1931. In this sense, internal migration from outer Britain towards inner Britain had the potential to significantly reduce unemployment, but the core of the labour frictions was actually within the regions themselves.

The most relevant study on matching efficiency during the interwar period was conducted by Lee (2016), who estimated the matching function in the United States for the period of 1924 and 1932. Using city-month level data on unemployed, vacancies and new hires, he finds no evidence of declining matching efficiency with the Great Depression, at least in its early phase. One interesting result is that the elasticity of the unemployed over the number of matches is estimated at 0.1, meaning that the matching function largely depended of the number of vacancies, and therefore the mass unemployment in the 1930s was mainly due to depressed aggregate demand rather than labour frictions.

## 2.4 Theoretical and econometric model

In a standard model of matching (Pissarides, 2000), the matching function is represented by equation 2.1:

$$M(U_t, V_t) = \Omega U_t^{\xi} V_t^{1-\xi} \tag{2.1}$$

where $M$ is the number of matches, $U_t$ is the number of unemployed, $V_t$ is the number of vacancies, $\Omega$ is an efficiency factor and $\xi$ is the elasticity of the unemployed over the number of matches. Equation 2.1 is a Cobb-Douglas function with constant return to scale, an assumption supported by evidence in Petrongolo and Pissarides (2001) regarding the structure of empirical matching functions.

$\Omega$ is matching efficiency and captures the extent of labour frictions or the number of matches which are not explained by unemployment or vacancies. This constant could be interpreted as the technology through which the unemployed and vacancies are transferred into new matches. $\xi$ measures the elasticity of the number of matches to a change in the number of unemployed.

Equation 2.2 denotes the job-finding rate for the unemployed:

$$f_t = \frac{M_t}{U_t} \tag{2.2}$$

Combining equation 2.1 and 2.2,

$$f = \frac{M(U_t, V_t)}{U_t} = \left(\frac{V_t}{U_t}\right)\left(\frac{M_t}{V_t}\right) = \Omega\theta_t^{1-\xi} \tag{2.3}$$

where $\theta_t = \frac{V_t}{U_t}$, is a measure of market tightness

Taking logarithms at equation 2.3 yields

$$\log(f) = \log(\Omega) + (1-\xi)\log(\theta_t) + u_t \tag{2.4}$$

The monthly deviations from the average matching efficiency $\Omega$ are described by equation 2.5:

$$\mu_t = Log\Omega_t - E_t Log\Omega_t \tag{2.5}$$

where $E_t Log\Omega_t$ is the expected value of $\Omega_t$, or the intercept in the econometric estimations.

There are several potential determinants of matching efficiency deviations $\mu$, but in order to provide a systematic analysis this article will follow the conceptual framework developed by Barnichon and Figura (2015). They developed an analysis of matching efficiency across labour market segments. A segment is a group of workers within a specific district and industry, such as workers in the retail industry in London. The authors argue that matching efficiency is affected by two factors: heterogeneity across workers and segments'

dispersion.

The former measures the variation in matching efficiency due to the composition of the unemployed pool. If the pool of unemployed has a lower job-finding rate than the labour force (due to a high share of groups with a low job-finding rates), then friction in the labour market increases and matching efficiency declines. If for example female workers have a lower job-finding rate and higher separation rate, the rate at what workers leave their jobs, than the male workers, they will also experience a higher rise in their unemployment rate during an adverse economic shock. The overrepresentation of this group in the unemployed pool causes the matching efficiency to be lower during the recovery than prior to the crisis.

The second set of determinants considered by Barnichon and Figura (2015) is the segments' dispersion. This factor measures the friction caused by the geographical or skill mismatch between the unemployed and vacancies. In this case, the unemployed and firms with open vacancies are in different locations or industries, with lower availability of suitable matches.

Any economic crisis affects some industries and occupations more severely than others, generating newly unemployed workers with the skills demanded precisely in those industries with a high unemployment rate. If such industries are facing an adverse business cycle, then migration to other industries requires time and adaptation, which leads to a decline in matching efficiency. In this situation, the unemployed have a skill endowment which is different than that looked at by the firms to cover their vacancies.

Similarly, the high variation in regional unemployment rates in Britain after the depression indicates the importance of geographical dispersion as a source of labour market friction.

Barnichon and Figura (2015) also developed the concept of permeability, which means the degree of mobility from one segment to another. The higher the degree of permeability between segments, the higher the matching efficiency and the resilience of the labour

market. In the presence of high permeability, workers who become unemployed can move quickly towards segments with open vacancies.

Unfortunately, this article cannot fully replicate Barnichon and Figura's methodology, because the information about segments is not available. The econometric estimations control for a set of variables, whose nature can be associated with either heterogeneity across workers or segments' dispersion. In the former group are variables including gender, age or unemployment duration, while in the latter are the shares of unemployed from specific industries.

## 2.5 Estimation results

### 2.5.1 Data and Econometric estimation

Inserting control variables $X_t$ in equation 2.4 yields

$$\log(f) = \log(\Omega) + (1-\xi)\log(\theta_t) + \beta X_t + u_t \tag{2.6}$$

The differences between the estimated job-finding rate and the actual job-finding rate are the deviations of aggregate matching efficiency described in equation 2.5.

To control for heterogeneity across workers, the regressions include the female share of the unemployed, the juveniles share of the unemployed, and the share of temporary stoppages in the unemployed pool. Unemployment insurance split the unemployed population between those who were *wholly unemployed* and *temporary stoppages*. The latter retain some link with their last employer and were called back once the situation improved (Thomas, 1988). In the main, *temporary stoppages* were workers suspended for a period of a maximum of 6 weeks.

The explanatory variables associated with segments' dispersion are the share of unem-

ployed coming from mining, the share of unemployed coming from textiles, the share of unemployed coming from these two trades, and the share of insured workers coming from distributive trades.

The data used for estimations were taken from the Labour Gazette, a Ministry of labour publication. These statistics were gathered monthly from the labour exchanges, which were government offices in charge of facilitating the matching between the unemployed and firms for the population affiliated with Unemployed Insurance. The coverage of this scheme was around 66% and remained stable for the entire interwar period. For this reason, it is plausible that information taken from such exchanges is broadly representative of the labour force.

This article uses monthly data between April 1921 and June 1934. The latter was the last month that the Labour Gazette presented information about unemployment flows, which are essential for the matching function estimation. The Labour Gazette does not show information about unemployment flows between May 1926 and May 1930. Results presented here replace missing flows with estimates based on the Holt-Winters[2] method (Winters, 1960), which in this case is equivalent to a linear interpolation. Data for other variables is complete.

Equation 2.6 was estimated using Ordinary Least Squares models. The series of the logarithm of the job-finding rate was evaluated for stationarity using the Dicky-Fuller test. The null hypothesis was rejected, indicating that this variable is stationary.

### 2.5.2 Results

The econometric results for equation 2.6 are shown in Table 2.2. Model 1 presents the results for the standard aggregate matching function without additional controls, as it is shown in equation 2.4. For this model, the coefficient of the elasticity of the unemployed (Lee, 2016). This finding supports the notion that labour market frictions were initially

[2]A model excluding these years yields similar results.

lower in the United States than in Britain (Hatton and Thomas, 2012).

Model 2 incorporates the variables associated with heterogeneity across workers, while model 3 adds also controls for segments' dispersion. The coefficients for the juvenile share of the unemployed are positive and consistently significant, indicating that this group had a higher job-finding rate than the average of the labour force. The coefficients for the female share of the unemployed are negative in both estimations, but become much less significant once I add controls for the share of unemployed coming from the textile industry. This shows that besides a lower job-finding rate for this group itself, they were overrepresented in the unemployed pool because their major employer was a depressed sector. The share of temporary stoppages in the unemployed pool is negative and significant for both models. Yet this coefficient is sensitive to the incorporation of the explanatory variables associated with the segments' dispersion as is set out in section 2.6.

The monthly deviations of matching efficiency for models 1 and 3 are presented in Figure 2.3. It can be observed that the efficiency levels increased during the first half of the 1920s, particularly after the 1921 crisis. There was a substantial decline in matching efficiency after the Great Depression, as was observed after the Great Recession of 2009 (Daly et al., 2012; Davis, Faberman, and Haltiwanger, 2013). The sharp decline of matching efficiency after 1929, was followed by a recovery in late 1931, although it decreased again from late 1932 onwards. This additional decline is likely associated with the rise in long-term unemployment, revealing the importance of the heterogeneity across workers factors. Yet, it does not explain why in late 1931, matching efficiency moved to a level similar to that of the late 1920s.

**Table 2.2:** Matching function results

Dependent variable: The natural logarithm of Job- finding rate

| | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| The natural logarithm of market tightness | 0.73*** | 0.52*** | 0.54*** |
| | (0.08) | (0.06) | (0.07) |
| Female share of unemployed | | -3.53*** | -3.23* |
| | | (0.77) | (1.67) |
| Juvenile share of unemployed | | 19.65*** | 18.73*** |
| | | (3.16) | (3.72) |
| The share of temporary stoppages | | -1.13*** | -0.98*** |
| | | (0.19) | (0.28) |
| The share of unemployed coming from textiles | | | -0.57 |
| | | | (1.5) |
| The share of unemployed coming from mining | | | -0.43 |
| | | | (0.61) |
| Constant | 2.14*** | 1.03*** | 1.21** |
| | (0.33) | (0.37) | (0.51) |
| $R^2$ | 0.36 | 0.63 | 0.63 |
| Observations | 159 | 159 | 159 |

Notes: * indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1* level. Standard errors are reported in parentheses.

More interesting than the expected fall in matching efficiency in 1929, is the trend change in the second half of the 1920s. Matching efficiency fell from early 1927, well before the

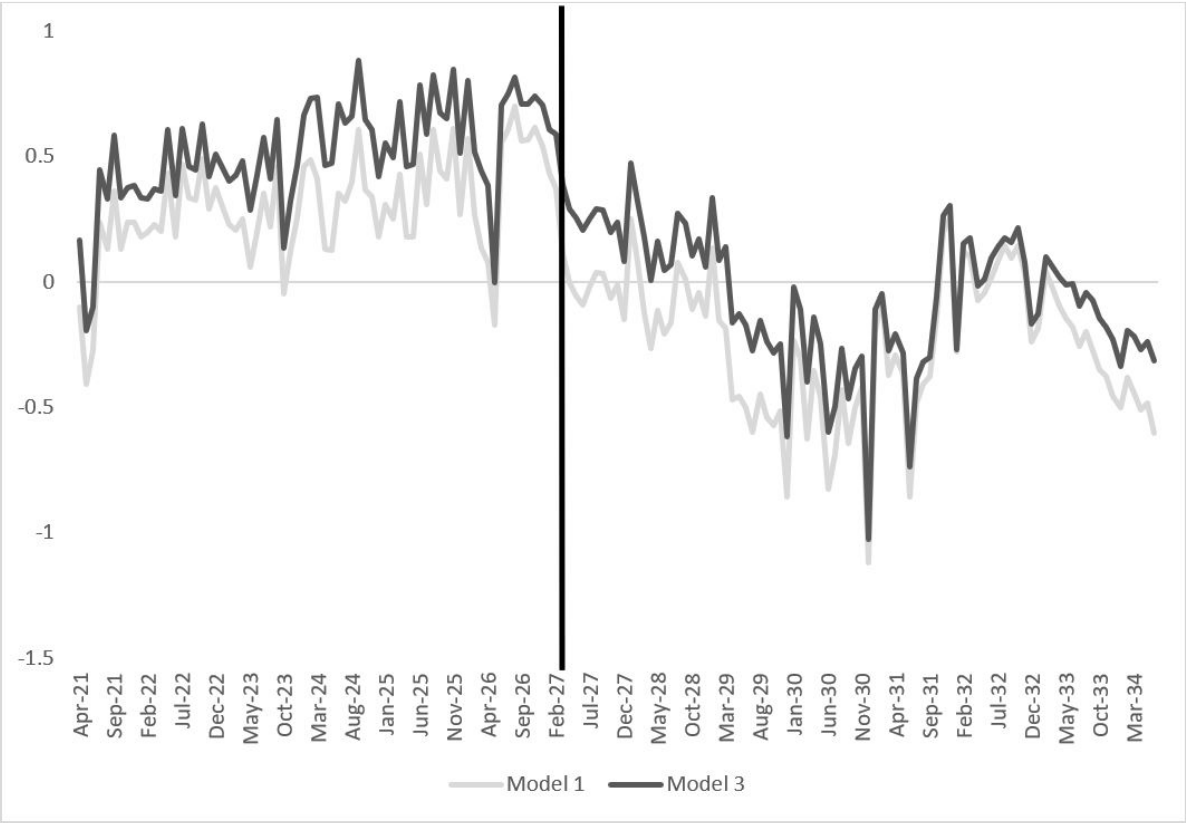


**Figure 2.3:** Monthly deviations of average matching efficiency, April 1921 - June 1934

1929 October shock, when there was a significant decline relative to the levels observed in the first half of the 1920s.

### 2.5.3 Structural break

A Supremum Wald test (Vogelsang, 1997) was used to detect a structural break at an unknown date. This test estimates the month when the probability of a structural break is the highest.

The results of this test show the most probable date for the structural break was March 1927, when the country started to recover from the 1926 coal stoppage. This strike, which lasted eight months from May to December, was a watershed in British labour history. It suspended the coal supply for a range of industries, which soon entered into decline. The impact was especially significant in the metal and cotton industries, which were located mainly in the North, and relied heavily on coal to operate.

This result points out that the two halves of the 1920s were very different in terms of labour market frictions. This was a result of an uneven recovery from the 1926 coal stoppage, a profound shock which involved more than one million miners. In the second part of the 1920s, high unemployment rates in the northern districts, and Wales coexisted with low unemployment rates in the southern districts, and to a lesser extent in the Midlands.

**Table 2.3:** Supremum Wald test for Structural break at unknown date

| | |
|---|---|
| Full sample: | April 1921 - June 1934 |
| Trimmed sample: | April 1923 - July 1932 |
| Estimated break date: | March 1927 |
| Ho: No structural break | |

| Test | Statistic | p-value |
|---|---|---|
| swald | 250.4146 | 0 |

| | |
|---|---|
| Exogenous variables: | The natural logarithm of market tightness, the female share of the unemployed, the juvenile share of the unemployed, the share of temporary stoppages, the share of unemployed coming from textiles, the share of unemployed coming from mining |
| Coefficients included in test: | The natural logarithm of market tightness, the female share of the unemployed, the juvenile share of the unemployed, the share of temporary stoppages, the share of unemployed coming from textiles, the share of unemployed coming from mining |

This difference in unemployment incidence was exacerbated following the Great Depression, but the results of matching efficiency and the structural break test indicate that the roots of the regional divergence were in the mid-1920s. The problems in the backbone industries, combined with the lack of mobility of those who were unemployed towards new emerging industries, were probably the main reason behind the high structural unemployment in interwar Britain. It is in this lack of inter-regional mobility, when segments'

dispersion factors are essential in solving the British interwar unemployment puzzle.

## 2.6 Reasons behind matching efficiency decline

To analyse the role of the segments' dispersion in matching efficiency in more detail, it will be assumed that fluctuations depend on three factors: the job-finding rate, the permeability, and the size of each industry in the economy.

If an industry has a job-finding rate higher than the average of the overall workforce, it will be called a *driver* since it contributes to an increase in matching efficiency. On the other hand, if an industry has a job-finding rate lower than the average of the entire workforce it will be called a *brake*, since it reduces matching efficiency. Unfortunately, it is not possible to estimate the job-finding rate for each industry since there is no information about unemployment flows in each of them. In that case, the unemployment rate will be used as a proxy for the job-finding rate. It will be assumed that these industries with high unemployment have a low job-finding rate, and vice- versa.

The classification between *driver* or *brake* will be based on their outcome relative to other sectors over the period under consideration. Industries such as shipbuilding or textiles had higher unemployment rates for all of the thirteen years that were analysed, than the average of the total labour force. On the other hand, industries such as clothing, or retail trades had unemployment rates lower than the mean of the total labour force for the entire period. A few industries had mixed outcomes, and in these cases, they were classified based on their outcome for most years.

Permeability is the capacity of an industry to provide employment for people, regardless of their skills or location. Since human capital development requires time, it is reasonable to assume that the higher the skill requirements, the lower the industry permeability will be. Geographical spread is also another condition for an industry to be permeable. Since workers' mobility has a cost, it is likely that the geographical proximity between segments

has a positive impact on matching efficiency. In this case, the nearer a vacancy is located, the lower the degree of friction.

Table 2.4 represents a summary of this theoretical framework. A permeable industry is one that is oriented to medium or low-skilled workers, and is geographically spread.

**Table 2.4:** Influence of Skill and Geographical dispersion on the segments' permeability

| | | Geographical concentration | |
|---|---|---|---|
| | | Low | High |
| Skill Level | High | Increase | Increase |
| | Medium | Reduce | Increase |
| | Low | Reduce | Increase |

This article classifies the fifteen major industries (in insured workers terms) by skill and geography, whose details are shown in Appendix 2.1. For the classification of skill categories, the occupation distribution by industry elaborated by Routh (1965) based on the 1951 census was used. Likewise, the geographical distribution of insured workers in December 1926, was used for the classification of the levels of geographical concentration in each industry. As a consequence of the General Strike and the 1926 coal stoppage, the Ministry of Labour conducted a study concerning the impact of the shock on other industries at the time. The outcome of the survey, which was published in the Labour Gazette of January 1927, is used to geographically classify the sectors.

In addition to the job-finding rate and permeability, a third factor, which is important in the behaviour of matching efficiency, is the size of the industry. In order to reduce the labour frictions, the labour market needs permeable drivers large enough to have a positive impact on the aggregate matching efficiency.

Figure 2.4 shows the results regarding permeability and size for these industries, considered as drivers of matching efficiency. The horizontal axis presents a measurement of

geographical concentration, while the vertical axis represents the skill class levels. The size of the circles represent the share of insured workers in June 1926.

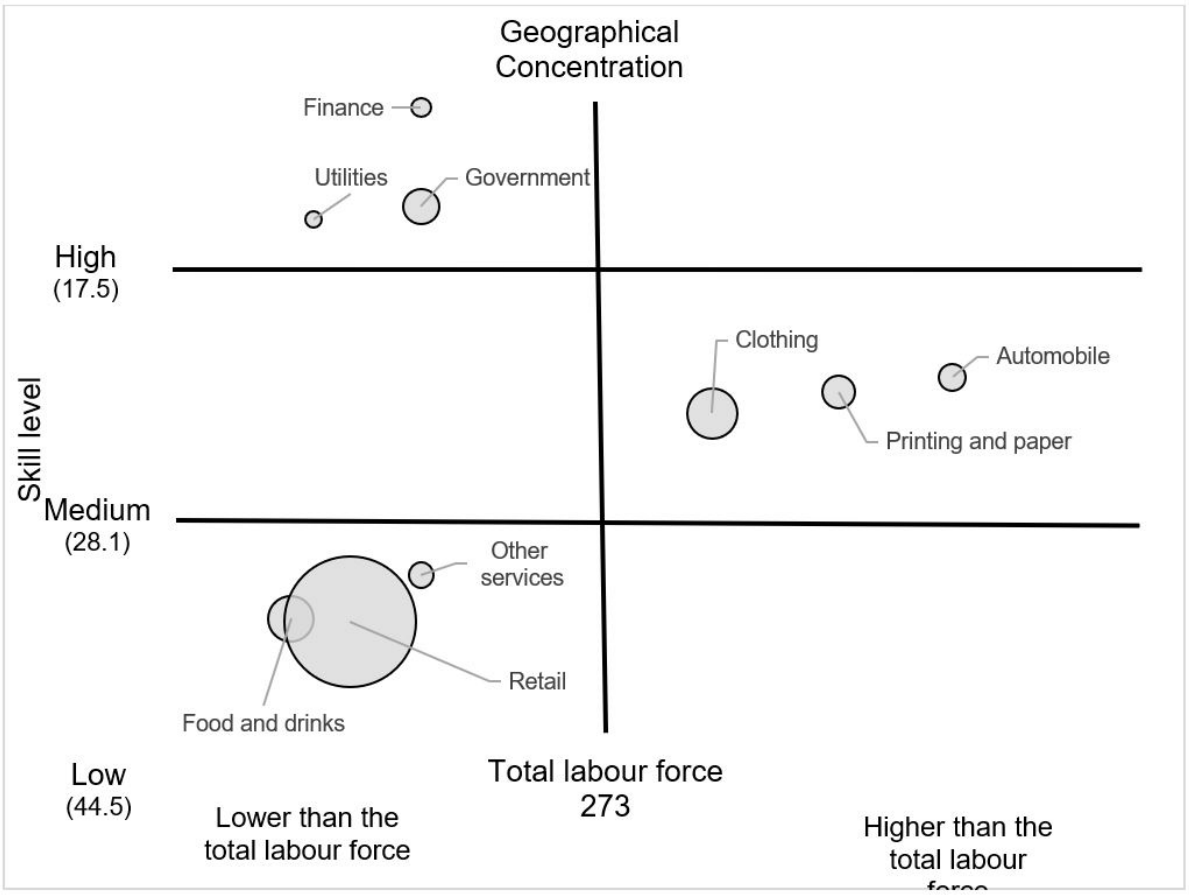


**Figure 2.4:** Drivers classification according to Influence of Skill[a] and Geographical[b] dispersion on matching efficiency

Notes: a) The numbers on the vertical axis between parentheses are the share of each skill class for the total labour force. b) The number in the middle on the horizontal axis in the variance for the total labour force.
Source: Information for Skill classification is from Routh (1980). Information for geographical concentration classification is from Labour Gazette January 1927

In the interwar period, several industries were permeable drivers, but it was the retail trades which had the largest share in terms of insured workers. This industry, which had a high proportion of low-skilled workers and was geographically spread, grew rapidly in the first half of the 1920s, leading to a significant improvement in matching efficiency.

On the other hand, the results concerning the permeability of industries considered as brakes are presented in Figure 2.5. The most important brake industries (mining and

textiles) in terms of insured workers were non-permeable due to the fact that they were geographically concentrated. The decline of these industries in the second half of the 1920s left a significant share of insured workers unemployed, and far away from locations with job vacancies. This increase in the average distance between the unemployed and job vacancies laid behind the decrease in matching efficiency in the second half of the 1920s.

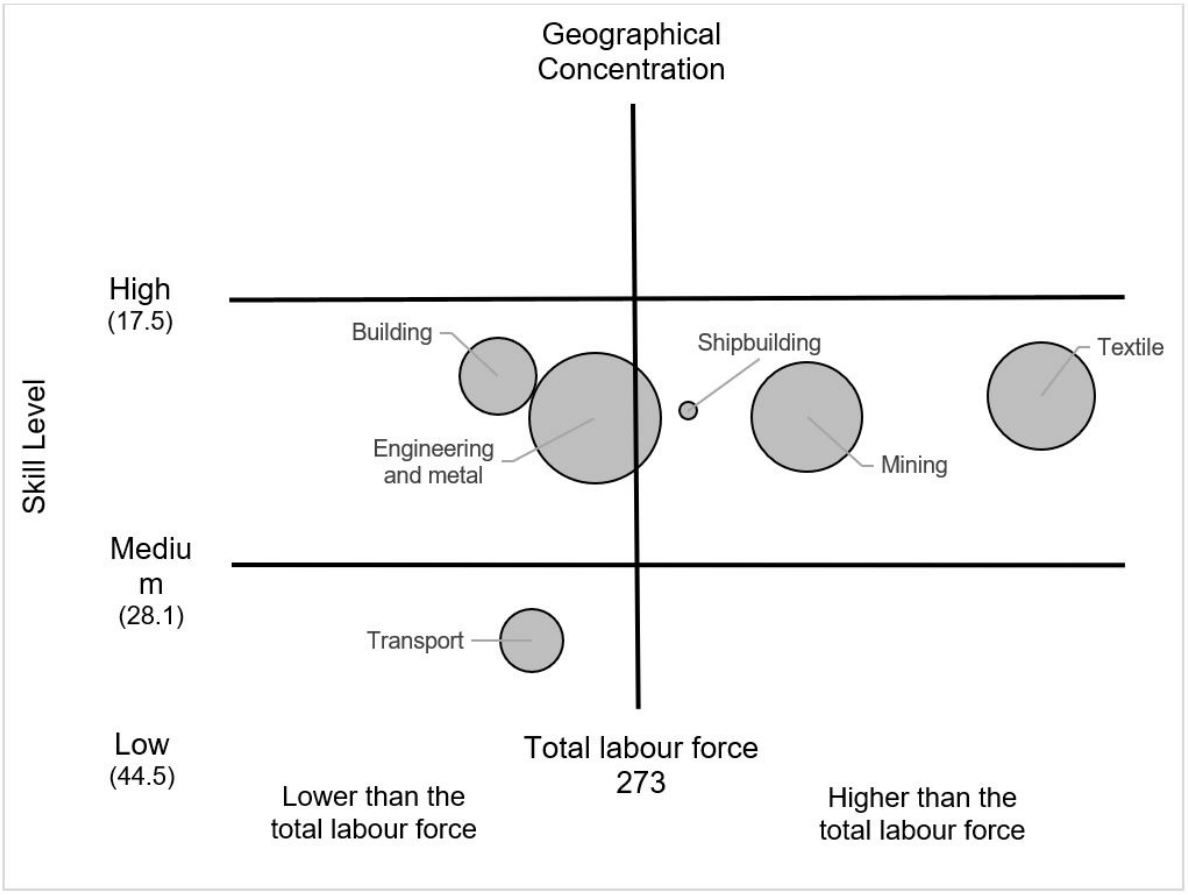


**Figure 2.5:** Brakes classification according to Influence of Skill[a] and Geographical[b] dispersion on matching efficiency

Notes: a) The numbers on the vertical axis between parentheses are the share of each skill class for the total labour force. b) The number in the middle on the horizontal axis in the variance for the total labour force.
Source: Information for Skill classification is from Routh (1980). Information for geographical concentration classification is from Labour Gazette January 1927

### 2.6.1 The retail revolution

Retail experienced a boom during the interwar period, but especially throughout the 1920s. In this decade, the industry evolved from local stores towards national chains. The increase in purchasing power and the adoption of mass consumption required the development of a sophisticated distribution channel, able to reach a wide consumer base. The development of mass production technology led to a separation between the production and distribution tasks due to an increase in the size of firms, and standardisation of products (Jefferys, 1954).

The share of insured workers in the retail industry was 13.9% in 1929, up from 7.9% in 1921. At the end of the 1920s, the retail industry became Britain's main employer, a position historically occupied by the textile industry. This massive incorporation of new workers and unemployed into the retail sector would be the key to matching efficiency improvement in the early 1920s and the south of England's resilience during the Great Depression. By then, tens of thousands of workers were located in an industry mildly affected by the crisis. In July 1932, when unemployment was at its highest, the unemployment rate at national level in the retail trade was only 11.6% while for the insured population the rate was 22.8%.

Despite such an important contribution to matching efficiency, the retail industry could not prevent a structural decline after March 1927, as its influence was mainly seen in the early 1920s. Between July 1921 and 1926, the number of insured workers in the retail trade increased by 56.1%, while between July 1926 and 1929 it only increased by 11.1%. This moderation in the expansion of retail coincided with the structural break in matching efficiency.

It is likely that this industry continued to exert a positive influence on matching efficiency in the second half of the 1920s. Yet it did not grow strongly enough to compensate the crises in the mining and textiles industries. The retail's share in insured workers continued expanding throughout the 1930s, although at a slower pace than in the first half of the

1920s, when the industry incorporated almost half a million workers.

### 2.6.2 Coal mining and textile's decline and the deterioration in matching efficiency

The bad performance of the great staple trades was constant throughout the 1920s. Yet it was with the general strike (May 1926) and the 1926 Coal Lockout that these industries started to have a significant negative impact on matching efficiency.

Most of the industries shown in Figure 2.5 are classified as intensive in mid-skilled workers, which implies that the main difference between them was geographical concentration. There were industries such as mining and textiles which were significantly concentrated precisely in the depressed areas in the North, Scotland and Wales. On the other hand, there were brakes such as engineering or building, largely spread over the whole of Britain. This difference in geography explains the difference in the unemployment dynamic in the two halves of the 1920s.

Between 1921 and 1926, a significant share of the unemployed came from industries with low geographical concentration. In July 1921, engineering, iron-founding and metal trades were the industries with the highest share in the pool of unemployed workers (29.5%). In July 1925 this share was, however, only 16.9% and it continued to decline in the second half of the decade to up to as little as 13.3% in July 1929. To a large extent, this decline was due to this group of industries reducing their number of insured workers by more than 450.000 between 1921 and 1925, rather than by a significant improvement in their operation. Although many of them left the labour force, others doubtless migrated to industries with better prospects such as retail, which in the same period saw an increase in the number of insured workers by more than 490.000 individuals.

In the second half of the 1920s, the unemployed came mainly from industries which were highly geographical concentrated. Two industries, mining and textiles, accounted for

around one-third of the unemployed between July 1926 and July 1929. Yet it was mining which contributed the most to the structural break in matching efficiency.

In the first half of the decade, the unemployment rate in the mining industry was below the national average. However, in 1925 problems in this industry began with the restoration of the Gold standard (April 1925), leading to the general strike in May 1926 and the coal lockout during most of 1926 (McIlroy, Campbell, and Gildart, 2004). In July 1927 and 1928, the unemployment rate in coal mining was 19.9% and 26.8%, respectively, while the national rates were 9.1% and 11.6%. In those two years, almost one in four of the unemployed came from the coal mining industry. Many of these unemployed were temporary stoppages which after 1929 became wholly unemployed, and likely became long-term unemployed after 1931. Here was planted the seed of a bifurcated labour market in Britain as described by Thomas (1988).

As in coal mining, the textile industry was highly concentrated in geographical terms, which is why it was a non-permeable brake and was costly to leave. Due to the sizes of these industries, their impact on matching efficiency was probably substantial. In addition, the textile industry used the temporary stoppages institution intensively. This fact, which at first sight may appear to have relieved the problem, could have increased expected the unemployed costs of migrating to the service sector in the South.

The unemployed in the first half of the 1920s had a different profile from those in the second half. Throughout the whole decade, the unemployed came from mid-skilled groups, but after 1926 they started to a large extent to emanate from specific regions. In this sense, the structural break of matching efficiency is associated with regional divergence, which significantly increased the mobility cost between industries.

### 2.6.3 Industrial composition and matching efficiency

Two additional models were estimated incorporating interactions between dummies, after and before the structural break, and explanatory variables associated with the segments'

dispersion. Model 4 incorporated an interaction between the share of unemployed coming from the textile and mining industries and a dummy for the months after the structural break. The coefficient for this new variable is negative and significant, indicating how important these industries were in explaining the decline in matching efficiency after March 1927.

Once the interaction is incorporated into the estimations, the coefficient for the share of temporary stoppages becomes positive, which is probably due to the fact that this kind of unemployed workers was more common in the five great staple industries after the 1926 coal stoppage. These industries had between 70% and 80% of the total of temporary stoppages between July 1926 and July 1934.

**Table 2.5:** Matching function results with interactions before and after structural break
Dependent variable: The natural logarithm of Job- finding rate

| | Model 4 | Model 5 |
|---|---|---|
| The natural logarithm of market tightness | 0.59*** | 0.47*** |
| | (0.05) | (0.04) |
| The female share of the Unemployed | -1.25 | -2.66* |
| | (1.05) | (1.09) |
| The juveniles share of the unemployed | 8.23*** | 8.50*** |
| | (2.79) | (2.36) |
| | ( 2.79) | ( 2.36) |
| The share of temporary stoppages | 0.48* | 0.34** |
| | (0.23) | (0.18) |
| The share of unemployed coming from textiles | -2.72* | -2.05* |
| | (1.15) | (0.99) |
| The share of unemployed | -1.90*** | |
| coming from the two major depressed trades*dummy after structural break (June 1926) | (0.18) | |
| The share of insured workers | | 5.36*** |
| coming from distributive trades*dummy before structural break (June 1926) | | (0.38) |
| Constant | 1.84*** | 0.99*** |
| | (0.31) | (0.26) |
| R2 | 0.79 | 0.84 |
| Observations | 159 | 159 |

Notes:* indicates statistical significance at the 10% level, ** at the 5% level, and *** at the 1* level. Standard errors are reported in parentheses.

Model 5 included an interaction between the share of insured workers coming from distributive trades and a dummy for the months before the structural break. The coefficient for this new variable is positive and significant, indicating that the increasing population working in the distributive trade was the main driver behind the improvements in

matching efficiency in the first half of the 1920s.

The results shown in table 2.5 are useful for solving the puzzle of unemployment in interwar Britain. They indicate that there was a significant change in the second half of the 1920s which generated two different groups displaying opposite trends. The first group comprised the workers with a high job-finding rate and to a great extent, was located in the South. Within this group, there were many workers who successfully moved to an industry with a high permeability, as occurred in the retail industry during the first half of the 1920s. This is why the retail revolution was at the core of the British labour market resilience during the Great Depression. The distributive trades not only had a good performance during the whole interwar period but were also highly permeable, which allowed a relatively fast recovery in the 1930s once the aggregated demand started to grow.

The second group consisted of those workers with a low job-finding rate, many of them located in the North and working in the great staple industries. These workers were not able to move to more resilient segments in the 1920s. Within this group, many workers became temporary stoppages in the second half of the 1920s, wholly unemployed after 1929 and eventually long-term unemployed in the 1930s. The size of this group can explain the high structural unemployment in interwar Britain. Their weak position as a result of the mining and textile decay in the second half of the 1920s, left them in a fragile position for the strong shock of the Great Depression.

## 2.7 Conclusions

The analysis of the labour frictions through the matching function offers a plausible explanation for both the structural unemployment in interwar Britain, and the relative employment resilience found throughout the Great Depression regarding other industrialised countries.

As the econometric results show, there was a structural break in matching efficiency in the middle of the 1920s, indicating two very different periods in this decade. The first half of the 1920s was characterised by significant improvements in matching efficiency, while the second saw a significant worsening in this variable. During the interwar period, matching efficiency fluctuations were determined largely by the segments' dispersion factor, generated by the industrial reshuffling observed.

Such industrial re-composition in the 1920s increased the demand for workers in those industries oriented to the internal market. At the same time, industrial re-composition reduced employment in industries oriented to exports, which had formed the core of economic prosperity since the time of the Industrial Revolution. This process increased the distance between unemployment and vacancies in terms of industries and geography.

This geographical mismatch appears to be a structural determinant of the worsening of matching efficiency after March 1927 and one of the main reasons behind the high structural unemployment in interwar Britain. The lower matching efficiency in the second half of the 1920s was largely influenced by the problems in coal mining and the textile industries. The high incidence of the unemployment of workers in these industries explains the high and persistent unemployment rates in the Northern districts, Scotland and Wales; these rates contrast with the resilience of the Southern districts, London and the Midlands. In this period, the unemployed and job vacancies were separated by geography, presenting a significant difference with the first half of the decade when the unemployed were more geographically spread.

On the other hand, in the first half of the 1920s matching efficiency saw significant improvements. What led to such progress was the emergence of the modern retail industry, which was able to absorb a significant share of the unemployed and newcomers to the labour force. The retail industry was a highly permeable industry as it required large numbers of low-skilled workers and were geographically spread, which is why their growth reduced the degree of labour frictions. Such successful retail industry expended more dynamically in the south of England, which was mildly affected by the Great Depression,

explaining the relative low level of unemployment rates in the early 1930s.

# Appendix 2.1

For the classification of skill categories, the occupation distribution by industry elaborated by Routh (1980) based on the 1951 census was used. The occupations classified as professionals (category 1) and clerical workers (category 3) are considered to be high-skilled workers. The occupations classified as foremen, supervisors and inspectors (category 4) and skilled manual workers (category 5) are considered mid-skilled workers, while semi-skilled (category 6), and unskilled (category 7) are considered low-skilled workers. Category 2 (employers and propitiators) was excluded from the analysis due to its inclusion of high and low skilled workers

The difference between the percentage of workers in each occupation and the percentage of workers in each occupation for all of the insured population was estimated and normalised (at this latter value) for each industry. For instance, the share of clerical workers in the chemical industry is 16.02%, while the share for all the insured population is 10.85%. The difference between the two values (normalised in the latter) was estimated at 47.6% which means that the chemical industry has 47.6% more clerical workers than the average of all other industries, and therefore these kinds of workers are over-represented. This article considers the category with the highest over-representation in each industry for its skill classification.

The geographical distribution of insured workers in December 1926, was used for the classification of the levels of geographical concentration in each industry. As a consequence of the General Strike in May 1926 and the coal stoppage, the Ministry of Labour conducted a study concerning the impact of the shock on other industries at the time. The Labour Gazette published the outcome of the survey in January 1927. This study classified insured workers into three main regions in Britain: group 1 was composed of the Northern Districts, Scotland and Wales; group 2 was comprised of the South-West and

the Midlands, and group 3 was made up of the South-East and London. These groups had a worker share in the insured population of 52.5%, 22.2% and 25.3%, respectively.

The difference between the share of insured workers in each industry and the share of all insured workers was estimated. Then, the variance of these three values for each industry was estimated. If the variance for an industry was higher than the average for all industries, then this industry was considered geographically concentrated.

# Chapter 3

## How important is regional polarisation in explaining structural unemployment?

### *The case of the first Western deindustrialisation*


## Abstract

This article aims to examine the impact of polarization in regional labor markets on labor frictions by examining the case of interwar Britain. Using an original dataset from the regional returns of the unemployment insurance administration, this article estimates the aggregate and regional Beveridge curve shifts for with a vector error correction model (VECM). This estimation allows the breakdown of labor frictions into spatial mismatching (interregional frictions) and frictions within regions. They accounted for 21% and 79% of structural unemployment, respectively.


## 3.1 Introduction

Substantial and persistent regional differences in unemployment rates have become a common characteristic of several advanced economies, particularly after major economic shocks such as the Great Recession (2007-09) (Fogli, Hill, and Perri, 2013; Beyer and Smets, 2015; Karahan and Rhee, 2019). The regional employment differences currently

observed in Europe and the United States are probably due to a long-running divergence trend (Moretti, 2012; Rosés and Wolf, 2019), which has its roots in the great structural change that deindustrialisation created from the 1980s onwards. Deindustrialisation had a clear uneven impact across European and American regions, with rising unemployment in places dependent on heavy industries and a concentration of job opportunities in areas that successfully developed high-tech industries or high value-added services. Considering this, deindustrialisation has the potential to increase structural unemployment through either the skills or spatial mismatching channels.

The coexistence within the same aggregate labour market of booming regions with an abundance of unfilled job vacancies and depressed regions suffering high unemployment has the potential to explain structural unemployment. This latter phenomenon is defined as a type of unemployment that is independent of regular business cycle fluctuations and is explained by labour frictions, that is, transaction costs between the two sides of the labour market: the unemployed and employers with job vacancies (Pissarides, 2000; Daly et al, 2012; and Sahin et al, 2014). If unemployed workers and job vacancies are located in different regions within the same country, there is an evident transaction cost, which increases structural unemployment. In other words, spatial mismatches are a potential, although not the only, driver of structural unemployment.

The economic literature has documented different explanations for structural unemployment in addition to spatial mismatching, such as skills mismatching (Entorf, 1994; Jackman and Savouri, 1999), the fact that unemployed workers have experience in shrinking industries while job opportunities are in booming industries (Barnichon, Elsby, et al., 2012), or the existence of discrimination against the long-term unemployed (Blanchard and Summers, 1986; Crafts, 1989; Mathy, 2018). However, usually all of these individual drivers overlap, which is why it is difficult to identify the main reason for structural unemployment. This difficulty is particularly notable during periods of structural change, when both geography and skills usually lead simultaneously to persistent unemployment.

This chapter aims to establish the impact of spatial mismatching on structural unem-

ployment in the case of the first Western deindustrialisation, which occurred in interwar Britain. Throughout this period, Britain suffered high and persistent unemployment characterized by enormous regional differences (Scott, 2007; Luzardo-Luna, 2020) due to the decline of Industrial Revolution industries (coal mining, textiles, metal works, and shipbuilding) located mainly in the north of England, Scotland and Wales. In contrast, southern England saw a period of sustained prosperity, with low unemployment and an abundance of unfilled vacancies in a booming services sector and new mass production industries. This structural change was accelerated by two major crises, the 1926 coal lockout and the Great Depression, which had devastating consequences for the Industrial Revolution industries but had only a mild effect on the emerging sectors. In accelerating the ongoing deindustrialisation, the interwar crises led to a polarized regional labour market. Such a geographical divide suggests an increase in labour frictions caused by spatial mismatching, although how important these were relative to other frictions (such as skills mismatching), and why the market forces did not close the regional gaps, has not yet been established.

To measure the impact of spatial mismatching on interwar Britain's labour frictions, this article breaks down the national Beveridge curve, a measurement of the level of labour frictions, into regional Beveridge curves for the period 1922-1931. Using a new dataset from the weekly returns of the regional unemployment insurance administrations, this empirical strategy allows the separation of the spatial mismatch effect (interregional frictions) from frictions within the regions.

This article is composed of three sections plus this introduction. The first section discusses the geographical nature of structural change in interwar Britain and the manner in which the new dataset allows for a better assessment of this problem. The second section estimates the aggregate and regional Beveridge curves, finding a significant increase in labour frictions after 1929 as a result of the Great Depression. The third section estimates the drivers of the Beveridge curve shifts with a vector error correction model (VECM) and finds that spatial mismatching accounted for approximately one-third of the national

labour frictions. For this reason, interregional labour mobility could have substantially reduced structural unemployment, although frictions within the northern England regions were the main reason for the high interwar unemployment.

## 3.2 Structural change and regional labour markets

### 3.2.1 The national and regional unemployment rates

Figure 3.1 shows the annual unemployment rates for Britain between 1920 and 1939. Starting from a position of full employment in the aftermath of the First World War, unemployment climbed rapidly with the 1921 crisis. This shock was partially reversed in the first half of the 1920s. However, in the second half of that decade, the decline in unemployment halted before beginning to soar again between 1929 and 1932 as a result of the Great Depression. For the remainder of the 1930s, the rate of unemployment steadily declined, although it did not reach the full employment level that was previously observed in 1920. Despite significant fluctuations, the national unemployment rate never dropped below 7%, which is to a large extent explained by the labour frictions (Hatton and Thomas, 2012; Luzardo-Luna, 2020) that operated in the interwar period, triggered by structural change in the form of deindustrialisation.

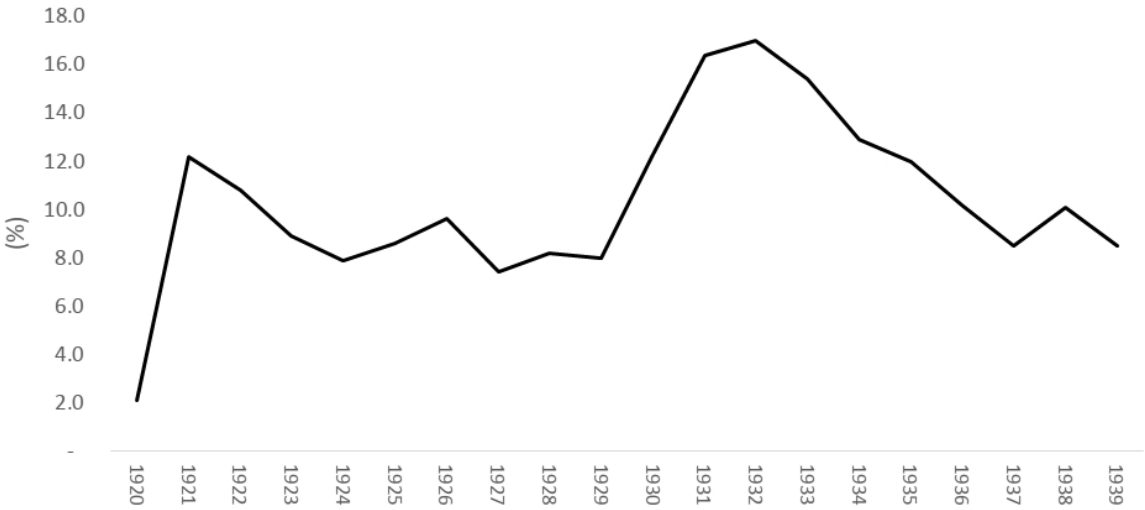


**Figure 3.1:** Annual unemployment rate for Britain, 1920-1939

Source: Boyer and Hatton, 2002.

Unemployment brought about by deindustrialisation had an important regional aspect because the industries in decline were very localized rather than spread across the country. Behind the aggregate national unemployment rate, there was enormous spatial heterogeneity, which was a result of differences in industrial composition. Figure 3.2 display the regional unemployment rates in the population covered by the unemployed insurance system for six main British macroregions: the northeast of England, the northwest of England, the Midlands, the south of England, Scotland, and Wales. Despite this scheme not including the entire working population, it had a great degree of representativeness, as it covered 70% of the labour force (Thomas, 1988) up to 1934. Before that year, unemployment insurance had excluded some sectors, such as agriculture and domestic services, that were not considered sensitive to business cycle fluctuations. As these sectors probably registered unemployment rates lower than the average, the regional unemployment rates are not comparable either after, or before 1934.

Figure 3.2 presents three types of regions. On the one hand, there were the regions with high unemployment levels, so-called outer Britain, where the core of deindustrialisation occurred. These regions, which included the northeast and northwest of England as well as Scotland and Wales, relied heavily on the industries of the Industrial Revolution,

such as mining, textiles, metal works and shipbuilding, which fell into decline after the First World War. These industries, strongly export-oriented, were affected by the sharp reduction in international trade throughout the interwar period as well as the arrival of new competitors and substitutes (Scott, 2007).

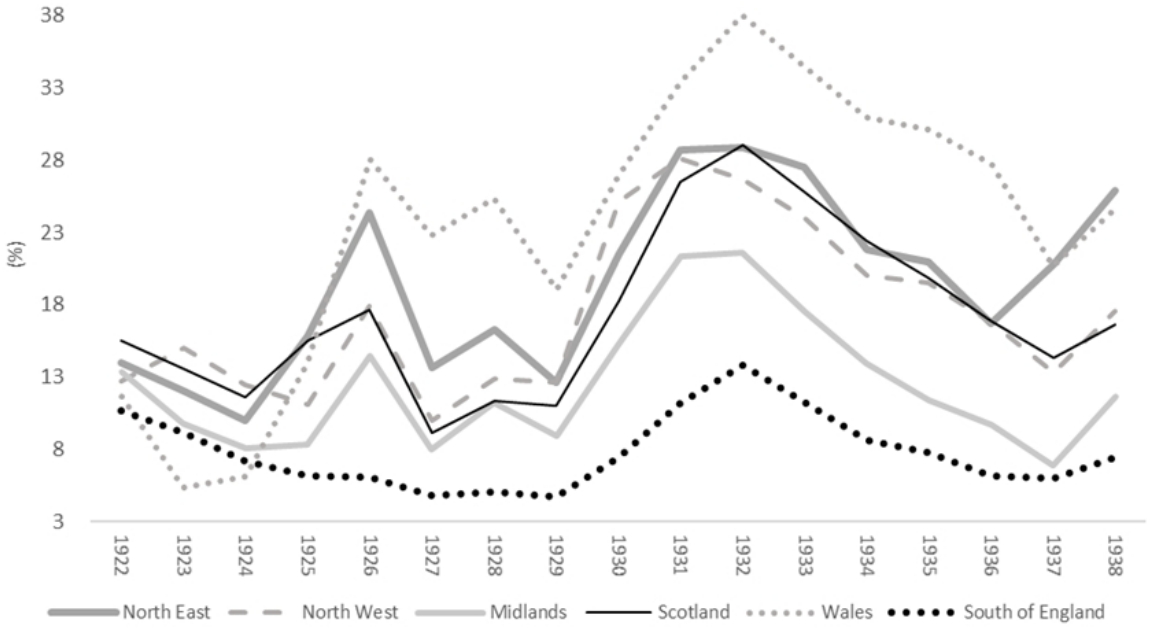


**Figure 3.2:** Regional Unemployment rate for the insured population for July, 1922-1938

Source: Estimated based on the Ministry of Labour Gazette for the number of unemployed

The second type of region, represented by the south of England, was so-called inner Britain, which experienced structural change in the opposite direction. Unlike the north of the country, the south benefited from a switch towards an economy focused on services and the internal market. The development of mass consumption increased the demand for workers in retail, which had become the main employer in Britain by the late 1920s, overtaking textiles and clothing, and demanded a vast number of low-skilled workers (Luzardo-Luna, 2020). Even in 1932, with the Great Depression at its height, the south of England saw an unemployment rate substantially lower than the levels observed almost everywhere else in the other industrialised countries. In other words, Britain's 'mild' Great Depression was essentially a southern phenomenon.

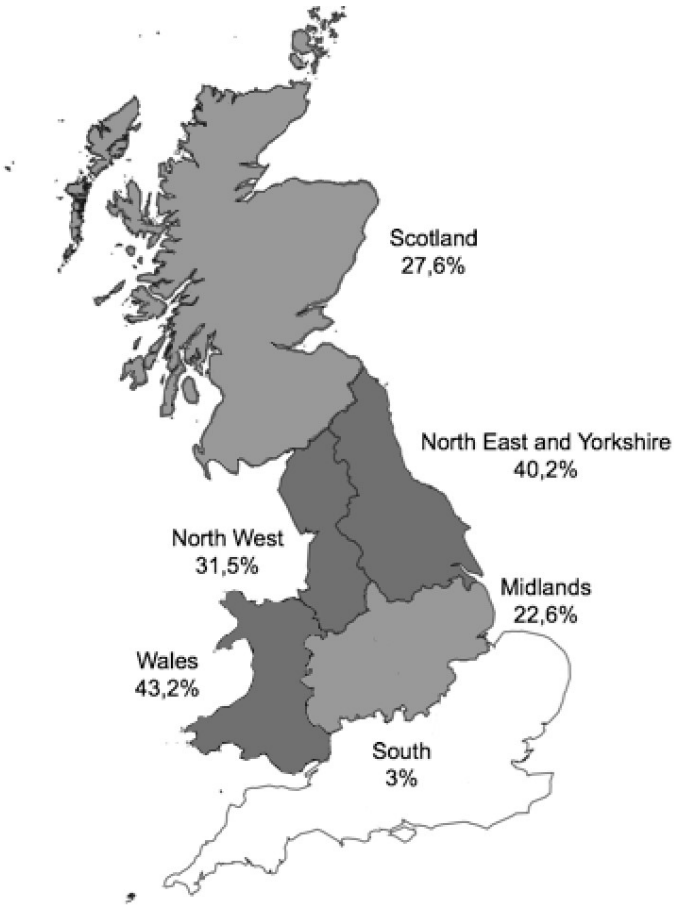


**Figure 3.3:** Share of the 'Industrial Revolution' (mining, textiles, shipbuilding and metal works) industries in the employed population in 1921.

Source: Estimated based on the Lee, 1979

Finally, the third type of region is represented by the Midlands, which was originally in a similar position to the outer regions of Britain but adjusted better to structural change and reduced its gap with inner Britain. Similar to the regions in the north of England, the Midlands region was also significantly affected by the General Strike of 1926 and the Great Depression. However, with a more diversified economy and an increasing share of the new mass production industries, such as automobile manufacturing or processed food, the Midlands substantially reduced its gap with the south of England.

Unfortunately, the case of the Midlands was the exception rather than the rule. The fact is that the interwar period was a time of regional divergence in terms of employment. From as early as 1922, there was an outer-inner Britain divide, but throughout the 1920s, this difference augmented. The general strike of 1926 seemed to be the tipping point in

interwar regional polarization. This conflict, which occurred between 3 and 12 May 1926 and involved almost every industrial sector, was followed by the 1926 coal lockout. This second strike paralyzed most of the coal mining industry for the remainder of 1926, affecting all of the industries that relied on power supply, such as textiles and metal works (The Ministry of Labour Gazette, January 1927).


**Figure 3.4:** Regional Unemployment rate July 1926

Source: Estimated based on the Ministry of Labour Gazette.

The shocks of 1926 had a devastating effect in most parts of Britain, except in the south, where the impact was marginal. While unemployment soared to over 20% in the northeast of England and Wales, it remained close to 6% in the south of England. It is worth noting that unemployment rates for the regions of outer Britain should be read as a minimum threshold in this year due to the unemployment insurance administration excluding miners who took part in the strikes from its records (and benefits) (The Ministry

of Labour Gazette, January 1927). This fact substantially reduced the official number of unemployed workers in areas such as Durham, Northumberland, and Wales, where coal mining was the main employer. The Great Depression amplified the outer-inner Britain divide, again due to the impact on the old manufacturing industries being greater than that on the service sector or other emerging industries.

The interwar period saw major structural change, accelerated by the 1926 shocks and reinforced by the Great Depression, leading to rapid deindustrialisation with effects that were geographically concentrated in the outer Britain regions. This regional polarization increased labour frictions due to many unemployed workers being faced with not only occupational switching costs but also potential migration costs, as the majority of job opportunities were now based in the south of England.

### 3.2.2 A new dataset

The main source of information regarding British interwar unemployment is the records of the unemployment insurance administration, whose main statistics were regularly reported in the Ministry of Labour's publications, such as the Ministry of the Labour Gazette or the Abstracts of Labour Statistics. Both publications provide detailed statistics regarding the labour market situation at that time, including unemployment rates, the insured population, strikes, and wages, which is why they have been the main sources used in the economic history literature (Eichengreen and Hatton, 1988; Thomas, 1988; Hatton and Thomas, 2012; Luzardo-Luna, 2020). Important as they are, these sources focused mainly on describing the state of the national labour market rather than regional or local dynamics, which represents a major constraint in establishing the impact of spatial mismatching on interwar unemployment in Britain.

The Ministry of the Labour Gazette, a monthly publication, began to publish regional unemployment rates from 1927 onwards but does not provide the number of vacancies at the regional level. Likewise, the Abstracts of Labour Statistics, an occasional publication

issued with gaps of two or four years, presents a summary of the main statistics compiled by the Ministry of Labour. Although, the Abstracts of Labour Statistics show annual regional unemployment rates from 1923 onwards, they also do not report the number of vacancies by region. Due to this constraint, these two sources, useful at the national level, do not allow us to establish how much of the unemployment was structural at the regional level.

This article uses a new dataset: the statistical returns received by the Ministry of Labour from its regional branches. These unexplored records provide weekly information on regional unemployment figures and vacancies, which was also the raw data used by the Ministry of Labour's publications. This regional and high-frequency dataset allows me, with the econometric analysis, to establish how much of structural unemployment were due to spatial mismatch or labour frictions within regions.

The records are available from 17 April 1922 up to 2 November 1931, when the returns stopped registering unfilled vacancies. Figure 3.5 shows the weekly and seasonally adjusted unemployment rates for the six main regions of Britain. This graph shows not only the differences in the impact of the 1926 crisis, already observed in the annual data, but also the duration of the shock. The regions of the north of England and the Midlands experienced a strong initial shock, which was followed by a slow and gradual recovery during 1926 and 1927. This fact is probably related to the way in which the coal lockout ended. Due to the exclusion of miners who took part in the strike from unemployment benefits, the trade unions and miners gradually desisted from mobilization and resumed their work. The last miners on strike, the minority by late 1926, came back to work in December 1926 (Ministry of the Labour Gazette, January 1927). The gradual demobilization of the strike allowed the economic reactivation of the power-supplied manufacturing industries in these areas, although unemployment only returned to pre-May 1926 levels by April 1927.

In contrast to the effect in the north, in the south of England, the 1926 crisis had only a minor impact on unemployment rates. Unemployment increased during the two weeks of

the general strike, but after that, it continued the declining trend that had begun from the early 1920s. Finally, there are the cases of Scotland and Wales, where the shock was intense, but unlike in the north of England, the recovery was not gradual. Because the coal lockout mobilization lasted longer in these regions, unemployment remained high up to the very end of 1926, when it declined abruptly.

In addition to unemployment, there were significant regional differences in job vacancy rate trends. All regions were strongly affected by the general strike, although there were notable differences in the timing and intensity of the recovery. At one extreme was the south of England, which was the first region not only to resume its growth trend in the job vacancy rate after the 1926 crisis but also to accelerate its expansion. At the other extreme was the case of the Midlands, where the job vacancy rate only recovered by 1929.

The regional differences in the job vacancy rate trends existed, however, even prior to the general strike. In the north of England, the Midlands and Scotland, job vacancy rates declined from mid-1924, indicating that the main industries in these regions were losing the capacity to generate new employment well before the general strike. More extreme was the case of Wales, which by mid-1923 had the highest job vacancy rate in Britain before seeing a massive decline from which it never recovered.

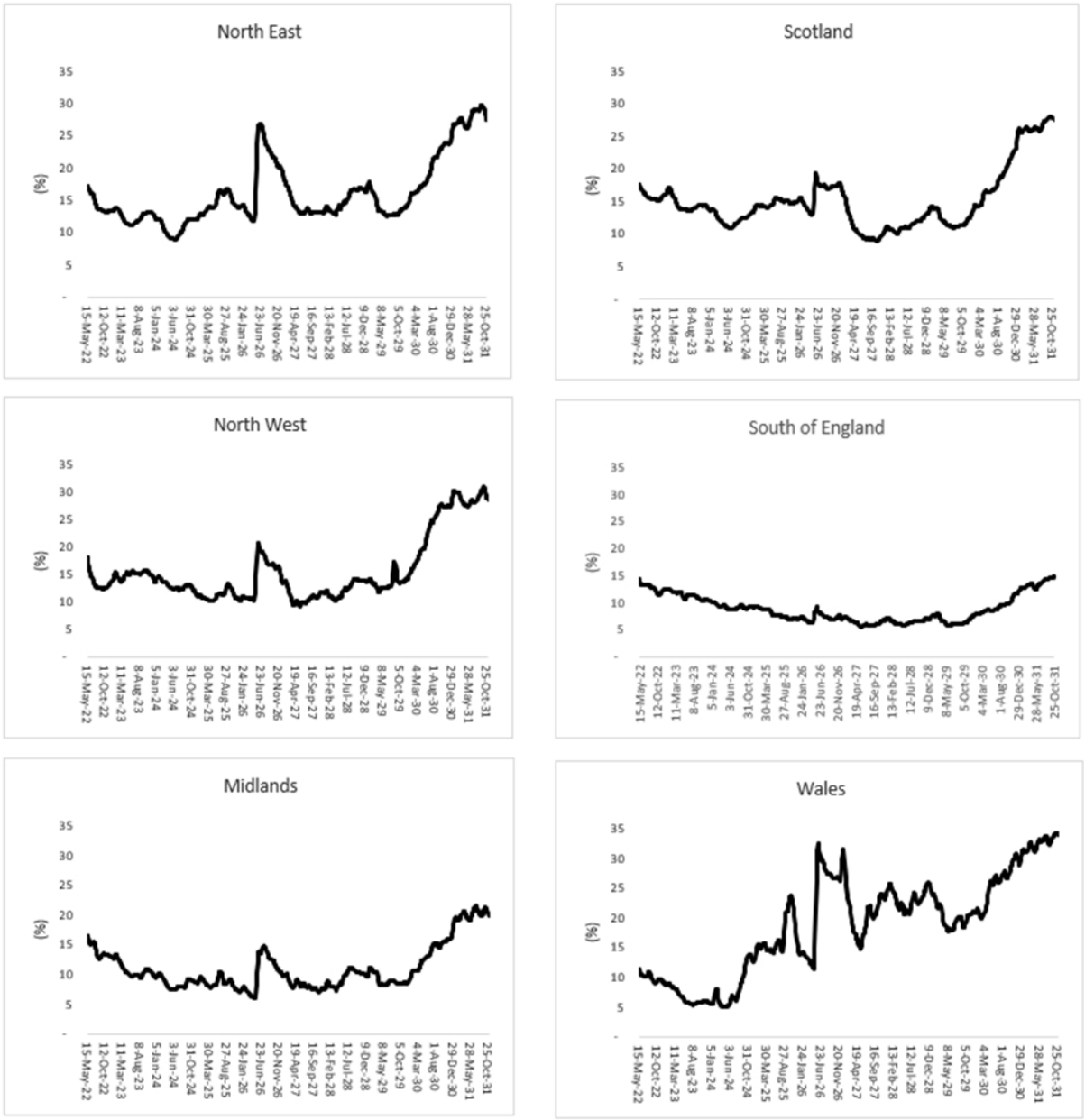


**Figure 3.5:** Weekly unemployment rates for British regions, 15th May 1922- 2nd November 1931 (4 weeks rolling average)

Source: Estimated based on the returns of the unemployment Insurance administration.

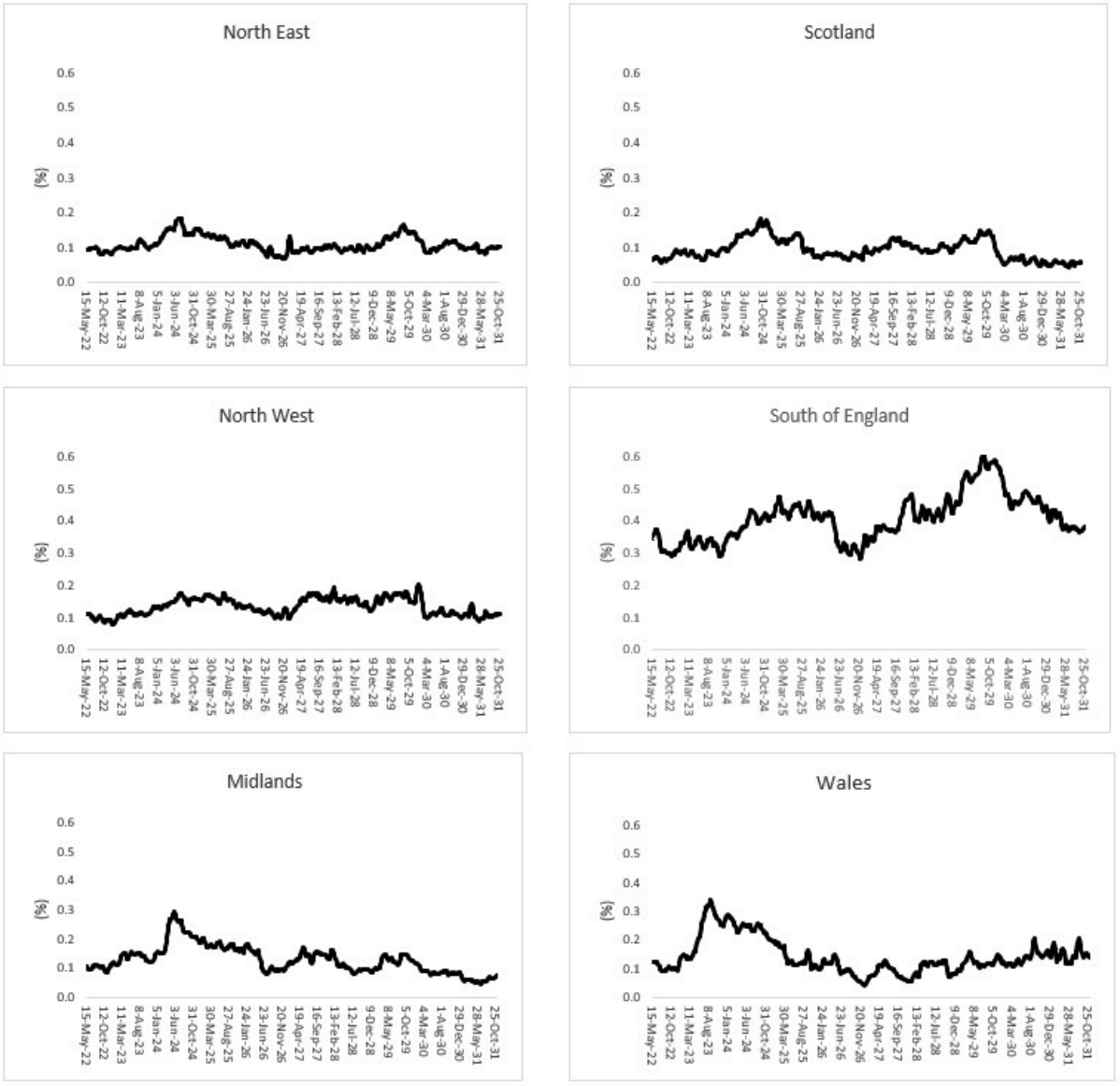


**Figure 3.6:** Weekly job vacancy rates for British regions, 15th May 1922- 2nd November 1931 (4 weeks rolling average)

Source: Estimated based on the returns of the unemployment Insurance administration.

## 3.3 The Beveridge curve

To document the changing relationship between unemployment and vacancies, between and within British regions over time, I estimate the national and regional Beveridge curves for Britain and its six main regions. The Beveridge curve is a graphical representation of the downward sloping relationship between the unemployment rate and the job vacancy

rate. The Beveridge curve allows a breakdown of the cyclical labour market dynamic from the structural changes in the level of labour frictions. A change in the relationship between unemployment and job vacancy rates caused by a normal fluctuation of the business cycle can be observed in movements along the Beveridge curve's slope. On the other hand, a change in the relationship between these same two rates, caused by changes in the level of labour frictions can be detected by inward and outward shifts of the Beveridge curve position from the origin.

If the Beveridge curve shifts outwards from the origin, this means the labour market is facing a worsening in its level of frictions or a decline in the matching efficiency due to unemployment being higher for the same job vacancy rate. On the contrary, if the Beveridge curve shifts inwards to the origin, the labour market is experiencing a decline in the level of labour frictions, which means that it is easier for the unemployed workers and potential employers to match.

### 3.3.1 The national and subnational Beveridge curves

Figure 3.7 represents the national Beveridge Curve for the period 1922-1934. With the arrival of the Great Depression, the Beveridge curve saw two consecutive years of enormous outward shifts, which meant a new long-term equilibrium of higher unemployment and job vacancy rates. In 1933, the unemployment rate was more than double that in 1927, despite the labour market having a greater number of unfilled vacancies. Certainly, there was a vast deterioration in the labour market's matching efficiency as a result of the Great Depression, however, that deterioration was part of a longer process of regional polarization of labour which commenced in 1926.

Figure 3.8 displays the Beveridge curves for two macro-areas, outer Britain and inner Britain plus the Midlands, between 1922 and 1931. As was explained in Section 3.1, the number of unfilled vacancies by region was only found up to 1931 in the Unemployment Insurance records, which is why Figures 3.7 and 3.8 display different periods. However,

the large outward shift of the Beveridge curve between 1929 and 1931 is still captured. Similarly, to that observed with regional unemployment rates, the two parts of the country were closer in terms of the Beveridge curve isoquant during the first half of the 1920s. The General Strike and Coal Lockout of 1926, however, triggered a regional polarization, which increasingly concentrated the job vacancies in inner Britain, and the unemployed in outer Britain and the Midlands. In the months previous to the Great Depression, inner Britain had plenty of job opportunities, but these vacancies were not being filled by the numerous unemployed in the rest of the country.

Spatial mismatching between outer Britain and the rest of the country was certainly a major labour friction in the interwar period, a fact that accelerated in the second half of the 1920s. However, labour frictions within the two parts of the country were also significant. The average annual unemployment rate in outer Britain was 28.2% in 1931, twice that in 1922, despite a higher job vacancy rate, which reveals a substantial increase in labour transaction costs within this this macro-area. Labour frictions within inner Britain plus the Midlands also worsened, although to a lesser extent, indicating that even with a higher vacancy rate than in the early 1920s, unemployment was considerably higher.

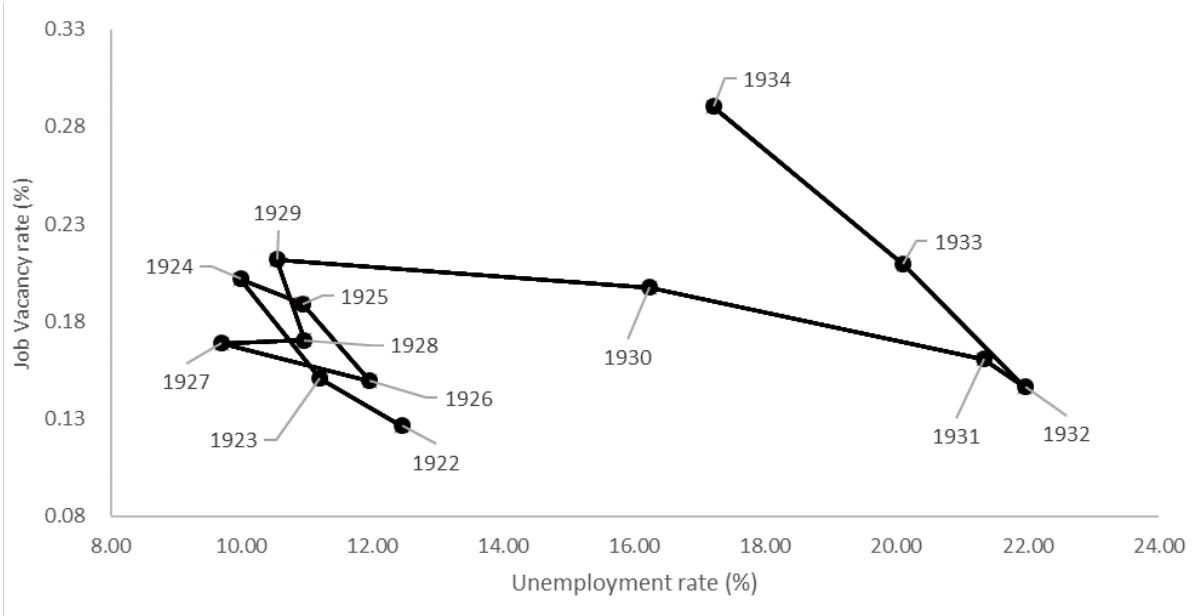


**Figure 3.7:** Annual Beveridge curve for Britain, 1922-1934 (annual averages).

Source: Estimated based on The Ministry of Labour Gazette

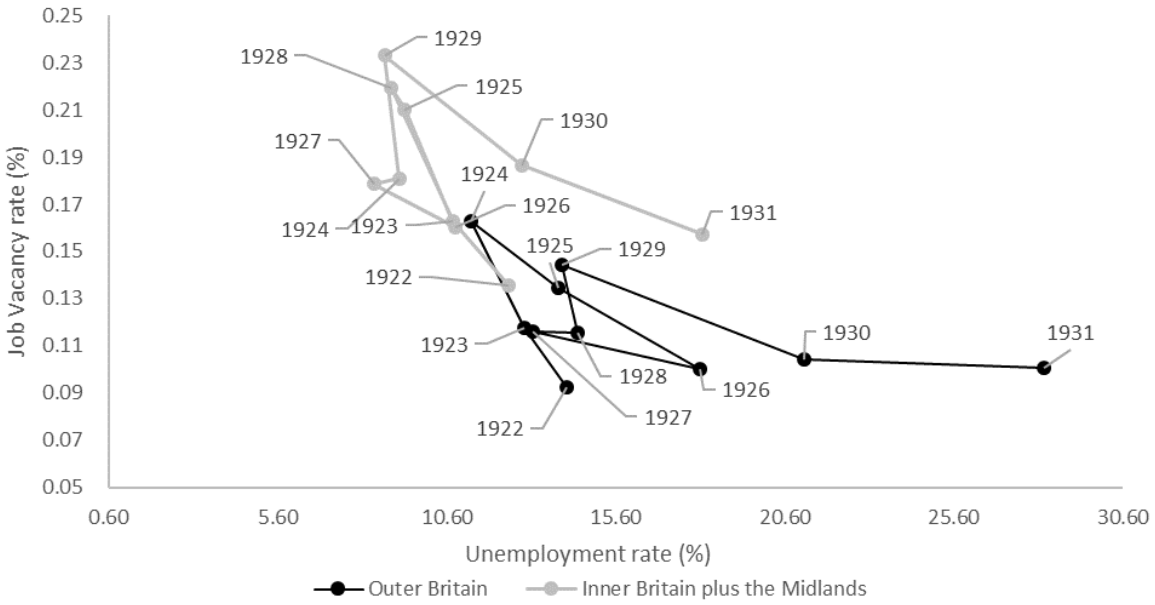


**Figure 3.8:** Annual Beveridge curve for British regions, 1922-1931 (annual averages).

Source: Estimated based on the regional returns of the Unemployment Insurance Administration.

### 3.3.2 Movements along and shifts of the Beveridge curve

The Beveridge curve represents a relationship convex to the origin, which is why a Cobb-Douglas production function has been widely used in the literature as a functional form (Petrongolo and Pissarides, 2001). The Beveridge curve can be defined as a Cobb-Douglas function presented in equation 3.1, similar to a production function, where unemployment rate $U_t$, and job vacancy rate Vt are the inputs to $b_t$, the position of the Beveridge curve isoquant. $b_t$ can be interpreted as a measurement of the labour frictions, or the shifts in the Beveridge curve. Formally $b_t$ can be defined as:

$$b_t = u_t^{\alpha} v_t^{1-\alpha} \tag{3.1}$$

Where $\alpha$ is the elasticity of the unemployment rate on $b_t$.

Taking logarithm and rewriting equation 3.1 yields

$$\alpha LnU_t = Lnb_t - (1-\alpha)LnV_t \tag{3.2}$$

which also could be write as

$$LnU_t = \frac{1}{\alpha}Lnb_t - \left(\frac{1-\alpha}{\alpha}\right)LnV_t \tag{3.3}$$

Equation 3.3 is estimated by an Ordinary Least Square model for Britain and its six main regions with the dataset presented in section 3.1. The estimated $\alpha$ elasticity and the econometric results are shown in Table 3.1, all being higher than the 0.5 commonly used in the literature, in particular, for the United States (Mathy, 2018). This means that on average, the labour frictions during the interwar period was more sensitive to unemployment than to the number of job vacancies in the case of Britain. The $\alpha$ elasticities estimations allows to establish the weekly values for bt by equation 3.1, whose results are displayed in Figures 3.9 and 3.10.

**Table 3.1:** Estimated coefficients for equation 3 and elasticities of the unemployment rate on the Beveridge curve isoquant

| Dependent variable = lnUt | | | | | | | |
|---|---|---|---|---|---|---|---|
| Covariates | Britain | North East England | North West England | Midlands | Scotland | Wales | South of England |
| Constant | -5.347*** | -6.225*** | -6.957*** | -12.631*** | -5.889*** | -6.880*** | -6.168*** |
| | (0.354) | (0.373) | (0.364) | (0.291) | (0.181) | (0.310) | (0.347) |
| LnVt | -0.514*** | -0.636*** | -0.757*** | -0.633*** | -0.562*** | -0.762*** | -0.671*** |
| | (0.055) | (0.054) | (0.055) | (0.021) | (0.026) | (0.046) | (0.063) |
| (adjusted) R2 | 0.148 | 0.214 | 0.277 | 0.637 | 0.491 | 0.351 | 0.185 |
| Observations | 498 | 498 | 498 | 498 | 498 | 498 | 498 |
| Estimated $\alpha$ | 0.66 | 0.61 | 0.57 | 0.61 | 0.64 | 0.57 | 0.60 |

Notes: (1) lnUt is the natural logarithm of the seasonally adjusted unemployment rate; lnVt is the natural logarithm of the seasonally adjusted job vacancy rate. (2) *indicates 10% of level of significance, ** indicates 5% of level of significance, *** indicates 5% of level of significance.

The Beveridge curve for Britain saw two important outward shifts with the 1926 Coal Lockout, and the Great Depression. The former was sudden and transitory, although the recovery was slow and determined by the lasting effect of the Coal Lockout. The improvements in labour frictions halted in early 1927, after which time a slow but constant outward shift of the Beveridge curve commenced, and only briefly interrupted by a moderate improvement in early 1929. In the case of the outward shift due to the Great Depression, the increase was gradual, but the higher labour frictions remained for longer, and probably only reversed in the late 1930s with the onset of the Second World War.

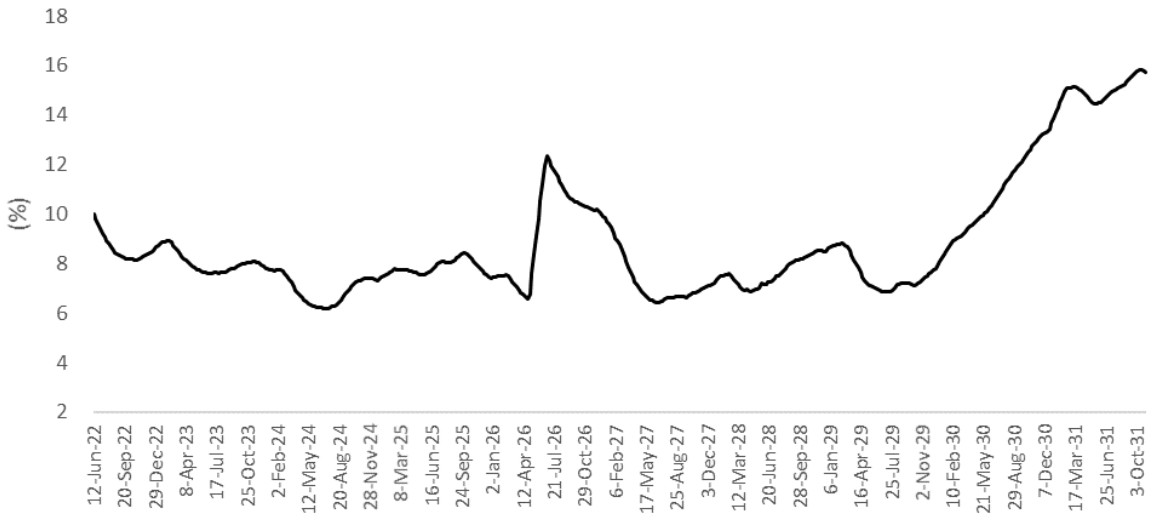


**Figure 3.9:** Beveridge Curve Isoquant Position in Britain, 15th May 1922 -2nd November 1931 (eight weeks rolling average)

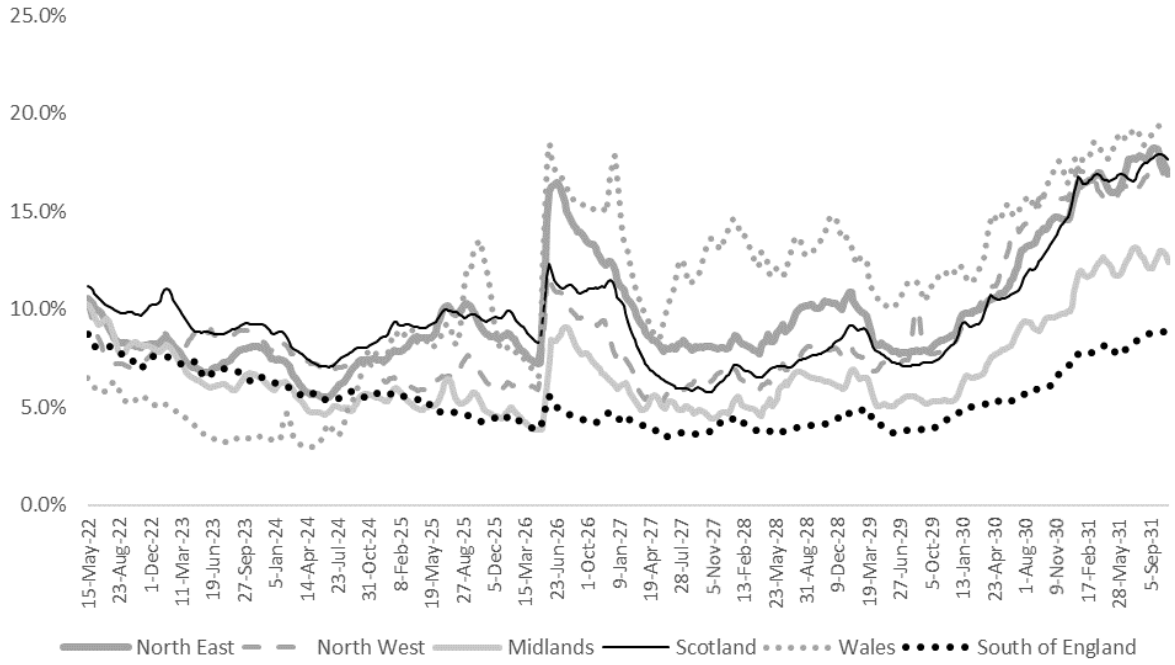


**Figure 3.10:** Beveridge Curve Isoquant Position in Britain, 15th May 1922 -2nd November 1931 (eight weeks rolling average)

Despite the Great Depression causing a greater deterioration of the labour market's matching efficiency than the 1926 Coal Lockout, the intensity of the latter cannot be underestimated. In the regions where coal mining was the major employer, Wales and the north east of England, the impact of the 1926 crisis was similar to that of the first year

of the Great Depression, and indeed these regions never reached pre-1926 employment levels. Furthermore, in these regions the labour frictions were increasing even before the General Strike, which suggests a negative impact of the resumption of the Gold Standard in 1925. It could be the case that the unemployed who came from mining had a lower job finding rate than the average unemployed worker. This group increased its share in the unemployed pool after 1925, and this could have led to a reduction in the regional job finding rates where the industry was relevant. However, as mining was a very localized activity within each region, it is not possible to separate the internal spatial mismatch from the occupational mismatch at this level of disaggregation.

In the north west of England and Scotland, which relied less on mining, the impact of the crisis in 1926 was more moderate, and these areas saw an important recovery from early 1927 onwards. However, in these regions, the impact of the Great Depression was devastating. The level of labour frictions soared after 1929, up to a convergence with those of the north East and the Midlands. The north west of England was deeply affected by the collapse of the cotton textile industry, the main economic activity in this region, which saw an unemployment rate of 42.2%, and was the worst affected sector due to the Great Depression, even over coal mining which reached 23.8% (Ministry of the Labour Gazette, July 1930). As for mining, it could the case that textile workers had a lower job finding rate than the average unemployed worker. However, this industry employed a substantial share of females in its labour force, which is probably why gender also played an important role. According to Lee (1979), female workers accounted for 58.4% of the employment in textiles in Britain in 1921.

Finally, the Midlands and the south of England displayed a notable improvement in their labour frictions in the first half of the 1920s. In the case of the south of England, the impact of the 1926 crisis was minimal, and even the Great Depression only led to moderate increase in its level of labour frictions, similar to those of 1922. After a long decade of moving away from the rest of Britain, by in 1931 the level of internal labour frictions in the south of England was less than the half of the other regions' average, consolidating a

regional polarized labour market not only in unemployment, but also in labour frictions terms. This fact raised the question about how important spatial mismatching was in explaining the outward shift of the Beveridge curve between 1927 and 1931.

## 3.4 The drivers of the Beveridge curve shifts

The results presented in section 3.2 are useful for a visual assessment of the Beveridge curve shifts. However, the unemployment rate and job vacancy rate were tested by the augmented dicky-fuller test, and the unit root problem cannot be ruled out for each variable. This is why an ordinary least square model is not appropriate for establishing the drivers of the Beveridge curve shifts. To avoid this problem, this article uses a vector autoregressive (VAR) model with cointegration analysis, following the methodology of Johansen and Juselius (1990). This approach is useful for non-stationary series, because it includes controls for lagged effects and exogenous variables, while estimating the long-term relationship between the variables of interest. Such a separation between the long-term and the short-term effects enables the estimation of the drivers behind Beveridge curve shifts.

### 3.4.1 Econometric strategy

The Beveridge curve can empirically be defined in term of unemployment (Abraham, 1987; Valletta, 2005), or:

$$U_t = \mu + \beta_1 V_t + \beta_2 V_t^2 + \Lambda X + \varepsilon_t \tag{3.4}$$

where $U_t$ is the unemployment rate, $V_t$ is the job vacancy rate, and $X$ is a vector of control variables. Because the relationship between unemployment and vacancies is convex to the origin (Petrongolo and Pissarides, 2001), equation 4 includes the quadratic term $V_t^2$. $\beta_1$, $\beta_2$ and $\Lambda$ are the coefficients for job vacancy, job vacancy squared variables, and control

variables, respectively. Likewise, the constant $\mu$ captures the structural unemployment effect, which can be interpreted as the expected unemployment rate without the effect of the job vacancy rate and other control variables.

Equation 4 can be rewritten as:

$$Z_t = \sum_{i=1}^{K} A_i Z_{t-1} + \sum_{j=1}^{l} B_j X_{t-j} + \gamma D + \epsilon_t \tag{3.5}$$

or in its error-correction form (VECM):

$$\Delta Z_t = \sum_{i=1}^{K-1} \pi_i \Delta Z_{t-1} + \phi Z_{t-1} + \sum_{j=0}^{l} B_j X_{t-j} + \gamma D + \epsilon_t \tag{3.6}$$

where $Z_t$ is a (n x 1) vector of endogenous variables, $X_t$ is a (m $\times$ 1) vector of continuous exogenous variables, and D is a matrix of deterministic binary variables. $A_i$ is a matrix of coefficients of dimension (n x n), $B_j$ is a matrix of coefficients of dimension (n x m), $\gamma$ is parameters vectors for D, $\epsilon_t$ is a column vector of (n x 1) for the errors, and k is the number of lags included in the endogenous variables of the VAR model. *Delta* is the difference operator, $\pi_i = -(A_{i=1} + ... + A_K)$ is the short-term coefficient matrix, and $\phi = -(I_n - A_1 - ... - A_k)$ is the long-run (structural) cointegration vector, where are estimated the shifts in the position of the Beveridge curve isoquant $b_t$, as well as the elasticities $\alpha$ and $(1 - \alpha)$ presented in equation 1.

In addition to spatial mismatching, the Beveridge curve shifts could be explained by the unemployed workers' personal characteristics. If the job finding rate is affected by factors such as gender or age, the composition of the unemployed pool can determinate the Beveridge curve isoquant position. For instance, if the juvenile unemployed had a lower job finding rate than the average unemployed worker, the over-representation of this group in the unemployed pool will have affected the aggregate matching efficiency. To consider this point, I control for the share of female workers, the share of juvenile unemployed (16 - 18 years old), and the share of workers which were classed as 'temporary stoppages' in the equation 6 estimation. The Unemployment Insurance administration breaks down the

unemployed into two types: *wholly unemployed* and *temporary stoppages*. The latter were short-term unemployed or furloughed workers, whom remained linked to their employers, and were usually called back to work after some weeks. If after six weeks a temporary stoppage did not resume her job, the Unemployment Insurance administration classified them as wholly unemployed (Ministry of Labour, January 1926).

Appendix 3.1 displays the Beveridge curve inputs and the control variables used for econometric estimation. Besides the variables related to the unemployed workers' characteristics, the estimation includes the square of the job vacancy rate, the share of unemployed workers coming from mining, the share of unemployed workers coming from textiles and a binary variable for the General Strike, which takes the value of 1 for the weeks of 10th and 17th May 1926. Likewise, to determine the optimal number of lags, this paper considered several tests which in general terms yield the same result and are reported in the Appendix 3.2.

### 3.4.2 Results

Table **??** displays the cointegration vector in equation 6, which shows the results of the Beveridge curve coefficients. The $\mu$ for Britain displays a significant reduction, although the drop is moderate in magnitude once the controls are integrated into the econometric model. Worker characteristics and the lagged endogenous effect have a very limited impact, and it is mainly concentrated in demographic variables such as gender and age. This finding indicates that mismatching, either within or between regions, was the main reason for structural unemployment, at least up until 1931.

As expected, considering the Beveridge curve graph presented in section 3.2, the estimated $\mu$ values for the northern England regions (the northeast and the northwest) are higher than those for the rest of the country. Internal labour frictions in these regions remained high, even after unemployed workers' personal characteristics are controlled for, which indicates the presence of other labour frictions such as spatial mismatch within each

region or skills mismatching. Booth and Glynn (1975) maintain that even in regions with high unemployment rates, depressed and prosperous areas coexist, which suggests a high potential for internal spatial mismatches. For instance, in September 1929, within the northeast of England, the geographically close cities of Jarrow and York displayed unemployment rates of 33.1% and 7.5%, respectively (Unemployment Index). This gap was certainly related to differences in industrial composition, but it also points out that the lack of labour mobility was not exclusively a north/south migration problem; also probably important were constraints with regard to commuting in the depressed regions.

Unlike its neighbours in the north, Scotland displays a $\mu$ coefficient close to that of the south of England. The reasons for this fact are beyond the scope of this paper, but some potential explanations are that it had a larger agriculture sector and massive overseas migration, which absorbed many unemployed workers with a low job finding rate. Another possibility, raised by examining local unemployment rates, is a higher degree of internal mobility, together with a more diversified economy (Scott, 2007). In September 1929, the unemployment rate in Glasgow, whose economy relied on struggling export-oriented industries, was 14%, substantially higher than that in Edinburgh (8.1%), which experienced a nuanced version of the services boom observed in London. Large as this difference was, it was remarkably narrower than that observed in the northern England regions, which suggests the possibility of high internal labour market integration.

Wales, strongly dependent on coal mining, shows a $\mu$ coefficient midway between that of Scotland and the regions of the north of England. It is possible that agriculture and emigration, in this case mainly to the south of England rather than overseas, could have had the same relief effect on labour frictions as that seen in Scotland. Despite mining accounting for the greatest share of the labour force in this region, the $\mu$ is lower than that in the other mining regions, such as the north of England, indicating that a higher share of unemployed miners in the unemployed pool did not necessarily lead to higher labour frictions. The results for Wales show that the mass unemployment experienced by this region from the mid-1920s was mainly explained by low demand for labour and

**Table 3.2:** Estimated cointegration vector

| Region | Control variables | Job Vacancy rate | Constant (μ) |
|---|---|---|---|
| **Britain** | Not | -330.057*** | 0.643*** |
| | | -79.141 | -0.134 |
| | Yes | -299.662*** | 0.597*** |
| | | -86.783 | -0.136 |
| **Weighted Sum** | Not | -218.767 | 0.451 |
| | Yes | -325.424 | 0.47 |
| **North East England** | Not | -455.015*** | 0.655*** |
| | | -114.418 | -0.126 |
| | Yes | -562.162*** | 0.771*** |
| | | -139.543 | -0.154 |
| **North West England** | Not | -370.056*** | 0.648*** |
| | | -78.77 | -0.107 |
| | Yes | -365.215*** | 0.642*** |
| | | -76.468 | -0.103 |
| **Midlands** | Not | -100.799*** | 0.240*** |
| | | -23.674 | -0.032 |
| | Yes | -105.489*** | 0.245*** |
| | | -24.794 | -0.034 |
| **Scotland** | Not | -232.301*** | 0.367*** |
| | | -56.622 | -0.055 |
| | Yes | -226.379*** | 0.359*** |
| | | -55.884 | -0.054 |
| **Wales** | Not | -186.376*** | 0.455*** |
| | | -53.922 | -0.082 |
| | Yes | -230.226*** | 0.532*** |
| | | -64.022 | -0.1 |
| **South of England** | Not | -65.915*** | 0.354*** |
| | | -19.369 | -0.08 |
| | Yes | -61.993*** | 0.344*** |
| | | -14.052 | -0.058 |

Notes: (1) All coefficients are presented were originally on the left-hand side of each equation, and were changed to the opposite signs for interpretation purposes. (2) * indicates statistical significance at the 10% percent level, ** at the 5% percent level, and *** at the 1% level. Standard errors are reported in parentheses. (3) value between (.) = standard deviation.

lower migration towards other regions rather than by particularly high internal labour frictions.

As expected, the south of England shows low labour frictions, with $\mu$ values ranging between 0.34 and 0.35. The rapid and sound growth of the retail industry, which employed many low-skilled workers (Luzardo-Luna, 2020), is probably key in this result. Likewise, the accelerated development of housing and new industries in the suburbs around London, which witnessed an enormous expansion during the interwar years (Bowley, 1945; Scott, 2007), demanded a vast amount of manpower. That opportunity was probably seized by many workers who could benefit from probably the largest transportation network in the world at that time, which allowed daily commuting between working and residential areas. Likewise, due to the shocks of 1926 having had a marginal impact in the south of England, the strengthening of this regional labour market was not interrupted, which proved important for its resilience during the Great Depression.

Finally, the most surprising result is that for the Midlands, which displays the lowest $\mu$ coefficient. This high level of matching efficiency is probably related to the rise of mass production industries in this region, which could have easily absorbed many unemployed workers from declining trades, such as metal works. In reducing its labour frictions, the Midlands managed to have an unemployment rate below the national average, even without a particularly high number of job opportunities.

### 3.4.3 Frictions within regions vs spatial mismatch

In addition to quantifying the magnitude of labour frictions within each region, it is useful to establish their impact on the national level of frictions. Following the approach of Abraham (1987) and Valletta (2005) for the United States, the article defines the percentage of national labour frictions that is not explained by the aggregation of the regional $\mu$ coefficients as spatial mismatching. The latter is calculated as the difference between the $\mu$ coefficient for Britain and the weighted sum of the regional $\mu$ coefficients,

using the share of each region in the insured population as the weights. In other words, spatial mismatching appears when transaction costs in the aggregate labour market are greater than the sum of its parts.

Once the $\mu$ coefficients are estimated, it is possible to establish how much of the national $\mu$ is explained by either labour frictions within regions or by spatial mismatching between regions. Figure 3.11 displays the contribution of each driver, finding that spatial mismatching accounted for 21% of the national $\mu$ labour frictions during the entire period studied. These results show that regional polarization brought about by deindustrialisation entailed a significant cost for Britain's labour market, contributing to persistently high unemployment.

Large-scale interregional labour migration would have had great potential to reduce structural unemployment, and the prosperity in the south of England during the *roaring twenties* could have provided relief for the depressed areas in other parts of the country. Contemporary policymakers were aware of the situation, and in fact, the government launched some labour mobility schemes managed by local labour exchanges (Burns, 1941). For instance, the Household Removal Scheme was launched in 1928 to provide financial assistance towards travel expenses when a head of household obtained a job in an area with good employment prospects for the other family members. However, the scope of this scheme was very limited, and this kind of policy was only implemented on a significant scale in 1934 with the reform of the entire unemployment insurance system (Burns, 1941).

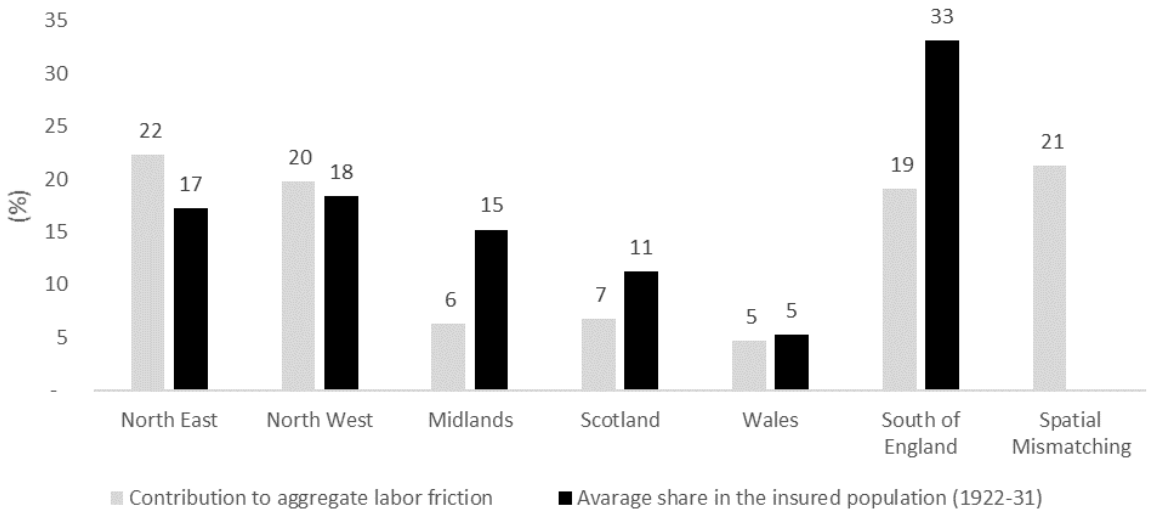


**Figure 3.11:** Contribution of drivers of the Beveridge curve shifts

Note: The average regional shares in the insured population were used as weights for the weighted sum estimation.

As important as spatial mismatching was, the fact is that frictions within regions were the main driver behind the national $\mu$ and therefore were the main cause of high structural unemployment in Britain. Figure 3.11 breaks down the contribution of each region to the national $\mu$. The largest frictions occurred in the northern regions of England (northeast and the northwest), which combined accounted for 42% of national labour frictions, having an effect that was the double of the cross-region spatial mismatch. As discussed in the previous section, within these regions, depressed areas coexisted alongside places better adapted to structural change; this fact, together with the limited commuting network, substantially increased intraregional frictions.

Finally, the internal frictions in the rest of the country explain the remaining 37% of the national $\mu$. All these regions accounted for 65% of the insured population, which means that they had, on average, a low level of labour frictions. The high unemployment rates in Scotland and Wales were essentially due to a labour demand problem, or in other words, few job opportunities, rather than high transaction costs between the two sides of the labour market. Had the whole of Britain had the $\mu$ of these regions, or that of the Midland, national unemployment in interwar Britain would have been substantially

lower. It was in regions such as Scotland and Wales were the labour mobility programs had its highest potential for reducing unemployment. The main reason behind structural unemployment in interwar Britain was not the lack of north-south migration. Instead, it came about because the unemployed in the north of England were not taking the job vacancies in their own region. Structural unemployment in interwar Britain was in large part a very localized problem with the north of England as its main centre. The reasons why the regions of northern England were different from the rest of the country is an important question for further research.

## 3.5 Conclusions

Throughout the interwar period, Britain faced rapid structural change, which had an uneven impact across the country. This massive transformation featured the decline of the first Industrial Revolution industries and the rise of new industries that implemented mass production technology, together with the consolidation of the services sector. Due to significant regional differences in industrial composition, the result was a polarized labour market, where unemployed workers and job vacancies were increasingly concentrated in different areas within regions and across the country. The spatial mismatch across regions accounted for 21% of aggregate labour frictions, which is why boosting interregional labour mobility could have had great potential for reducing unemployment but was not enough.

The structural change not only brought about a regional spatial mismatch between outer and inner Britain but also were associated with high frictions within some regions. This was particularly important in the regions of the north of England, in which internal frictions contributed 42% of the total frictions measured for the national market. Thus the frictions that prevented the unemployed from filling local job vacancies within the region were even more important than the frictions that prevented the unemployment in the north of England from filling vacancies in the south of the country. The lack of a

suitable commuting network like the one in London and south-eastern England and the role of skills mismatches are areas that would be particularly interesting to explore.

The intensity of structural change in interwar Britain, the first example of deindustrialisation in Western history, was remarkable and played a critical role in high and persistent unemployment during this period. This radical adjustment is probably only comparable to the Industrial Revolution itself, when the changes worked in precisely the opposite direction, leading to the rise of the north and the relative decline of the south of Britain.

# Appendix 3.1

## Descriptive statistics for the variables used in the VECM estimation

Number of observations=498

| | **Britain** | | **North east England** | | **North west England** | |
|---|---|---|---|---|---|---|
| **Variable** | **Mean** | **Std. Dev.** | **Mean** | **Std. Dev.** | **Mean** | **Std. Dev.** |
| Unemployment rate (%) | 13.36 | 3.80 | 16.12 | 5.14 | 15.51 | 5.79 |
| Job vacancy rate (%) | 0.17 | 0.03 | 0.11 | 0.02 | 0.13 | 0.03 |
| Job vacancy rate square (%) | 2.86E-04 | 1.07E-04 | 1.22E-04 | 5.64E-05 | 1.84E-04 | 7.98E-05 |
| Share of Female unemployed (%) | 16.03 | 3.11 | 11.68 | 3.39 | 26.49 | 5.12 |
| Share of Juveniles unemployed (%) | 5.11 | 0.63 | 5.27 | 0.54 | 5.74 | 0.65 |
| Shares of Temporary workers (%) | 15.60 | 9.99 | 18.95 | 11.50 | 23.68 | 15.89 |
| Share of unemployed from mining (%) | 12.52 | 5.90 | 19.75 | 8.55 | 6.39 | 3.30 |
| Share of unemployed From textiles (%) | 13.27 | 3.61 | 15.05 | 4.20 | 28.99 | 5.76 |
| General Strike | 0.00 | 0.06 | 0.00 | 0.06 | 0.00 | 0.06 |

Number of observations=498

| | Midlands | | South of England | |
|---|---|---|---|---|
| **Variable** | **Mean** | **Std. Dev.** | **Mean** | **Std. Dev.** |
| Unemployment rate (%) | 11.05 | 3.73 | 8.87 | 2.53 |
| Job vacancy rate (%) | 0.13 | 0.05 | 0.41 | 0.07 |
| Job vacancy rate square (%) | 1.87E-04 | 1.49E-04 | 1.70E-03 | 6.25E-04 |
| Share of female unemployed (%) | 23.17 | 3.19 | 15.09 | 1.86 |
| Share of juveniles unemployed (%) | 4.59 | 0.83 | 6.29 | 1.18 |
| Shares of Temporary unemployed (%) | 26.58 | 17.25 | 5.43 | 4.92 |
| Share of unemployed from mining (%) | 20.42 | 10.22 | 2.75 | 1.61 |
| Share of unemployed from textiles (%) | 15.90 | 4.89 | 3.59 | 1.75 |
| General Strike | 0.00 | 0.06 | 0.00 | 0.06 |

Number of observations=498

| | Scotland | | Wales | |
|---|---|---|---|---|
| **Variable** | **Mean** | **Std. Dev.** | **Mean** | **Std. Dev.** |
| Unemployment rate (%) | 15.06 | 4.52 | 18.81 | 8.49 |
| Job vacancy rate (%) | 0.09 | 0.03 | 0.14 | 0.06 |
| Job vacancy rate square (%) | 9.45E-05 | 6.32E-05 | 2.37E-04 | 2.24E-04 |
| Share of female unemployed (%) | 15.99 | 3.28 | 4.44 | 1.56 |
| Share of juveniles unemployed (%) | 5.69 | 0.79 | 4.84 | 0.78 |
| Shares of Temporary unemployed (%) | 9.67 | 5.86 | 15.49 | 12.71 |
| Share of unemployed from mining (%) | 14.42 | 7.88 | 34.89 | 8.19 |
| Share of unemployed from textiles (%) | 14.13 | 4.71 | 0.91 | 0.46 |
| General Strike | 0.00 | 0.06 | 0.00 | 0.06 |

# Appendix 3.2

## Optimal lag tests

Region: Britain

Endogenous variables: unemployment rate and job vacancy rate

Number of Observations: 494

| lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|---|---|---|
| 0 | 162.244 | | | | 0.001792 | -0.64876 | -0.64208 | -0.63175 |
| 1 | 1667.08 | 3009.7 | 4 | 0 | 4.10E-06 | -6.72501 | -6.70497 | -6.67397 |
| 2 | 1686.18 | 38.197 | 4 | 0 | 3.90E-06 | -6.78614 | -6.75274 | -6.70107 |
| 3 | 1693.79 | 15.228* | 4 | 0.004 | 3.8e-06* | -6.80077* | -6.75401* | -6.68167 |
| 4 | 1696.97 | 6.3675 | 4 | 0.173 | 3.80E-06 | -6.79747 | -6.73735 | -6.64434 |

Selected Order: 3

Region: North East

Endogenous variables: unemployment rate and job vacancy rate

Number of Observations: 494

| lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|---|---|---|
| 0 | 41.8749 | | | | 0.002917 | -0.16144 | -0.15476 | -0.14442 |
| 1 | 1252.04 | 2420.3 | 4 | 0 | 0.000022 | -5.04469 | -5.02465 | -4.99365 |
| 2 | 1265.59 | 27.098 | 4 | 0 | 0.000021 | -5.08335 | -5.04995* | -4.99828* |
| 3 | 1270.79 | 10.405 | 4 | 0.034 | 0.000021 | -5.08822 | -5.04146 | -4.96912 |
| 4 | 1276.63 | 11.67* | 4 | 0.02 | .000021* | -5.09565* | -5.03553 | -4.94252 |

Selected Order: 4

Region: North West

Endogenous variables: unemployment rate and job vacancy rate

Number of Observations: 494

| lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|---|---|---|
| 0 | -22.2524 | | | | 0.003782 | 0.098188 | 0.104868 | 0.115202 |
| 1 | 1047.99 | 2140.5 | 4 | 0 | 0.00005 | -4.21858 | -4.19854 | -4.16754 |
| 2 | 1071 | 46.022 | 4 | 0 | 0.000047 | -4.29555 | -4.26215 | -4.21048 |
| 3 | 1085.8 | 29.603 | 4 | 0 | 0.000045 | -4.33928 | -4.29252 | -4.22018* |
| 4 | 1096.43 | 21.251* | 4 | 0 | .000044* | -4.3661* | -4.30598* | -4.21297 |

Selected Order: 4

Region: Midlands

Endogenous variables: unemployment rate and job vacancy rate

Number of Observations: 494

| lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|---|---|---|
| 0 | 30.1138 | | | | 0.003059 | -0.11382 | -0.10714 | -0.09681 |
| 1 | 1223.57 | 2386.9 | 4 | 0 | 0.000025 | -4.92942 | -4.90938 | -4.87837 |
| 2 | 1237.87 | 28.616* | 4 | 0 | 0.000024 | -4.97115 | -4.93775* | -4.88608* |
| 3 | 1242.12 | 8.4904 | 4 | 0.075 | 0.000024 | -4.97214 | -4.92538 | -4.85304 |
| 4 | 1246.66 | 9.0888 | 4 | 0.059 | .000024* | -4.97435* | -4.91423 | -4.82122 |

Selected Order: 4

Region: Scotland

Endogenous variables: unemployment rate and job vacancy rate

Number of Observations: 494

| lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|---|---|---|
| 0 | -52.2268 | | | | 0.00427 | 0.219542 | 0.226221 | 0.236556 |
| 1 | 1371.91 | 2848.3 | 4 | 0 | 0.000014 | -5.53 | -5.50996 | -5.47896 |
| 2 | 1409.2 | 74.591 | 4 | 0 | 0.000012 | -5.6648 | -5.6314 | -5.57973 |
| 3 | 1424.23 | 30.043 | 4 | 0 | 0.000011 | -5.70942 | -5.66266 | -5.59032* |
| 4 | 1431.9 | 15.355* | 4 | 0.004 | .000011* | -5.72431* | -5.66419* | -5.57118 |

Selected Order: 4

Region: Wales

Endogenous variables: unemployment rate and job vacancy rate

Number of Observations: 494

| lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|---|---|---|
| 0 | -585.345 | | | | 0.036963 | 2.37792 | 2.3846 | 2.39493 |
| 1 | 753.968 | 2678.6 | 4 | 0 | 0.000166 | -3.02821 | -3.00817 | -2.97717 |
| 2 | 775.318 | 42.7 | 4 | 0 | 0.000155 | -3.09845 | -3.06505* | -3.01338* |
| 3 | 779.623 | 8.6105 | 4 | 0.072 | 0.000154 | -3.09969 | -3.05293 | -2.98059 |
| 4 | 787.761 | 16.277* | 4 | 0.003 | .000152* | -3.11644* | -3.05632 | -2.96331 |

Selected Order: 4

Region: South of England

Endogenous variables: unemployment rate and job vacancy rate

Number of Observations: 494

| lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|---|---|---|
| 0 | 4040.03 | | | | 2.70E-10 | -16.3483 | -16.3416 | -16.3313 |
| 1 | 5701.17 | 3322.3 | 4 | 0 | 3.30E-13 | -23.0574 | -23.0373 | -23.0063* |
| 2 | 5708.35 | 14.367 | 4 | 0.006 | 3.30E-13 | -23.0702 | -23.0368 | -22.9852 |
| 3 | 5718.51 | 20.318 | 4 | 0 | 3.20E-13 | -23.0952 | -23.0484* | -22.9761 |
| 4 | 5723.64 | 10.264* | 4 | 0.036 | 3.2e-13* | -23.0998* | -23.0396 | -22.9466 |

Selected Order: 4

Note: * indicates lag order selected by the criterion. LL=Log Length. LR=sequential modified LR test statistics. FPE=Final prediction error. AIC= Akaike information criterion. SBIC=Schwartz information criterion. HQIC=Hannan-Quinn information criterion.

# Chapter 4

## Unemployment benefits and labour frictions during the Great Depression:

## *The case of the industrial north in interwar Britain*


# Abstract

This chapter aims to establish the determinants for the high level of internal frictions within northern England, which was the main driver behind the aggregate labour friction in interwar Britain found in Chapter 3. To achieve this purpose, this chapter uses an original dataset of the local office of the Unemployment Insurance administration with information about paid unemployed benefits between 1928 and 1931, the period when labour frictions underwent their greatest increase. This information allows the incorporation of the effect of unemployment insurance on structural unemployment via the replacement rate as an explanatory variable.

This chapter estimates the drivers behind structural unemployment for the 18 counties located in northern England and Scotland between January 1928 and November 1931. Unlike the former, and despite its geographical proximity, Scotland displayed a low level of internal frictions, which is why it proves an interesting contrasting case to analyse. The econometric estimation is performed using the Arellano-Bond's Generalized Method of Moments technique for a dynamic panel models.

The results find that the particularly high labour frictions in northern England were related to an important increase in the replacement rate in the most populated counties in this region: Lancashire and West Riding in Yorkshire. Due to their sizes, these counties determined the extent of labour frictions in the entire north. They also contained a large share of unemployed females and a high frequency of temporary stoppages within the unemployed pool, which displayed a positive relationship with structural unemployment. Similar to the replacement rate, a higher share of temporary stoppages in the unemployed pool seemed to have a "deterrence" effect on unemployed workers, reducing their mobility toward industries and locations that offered better employment opportunities.

## 4.1 Introduction

One of the main findings of Chapter 3 was that internal labour frictions within the northern regions of England accounted for 42% of the national structural unemployment between 1922 and 1931. This contribution was double that of any interregional spatial mismatching and thus was the main reason behind the rise of structural unemployment in interwar Britain. In other words, establishing the reasons behind the high structural unemployment at the national level necessarily led to the identification of the elements behind the high labour frictions within northern England.

Like Scotland or Wales, employment in northern England relied heavily on the industries born during the Industrial Revolution (mining, shipbuilding, textiles and metal trades). These industries experienced high unemployment during the second half of the 1920s and the situation worsened with the onset of the Great Depression. In contrast to Scotland or Wales, however, the estimation in Chapter 3 shows that the measure of labour frictions in the north of England were much higher than in any other region. This fact raises the question: why did the increasing number of unemployed workers not take advantage of local job opportunities in Northern England?

This chapter aims to analysing the determinants of labour frictions at the county level and

contrasts the situation in Northern England with that of neighbouring Scotland where labour frictions were much lower. The determinants of structural unemployment at the county level from January 1928 to November 1931 are estimated using the Arellano-Bond estimator of Generalized Method of Moments for a dynamic panel model. A substantial literature has debated whether increases in unemployment benefits were a significant determinant of higher unemployment. Benjamin and Kochin (1979) claimed they did by reducing workers search activity, while Eichengreen (1986), and Hatton and Bailey (2002) find little evidence of a connection between the two variables. During other periods, such as in Europe and the United States in the 1980s (Burda, 1988; Katz and Meyer, 1990), or the United States during the Great Recession 2007-09 (Rothstein, 2011; Hagedorn et al., 2013; Farber and Valletta, 2015), scholars have found a positive relationship.

The measure used for the generosity of unemployment benefits is the replacement rate, which is the ratio of unemployment benefit to workers' earnings. The results show that the replacement rate is associated with a higher unemployment rate if the model is weighted by the insured population, which could be seen as a measure of the labour force. Because workers' earnings depend on multiple factors, such as occupation, gender, or being eligible for benefits, the replacement rate had a local dynamic that has not been fully recognised by previous studies. In addition, nominal wage rates fell throughout the late 1920s and the early stages of the Great Depression, while nominal unemployment benefits did not change, causing the replacement rate to rise. Since the change in wages varied across industries, changes in the replacement rate varied substantially across local labour markets with consequent potential impact on the unemployment rate.

This chapter is composed of four sections in addition to the present introduction. Section 4.2 presents a literature review and discussion of the role of unemployment benefits in interwar Britain. Section 4.3 displays the econometric estimation for a set of panel data models and discusses the main results. Section 4.4 analyses in detail the cases of Lancashire and West Riding in Yorkshire to establish how the industrial composition in the most populated counties of northern England led to relatively high replacement rates.

Finally, section 4.5 presents the main conclusions.

## 4.2 Unemployment benefits during the expanded unemployment insurance era and their influence on structural unemployment.

The impact of unemployment benefits on the interwar labour market has attracted the attention of several generations of scholars. The benefits under the 1920 Unemployment Insurance Act were initially designed to temporarily mitigate the mass unemployment brought about by the macroeconomic and industrial adjustments after the First World War. However, British labour market struggled to accommodate the thousands of ex-soldiers and workers from those industries oriented toward the mobilisation of the war, which is why unemployment benefits, rather than transitory support, became a permanent public policy of interwar Britain that shaped the labour market for the next two decades.

The unemployment insurance scheme underwent a massive expansion in 1920 from its very limited framework that had been in operation since 1911. The original program was mainly oriented to the great staple industries that faced significant international competition since early in the twentieth century. The new scheme launched in 1920 substantially increased its coverage until it reached approximately 70% of the labour force (Thomas, 1988), although it excluded industries considered not sensitive to business cycle fluctuations, such as domestic services or agriculture. This situation remained unchanged until 1934 when there was a further increase in coverage.

Even though the unemployment insurance scheme remained operative throughout the entire interwar period and beyond, it passed through different stages and changes. This was to a large extent the outcome of a "trial and error process" during the 1920s, which

later resulted in a more stable and sustainable version in the 1930s. Burns (1941) identified two main stages in the British interwar Unemployment Insurance, each one of them associated with the level and administration of the benefits. The first stage, covering the period between 1920 and 1931, which she called *Expanded Unemployment Insurance*, was characterised by a high degree of flexibility in the rules' adherence for claiming the benefit. Such flexibility is explained to a large extent by the short length of the 1920 scheme in the context of high and persistent unemployment, which in many cases gave little time for the insured workers to pay the required number of contributions to be eligible to claim the benefits. Initially, the unemployment insurance program required that a worker had to have paid at least 12 sequential weekly contributions before becoming eligible to claim the benefit. Furthermore, the benefits were capped at a maximum of fifteen weeks. In practice, however, these norms were not always followed. The unemployment insurance administration issued many exceptions and temporary provisions (Burns, 1941) aimed at facilitating access by the unemployed to the benefits to mitigate the social problems caused by persistent unemployment and the decline of key employers in the coal mining, textile, or shipbuilding industries.

The high level of unemployment brought about by the Great Depression and the flexibility in the adherence to the rules led the scheme into a delicate financial situation, which made reform inevitable. This initiated a second phase in November 1931, which Burns (1941) termed *Restricted Unemployment Insurance*. From that point onward, new conditions aimed at restricting the benefits and their duration were established, with greater emphasis placed on adherence to the norms. In addition, the benefits were substantially reduced (Burns, 1941), although this reduction was reversed in 1934 when the economic situation improved.

A potential negative impact of employment benefits on workers' job searching efforts was discussed by Benjamin and Kochin (1979), who maintained that a higher replacement rate was associated with a higher incidence of unemployment because workers had less incentive to find a job. To support this conclusion, the authors analysed the differ-

ence by gender and age in unemployment benefits, controlled for the business cycle, and found that unemployment incidence was higher for adult male groups, who had a higher estimated replacement rate.

A major constraint in Benjamin and Kochin's estimation is the fact that the unemployment benefits data they used to calculate the replacement rate was established by the unemployment insurance administration, which implicitly assumes that all unemployed individuals receive the same benefits according to their gender and age, without considering workers' eligibility for the benefits and the unemployment administration adherence to the established conditions.

Contrary to Benjamin and Kochin's conclusion, Eichengreen (1986) and Hatton and Bailey (2002) did not find a relationship between unemployment incidence and unemployment benefits once unemployed personal characteristics, skills and industry differences were taken into consideration. This research, however, is based on data from the New Survey of London Life and Labour (1929-31), which only analyses the case of London in a period when the labour market was particularly affected as a result of the Great Depression. Due to regional diversity in the industrial composition and labour conditions across Britain, as well as the aforementioned information on low adherence by the Unemployment Insurance administration between 1920–1931, what is concluded for London is not necessarily what could be inferred as true for the rest of the country, particularly for depressed regions shaped by a high proportion of the depressed industries. It could be the case that wages in London were substantially higher than the national average, and therefore the replacement rates were substantially lower, having a marginal impact on structural unemployment.

Due to the constraints in the previous literature, the question regarding the impact of unemployment benefits on unemployment is not fully resolved. This chapter aims to fill that information gap by using data on actual unemployment benefits paid at the county level for northern Britain, which is composed of northern England and Scotland, between 1928 and 1931. Despite their geographical proximity, similarities in their industrial com-

position and being located in so-called "outer" Britain, northern England and Scotland followed two different paths in terms of the evolution of their internal frictions. While in northern England, a high unemployment rate occurred alongside a high level of labour frictions, Scotland's low level of labour frictions was very similar to that of southern England. In the case of Scotland, unemployment is predominantly explained by the lack of local job opportunities in that area of the United Kingdom and not by the mismatching between the unemployed and job vacancies, as was the case for northern England.

Unemployment benefits were determined not only by gender and age but also by the number of dependents that an insured worker had. From November 1921, unemployment insurance began to pay a benefit rate of 5 shillings per adult dependent and 1 shilling per child dependent. The rates for the former gradually increased throughout the period until they reached 10 shillings per adult dependent in March 1938. Tables 4.1, 4.2 and 4.3 display the prevailing benefit rates, established by the different unemployment insurance acts throughout the period.

In addition to the established benefit rates, another important element within the unemployment insurance scheme was the duration of the benefits. The general trend was an increase in the benefit duration throughout the period of Extended Unemployment Insurance when long-term unemployment was already a problem, although it did not have the magnitude it would reach in the 1930s. The flexibility regarding the terms of duration was particularly important between April 1928 and November 1931 when there was no established limit for the continuance of claiming the benefit. In addition to the benefits' duration, the administration of the Extended Unemployment Insurance displayed a high degree of flexibility in granting benefits to uninsured, unemployed individuals who did not complete the required number of contributions. These payments were classified using different terms, such as uncovenanted, extended, or transitional, during the period but still preserved the essence of the meaning.

All the elements regarding the administration of unemployment insurance determined the actual amount paid for benefits and therefore its impact on the labour market. These

**Table 4.1:** Prevailing benefit rate in pence for insured workers and dependents (14 August 1924 – 4 July 1928)

| **Period** | | **Men** (age 18 and over) | **Women** (age 18 and over) | **Boys** (Age 16-17) | **Girls** (Age 16-17) | **Adult dependent** | **Each dependent child** |
|---|---|---|---|---|---|---|---|
| Starting date | Ending date | | | | | | |
| 14-Aug-24 | 18-Apr-28 | 216 | 180 | 90 | 72 | 60 | 24 |
| 19-Apr-28 | 4-Jul-28 | 204 | 180 | 72 | 60 | 84 | 24 |

Source: Estimated based on Burns (1941)

**Table 4.2:** Prevailing benefit rate in pence for insured workers (5 July 1928 – 30 June 1934)

| **Period** | | **Men** | **Women** | **Young Men** | | | **Young Women** | | | **Boys** | | **Girls** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Starting date | Ending date | Age 21-64 | Age 21-64 | Age 20 | Age 19 | Age 18 | Age 20 | Age 19 | Age 18 | Age 16-17 | | Age 16-17 | |
| 5-Jul-28 | 12-Mar-30 | 204 | 180 | 168 | 144 | 120 | 144 | 120 | 96 | 72 | | 60 | |
| **Period** | | **Men** | **Women** | **Young Men** | | | **Young Women** | | | **Boys** | | **Girls** | |
| Starting date | Ending date | Age 21-64 | Age 21-64 | Age 20 | Age 19 | Age 18 | Age 20 | Age 19 | Age 18 | Age 17 | Age 16 | Age 17 | Age 16 |
| 13-Mar-30 | 7-Oct-31 | 204 | 180 | 168 | 168 | 168 | 144 | 144 | 144 | 108 | 72 | 90 | 60 |
| 8-Oct-31 | 30-Jun-34 | 183 | 162 | 150 | 150 | 150 | 129 | 129 | 129 | 96 | 66 | 81 | 54 |

Source: Estimated based on Burns (1941)

**Table 4.3:** Prevailing benefit rate for dependants (5 July 1928 – 30 June 1934)

| **Period** | | **Adult dependent** | **Each dependent child** |
|---|---|---|---|
| Starting date | Ending date | | |
| 5-Jul-28 | 12-Mar-30 | 84 | 24 |
| 13-Mar-30 | 7-Oct-31 | 108 | 24 |
| 8-Oct-31 | 30-Jun-34 | 96 | 24 |

Source: Estimated based on Burns (1941)

elements were different across Britain due to the particularities of each region regarding the participation of women and juveniles, as well as the incidence of long-term unemployment and the number of dependents. For this reason, it is plausible to assume that the average benefit paid to each region and even each county varies substantially, which could prove useful in identifying its impact on unemployed members' job search efforts. Not only did the average amount of paid benefit vary for the different regions across Britain, but so did the replacement rate. The regional differences in industrial composition, as well as the particular employment situation in each local labour market, and the average workers' earnings, all differed across the country. With the differences in both the average paid benefit and workers' earnings across regions, the effect of the replacement rate on people's job search efforts was, to a large extent, a regional rather than national phenomenon.

Figure 4.1 displays the average replacement rate between January 1928 and November 1931 for the 18 counties located in northern England and Scotland. Despite the geographical proximity and the fact that the great staple industries accounted for an important share of the employment in the analysed regions, these counties show significant differences. This is in contrast to the long-held assumption of a national replacement rate, indicating that the potential impact of the unemployment insurance scheme on search effort differs across Britain. In counties such as Cumberland and Durham, the average paid benefit was over 28% of an average worker's earnings, whereas in Westmorland, East Riding in Yorkshire, and Lothian, the ratio was below 24%.

Despite regional differences, however, between 1928 and 1931, the replacement rate experienced an increasing trend, as presented in Figure 4.2. In these four years, the monthly weighted sum of the replacement rate increased from 22.3% in January 1928 to 29.7% in October 1931, although it declined to 26.8% in November 1931. This increase was largely due to the persistent deflation observed in Britain in the late 1920s and the early years of the Great Depression, which led to a significant reduction in nominal wages. At the same time, the established benefits remained relatively constant, although there was a significant and permanent increase in April 1930. As shown in Tables 4.2 and 4.3, the

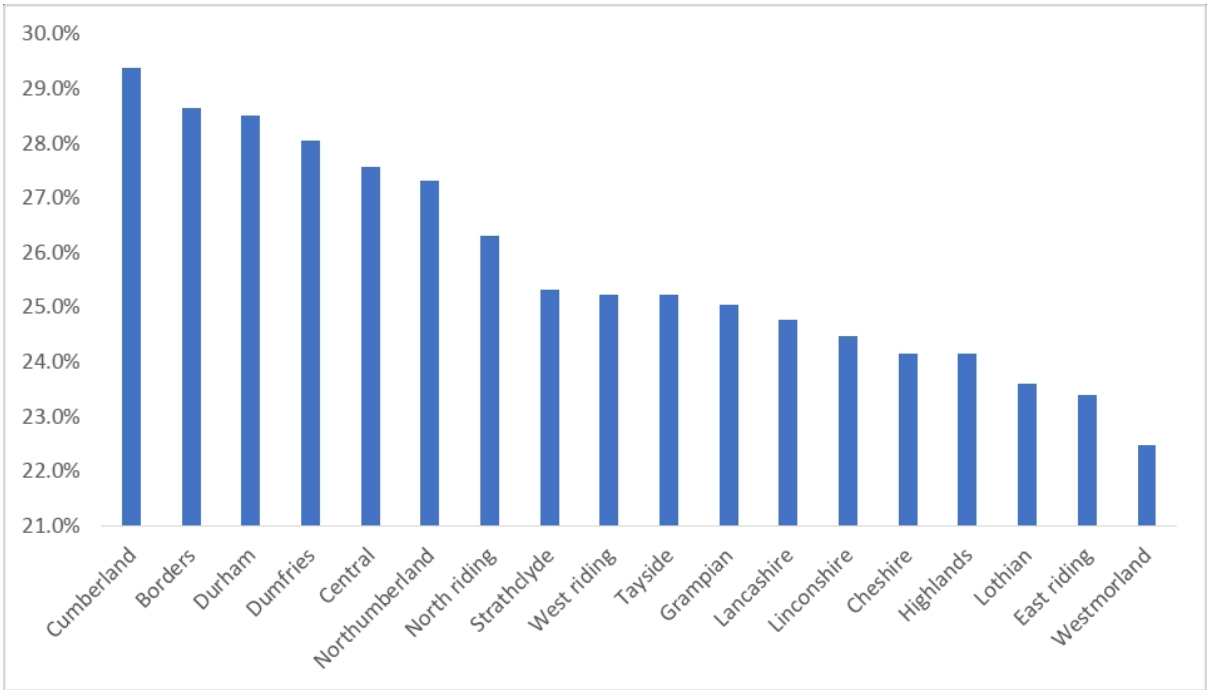


**Figure 4.1:** Average replacement rate by county, 1928-1931
Source: Estimates based on the regional returns of Unemployment Insurance scheme for benefits and Chapman, 1953 for wages (see Appendix 4.2).

benefits paid to men and women between the ages of 16 and 19 increased significantly in April 1930, as did the benefit paid for adult dependents, which increased to 9 shillings per week from a previous 7 shillings.

The rises in the established rates in a context of deflation led to an increase in the paid benefits purchasing power. Such a substantial increase in the replacement rate occurred during the large outward shift observed in the Beveridge curve in the early 1930s shown in Chapter 3. Considering that correlation, it is worth examining the potential relationship between the phenomena. Deflation in wages, plus the initial stability in the level of benefits followed by an increase, led to a situation where there was the potential for unemployment insurance to have had a negative effect in reducing unemployed people's search efforts. The econometric results presented in section 4.4 confirm that this was the case, which would explain the particularly high level of labour friction within northern England.

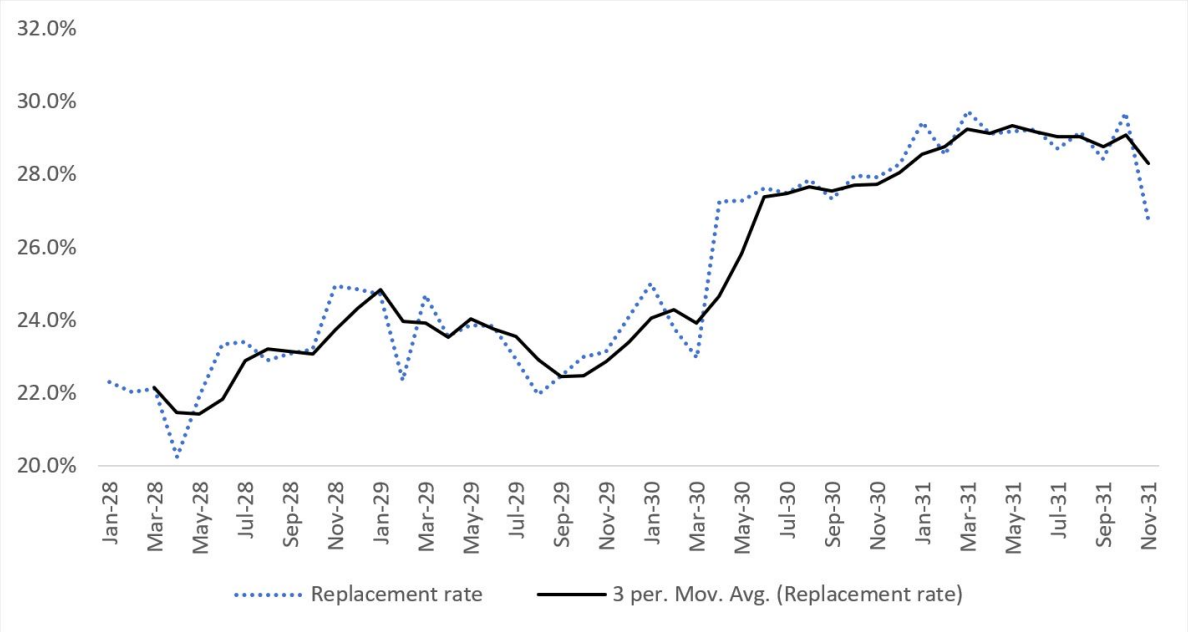


**Figure 4.2:** Monthly weighted replacement rate, January 1928-November 1931
Source: Estimated based on the regional returns of Unemployment Insurance scheme for benefits and Chapman (1953) for wages (see Appendix 4.2).

## 4.3 Unemployment benefits and search efforts

In order to establish the actual impact of unemployment benefits on unemployed workers' search efforts, it is necessary to include in the analysis the demand side of the labour market. In considering the other side of the labour market, and not exclusively the supply side, it is possible to control for how easy was to find a job in given regional labour conditions, in order to test for the actual impact of unemployment benefits. In this sense, this chapter measures the impact of unemployment benefits on structural unemployment, which as in Chapter 3 could be defined as the kind of unemployment which does not depend on the demand for labour.

### 4.3.1 Dataset

The details of the dataset and how the variables used in the econometric model were built are presented in Appendix 4.2. As in Chapter 3, the current chapter uses an original

dataset based on is the regional returns of the unemployment insurance administration. This source provides detailed information on the number of unemployed (by gender and age), and the number of vacancies at the local office level. In addition, between January 1928 and November 1931, the regional returns presented information on the quantity and amount of paid benefits, which allows for the estimation of the average paid benefit by county.

Unlike Chapter 3, which works with regional estimations, this current chapter goes into a further level of disaggregation, by estimating the variables at the county level for the north of Britain. These data were combined with data from the Local Unemployment Index, a monthly publication from the Unemployment Insurance scheme that was in circulation between January 1927 and August 1939. It presented information on the number of insured workers at the county level, which was absent in the regional returns, and which allows for the estimation of local unemployment and job vacancy rates for the insured population. In fact, the main purpose of the Local Unemployment Index was to display monthly local unemployment rates, although it did so by taking as a base for the labour force for a given year, the insured population in July of the previous year. This fact made the local rates of unemployment presented in the Local Unemployment Index inaccurate, although they were still useful in identifying the main general trends for the regional labour market in interwar Britain as the insured population was relatively stable in most cases.

In order to present monthly unemployment rates, this chapter combines the number of unemployed reported for every county in the north of England and Scotland in the regional returns, with the respective information on the insured population presented in the Local Unemployment Index. The latter only provided information for July every year, which is why the number of insured for the months in between were estimated by linear interpolation. Figure 4.3 shows the average unemployment for the eighteen counties in the north of England, and Scotland for 1928 and 1931. These years are useful in obtaining the first assessment of the differences within the regions of the north of England, and

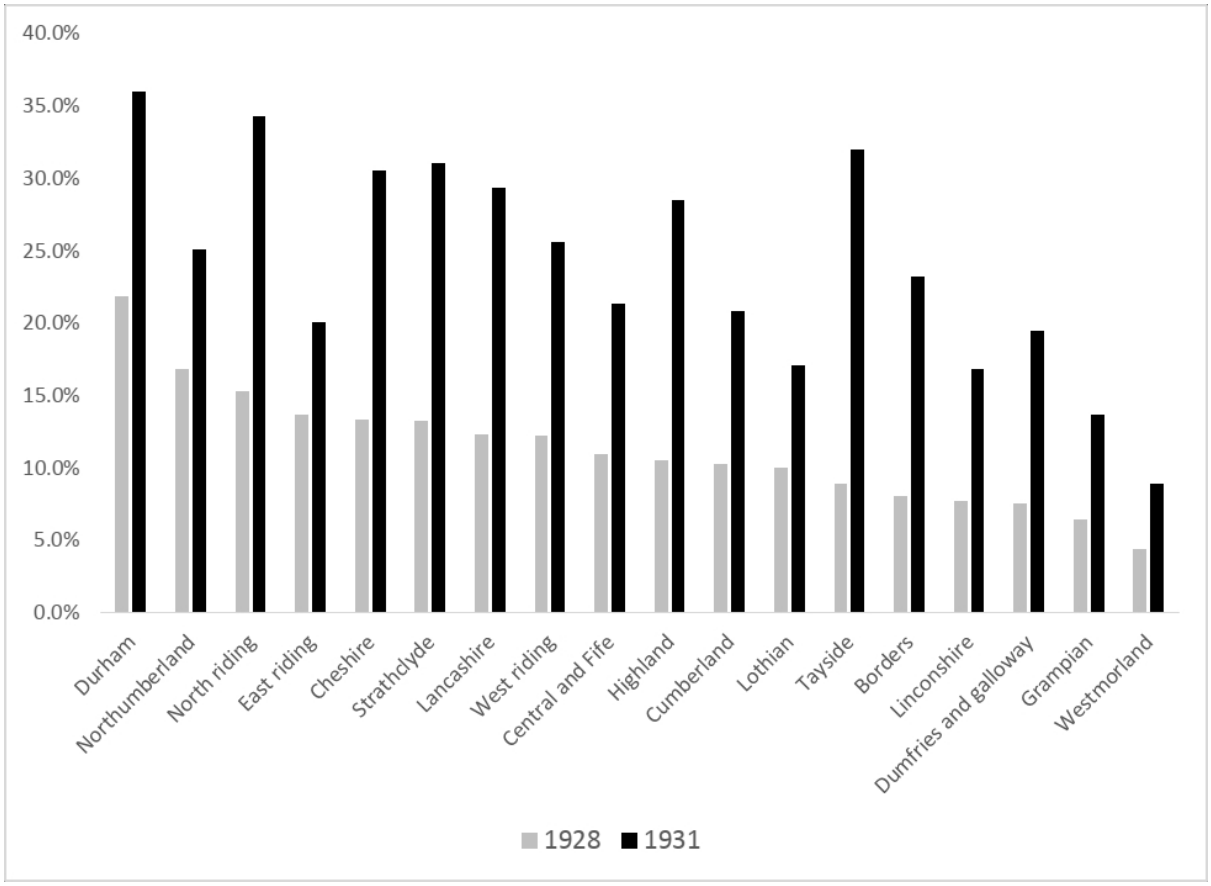


**Figure 4.3:** Average unemployment rates for the northern counties of Britain (North of England, and Scotland, 1928 and 1931)
Source: Estimated based on the regional returns of Unemployment Insurance scheme for the number of unemployed and the Local Unemployment Index for insured population.

Scotland for the periods before and during the Great Depression.

Before the Great Depression, even within the long-depressed regions of north-east England, there were substantial differences between counties. West Riding in Yorkshire, which was the most populated county within the north-eastern region, displayed an average unemployment rate of 12.2% in 1928, which was substantially lower than that observed for the already depressed county of Durham, which registered 21.8% for the same year. This difference of almost 10% was probably related to the difference in industrial composition, with employment in the former relying more on the textile industry, while in the latter, coal mining was more significant, where its decline commenced earlier.

By 1931, early in the Great Depression, the acute decline of coal mining that had already been taking place since the late second half of the 1920s, was joined by a decline in the

textile industry propelling the unemployment rate to 25.6% in West Riding in Yorkshire. Even though it was high, the rate was still lower than that of Durham (36%). Similar to West Riding in Yorkshire, Lancashire, the most populated county in the entire north of England and the core of the textile industry from the Industrial Revolution, sustained a massive increase in unemployment- from 12.3% to 29.3% between 1928 and 1931.

The cases of both Lancashire and West Riding in Yorkshire, highlight the fact that the sharp rise in unemployment in textiles was behind the massive outward shift in the Beveridge curve observed early in the Great Depression and examined in Chapter 3. The textile industry was experiencing problems similar to what had occurred in the coal mining industry after the General Strike in 1926. The differences in the timing of unemployment across industries in the counties caused there to be virtually no correlation across counties between the relatively high unemployment rates in 1928 and 1931 in Figure 4.1. Northumberland, for example, displayed the second largest unemployment rate in 1928, but by 1931 it was not among the counties with the highest rate of unemployment. Conversely, the county of Tayside in Scotland, where the textile industry accounted for around 27.6% of the interwar employment (Lee, 1979), shifted from low unemployment in 1928 (8.9%) to one of the highest in 1931 (32%).

As expected, the rise in unemployment occurred alongside a decline in job vacancy rates, although the vacancy rates underwent a far more moderate change. In general terms, the counties in the north of England, and Scotland saw a decline in their job vacancy rates between 1928 and 1931, which is in line with the massive shock that the Great Depression caused. However, such a decline did not follow the pace of the increase in unemployment, and even in Cumberland, Durham, and Northumberland, there was an increase in the job vacancy rates (as displayed in Figure 4.4). Lancashire, and West Riding in Yorkshire experienced a very moderate decline in job vacancy rates which differed from the massive increase in their unemployment rates. This indicates that the rise in local internal frictions observed early in the Great Depression was driven by the increase in unemployment.

Figure 4.5 presents the relationship between the changes in the counties' unemployment

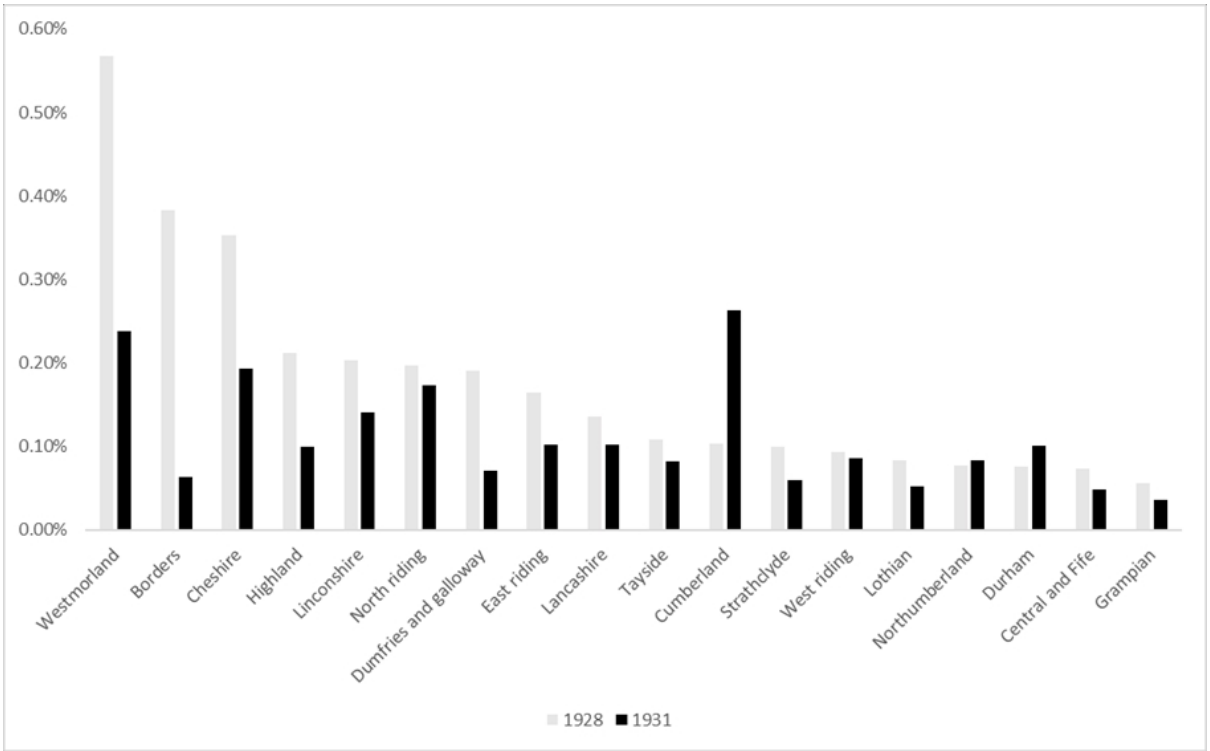


**Figure 4.4:** Average job vacancy rates for the northern counties of England, and Scotland (1928 and 1930)

Source: Estimated based on the regional returns of Unemployment Insurance scheme for the number of vacancies and Local Unemployment Index for insured population.

rates and the job vacancies between 1928 and 1931. There was a significant diversity in the counties' behaviour, with essentially no relationship between the two analysed variables. Besides the cases where the rise in unemployment occurred alongside an increase in the job vacancy rate, what occurred in Lancashire and West Riding Yorkshire was particularly important because the two counties accounted for around the 70% of the insured population in the north of England. In both cases the strong rise in the unemployment rate was matched with a very small change in the job vacancy rate. This indicates a substantial increase in the labour frictions within the counties, and raises the question: why were the increasing number of unemployed not absorbed by local vacancies, which remained unfilled- as they were before the Great Depression.

The finding in Chapter 3 that labour frictions within the north of England accounted for the 42% of the aggregate national labour frictions suggests that an examination of events in Lancashire and West Riding in Yorkshire will provide insight into the causes of

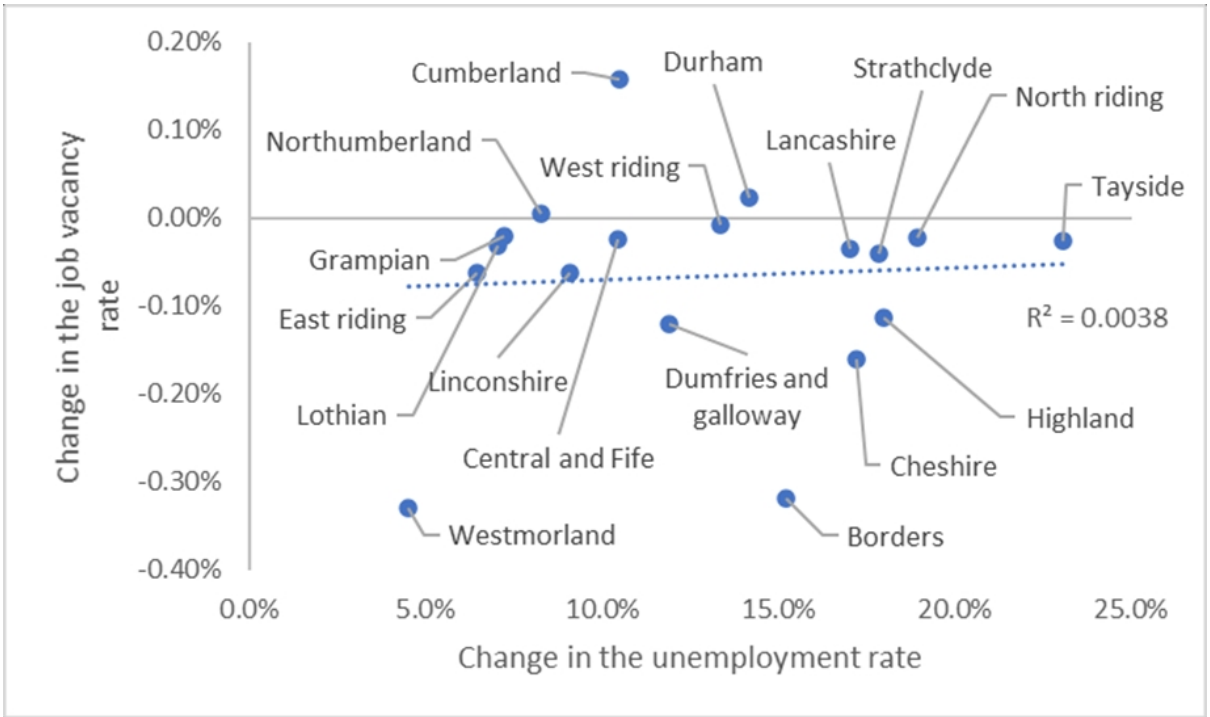


**Figure 4.5:** Changes in the unemployment and job vacancy rates by county (1928-1931)
Source: Estimated based on the regional returns of Unemployment Insurance scheme for the number of unemployed and vacancies and Local Unemployment Index for insured population.

structural unemployment for Britain as a whole. As the econometric results will show, in these counties the replacement rates rose sharply as wages fell and benefits rose. The low wages observed in the textile industry played a particularly important role in the process.

### 4.3.2 Econometric strategy

In order to test the effect of the replacement rate on the unemployment rate, this chapter will follow the approach of Valletta (2005), which develops an empirical version of the Beveridge curve, as displayed in Equation 1, or:

$$U_t = \mu + \beta_1 V_t + \beta_2 V_t^2 + \Lambda X_t + \varepsilon_t \tag{4.1}$$

Where $U_t$ is the unemployment rate, $V_t$ is the job vacancy rate, $V_t^2$ the square of the job vacancy rate, and $X_t$ is a vector of control variables. Equation 1 can be adapted to

include the replacement rate, or:

$$U_t = \mu + \beta_1 V_t + \beta_2 V_t^2 + \beta_3 P_t + \Lambda X + \varepsilon_t \tag{4.2}$$

Where $P_t$ is the replacement rate in the $t$ period. Considering the high persistence of unemployment, it is plausible to assume a significant level of autocorrelation, which is why the estimation for Equation 2 will be done by a set of dynamic panel models, following the methodology of Generalized Method of Moments estimators developed by Arellano and Bond (1991). This estimation is conducted for the northern counties of England, Scotland, and the whole of the north of Britain, in order to identify if the explanatory variables had different impacts, which could explain the divergence in terms of labour frictions. In addition, the observations are weighted using the counties' share in the number of insured workers to place more importance on the large counties, and therefore to explain the aggregate regional behaviour.

Besides the replacement rate, and the job vacancy rate, the estimation presented in this chapter also includes other control variables, such as the share of female workers, juveniles, and temporary stoppages within the pool of unemployed workers. Appendix 4.1 shows a summary of the variables included in the estimation with some descriptive statistics.

The regional returns of the Unemployment Insurance presented weekly information at a local level. However, this chapter only considers the information for the week closest to the middle of each month as a representative of that month, following the approach presented by the Local Unemployment Index. An observation from the middle of the month is illustrative of what was occurring in that period, but has enough 'distance' in time between the next observation to actually assess the changes in the local labour market conditions.

The job vacancy rate is defined as the total number of vacancies relative to the number of insured workers in a given county. Unfortunately, in November 1929, the Unemployment Insurance returns stopped registering the number of live or unfilled vacancies. After that

date, the series was estimated for the remaining period using the growth rates (estimated in Chapter 2 and based on notified and filled vacancies) of the regions in which the county was located. The regions were the north-east of England, the north-west of England or Scotland. For instance, to get vacancies for December 1929 in Lancashire, the total number of vacancies in Lancashire on 18th November 1929 was multiplied by the growth rate in the north-western regions from 18th November 1929 to December 1929.

### 4.3.3 Result

Table 4.4 displays the results of estimating Equation 2, including the results for a non-weighted model in column 4. All the variables included in the model are expressed in percentage terms, which is why the coefficients could be interpreted as elasticities.

There are substantial differences between the estimates from the non-weighted model presented in column 4 of table, and weighted model displayed in column 3 regarding the variables of interest. The non-weighted model displays a negative elasticity of -0.06 for the replacement rate in time t, in contrast to a positive elasticity of 0.06 in the weighted model. The coefficients of the lagged replacement rate are almost identical. Similarly, the weighted model generally has coefficients that were larger in magnitude for the proportion of female and juvenile workers of total number of unemployed workers.

These differences between the non-weighted and weighted models reveal that the large counties displayed a different pattern to that observed in the smaller counties. This fact would confirm that large counties, with their particularities, had a greater impact on the performance of the aggregate regional markets, which is why the weighted models present a better description of the regional labour markets in the north of Britain. In other words, any econometric model aiming to discover the determinants of regional structural unemployment, should consider that Lancashire had a greater impact on structural unemployment in the north of England than Westmorland did.

The impact of the replacement rate in the north of England (Model 1) was double the size

of its impact in Scotland (Model 2), and the coefficient was only statistically significant in the north of England.

According to these results, the unemployed workers in the north of England responded to the incentives of the Unemployment Insurance scheme, for instance through a reduction in their search efforts, leading to greater unemployment. Nevertheless, the Extended Unemployment Insurance scheme cannot be seen as the only cause of the positive relationship between the replacement and structural unemployment. Substantial wage deflation was also necessary, strong enough to push up the replacement rate. What lay behind the negative impact of the replacement rate on employment was not the period of Extended Unemployment Insurance, but that scheme operating in a context of strong wage deflation propelled by the monetary response that was brought about by the Great Depression.

The results presented in Table 4.4 raise the question; why did the replacement rate not have the same impact on Scotland as it had on the north of England? This difference indicates that there are additional elements to consider, such as the difference in labour mobility costs, overseas migration, or the importance of the agricultural sector being an alternative for the unemployed. Agriculture was outside the Unemployment Insurance scheme, and therefore omitted from the unemployment records. In any case, the econometric results found that not only were the replacement rates different across regions, but also, so was their impact on structural unemployment.

The differences between the north of England and Scotland go beyond just the replacement rate. In both regions, the results show a positive coefficient for the share of female unemployed within the pool of unemployed workers, confirming the findings reached in Chapters 1 and 2. However, in the case of the north of England, the impact is substantially higher, considering the coefficient for the present and the lagged variable. On average, female unemployed displayed a lower job finding rate, which had a negative impact on the regional labour market in the north of England, where they had a higher participation rate than in the rest of the country due to the importance of the textile industry. This result is particularly important due to the lower unemployment rate

**Table 4.4:** Econometric estimations results Dependent variable: Unemployment$_{(t)}$

| **Variable** | **(1) North of England (Weighted)** | **(2) Scotland (Weighted)** | **(3) North of England and Scotland (Weighted)** | **(4) North of England and Scotland (Non-Weighted)** |
|---|---|---|---|---|
| Unemployment rate$_{(t-1)}$ | 0.887*** | 0.912*** | 0.897*** | 0.957*** |
| | (0.017) | (0.019) | (0.012) | (0.016) |
| Vacancy rate$_{(t)}$ | -14.72*** | -2.75 | -13.177*** | -7.207*** |
| | (4.662) | (5.14) | (3.265) | (1.459) |
| Vacancy rate$_{(t-1)}$ | 1.154 | 3.257 | -0.204 | 0.095 |
| | (4.611) | (5.151) | (3.239) | (1.453) |
| Replacement rate$_{(t)}$ | 0.071** | 0.039 | 0.063*** | -0.063** |
| | (0.07) | (0.025) | (0.022) | (0.028) |
| Replacement rate$_{(t-1)}$ | 0.058* | -0.011 | 0.051*** | 0.057** |
| | (0.057) | (0.025) | (0.022) | (0.027) |
| Female$_{(t)}$ | -0.039 | 0.181*** | -0.013 | 0.086*** |
| | (0.034) | (0.042) | (0.025) | (0.022) |
| Female$_{(t-1)}$ | 0.164*** | -0.156*** | 0.129*** | -0.07*** |
| | (0.037) | (0.046) | (0.028) | (0.022) |
| Juveniles$_{(t)}$ | 0.389*** | -0.383*** | 0.335*** | 0.038 |
| | (0.076) | (0.096) | (0.057) | (0.071) |
| Juveniles$_{(t-1)}$ | -0.07 | 0.102 | -0.053 | 0.056 |
| | (0.074) | (0.09) | (0.056) | (0.064) |
| Temporary Stoppages$_{(t)}$ | 0.282*** | 0.222*** | 0.28*** | 0.110*** |
| | (0.014) | (0.032) | (0.01) | (0.014) |
| Temporary Stoppages$_{(t-1)}$ | -0.234*** | -0.113*** | -0.231*** | -0.073*** |
| | (0.014) | (0.033) | (0.011) | (0.014) |
| | | | | |
| Constant | -0.005*** | 0.002*** | -0.002*** | 0.006 |
| | (0.001) | (0.001) | (0.000) | (0.009) |
| | | | | |
| Vacancy rate square | Yes | Yes | Yes | Yes |
| Obs | 450 | 360 | 810 | 810 |
| Wald Chi2(13) | 27,598.30 | 18,948.74 | 47,225.93 | 11,856.87 |

Notes: (1) * indicates statistical significance at the 10% percent level, ** at the 5% percent level, and *** at the 1% level. (2) Standard errors are reported in parentheses.

in female workers registered previously in the literature (Benjamin and Kochin, 1979; Thomas, 1988). However, once the labour demand and the replacement rate are both considered, the econometric results show that female workers faced a more adverse labour market than their male counterparts. Although more research is required on this point, a possibility for the positive coefficient for the female portion of workers could be that this group faced more restrictions regarding geographical and industrial mobility, limiting their employment options to just a few possibilities, such as the textile industry in their locality.

The north of England and Scotland also display dramatically different results as to the impact that juvenile unemployed workers had. Even though the juvenile unemployed accounted for less than 7% of the total unemployed workers (except in Lincolnshire and Cheshire), the coefficient for this variable is statistically significant in both places, although it had opposite signs in each region. In the north of England a one percent rise in the share of juvenile unemployed led immediately to a 0.389 percent rise in unemployment, followed by a 0.07 percent decline in unemployment. On the other hand, in Scotland, the situation was reversed with an immediate elasticity of -0.383 followed by a lagged elasticity of 0.1. There is anecdotal evidence that labour exchanges in the regions receiving workers under the Household Removal Scheme, a government program orientated to facilitating labour mobility towards areas with a high volume of vacancies, preferred unemployed juveniles to fill their vacancies (Burns, 1941). However, the reasons behind the differing impacts on the north of England and Scotland are not clear.

The immediate effect of temporary stoppages, or furloughed workers, on the unemployment rate is positive, and had the same sign in the north of England and Scotland, although the lagged effect was negative. It is plausible to assume that temporary stoppages were a way of mitigating permanent unemployment, making it easier for unemployed in this condition to return to work once labour demand improved. On the other hand, being under temporary stoppage conditions could have prevented some workers from permanently migrating towards industries and locations with better employment prospects.

This second possibility could be interpreted as a 'deterrence' effect, which had a negative impact on the unemployed workers' search efforts, similarly to that of the replacement rate. The econometric results indicate that this 'deterrence' effect dominated during the period that was analysed, although it did so with more intensity in Scotland.

The estimated coefficient for the replacement rate, the share of female workers, and the temporary stoppages are useful in untangling the reasons behind the deterioration in the level of labour friction between 1928 and 1931, as well as the substantial differences in the internal frictions between the regions found in Chapter 3.

Considering hese results and the insured population density, what was behind the relatively high labour frictions in the north of England and the strong outward shift of the Beveridge curve in this region early in the Great Depression? The largest increases in the replacement rate, the share of female unemployed and the share of temporary stoppages occurred specifically in the largest counties of that macro-region, which were Lancashire, and West Riding in Yorkshire. In the case of the replacement rate, these two counties converged with mid-sized Durham and Northumberland which already registered high replacement rates, but those counties had a limited impact on the entire regional labour market due to their relatively small population size. The strong increase in structural unemployment in the north of England only occurred when that rise was observed in the most populated counties in the region.

In addition to the increase in the replacement rate in Lancashire, and West Riding in Yorkshire, the share of female unemployed workers and temporary stoppages were particularly high in these two counties. While in Strathclyde, which concentrated more than half of the entire insured population in Scotland, female unemployed accounted for 15.2% of the total unemployed workers. In Lancashire this group achieved a share of 30.6%, which was probably among the highest across Britain. In West Riding in Yorkshire, female unemployed accounted for 21.9% of total, again higher than the national level.

The counties with the largest populations in the north of England were not only shaped

by substantial increases in replacement rate between 1928 and 1931, and a large share of female unemployed, but also by a particularly large share of temporary stoppages. Again, the differences between Strathclyde and the two largest counties in the north of England are huge. The temporary stoppages in Strathclyde accounted for an average share of 12.5%, much lower than in West Riding in Yorkshire, and Lancashire with rates of 42.5% and 33.1%, respectively. Similar to the potential effect of the replacement rate, it could be possible the that the large share of temporary stoppages led to a reduction in the unemployed workers' job search efforts or thwarted their migration towards emerging industries. In this case, and alongside a significant increase in the replacement rate, the incentives for waiting for the remaining employment opportunities in a depressed, but already familiar industry or occupation, increased.

The intersection of the replacement rate and deterrence effect, brought about by the temporary stoppage conditions, could be also useful in explaining the reasons for the relatively low north-south labour mobility observed during this period. If the replacement rate and deterrence effect played a critical role in increasing the intra-regional labour frictions, it is plausible to assume that they also made migration towards the south of England seem less attractive. However, other elements such as the total cost of migration should also be taken into consideration.

After analysing the sign and significance of the coefficients of the explanatory variables, the next point is to examine the magnitude of the impact on the unemployment rate. In 1931, the average replacement rate in the north of England was 29.7%. This rate multiplied by the coefficients presented in Table 4.4 for the current and lagged terms yields 3.8%, which would be the reduction in the unemployment rate if the replacement rate had been reduced to zero. In addition, assuming a counterfactual, where the north of England had the same share of women and temporary stoppages in the unemployment pool as Scotland had, it would have yielded an unemployment rate 5.3% lower in that region. At first sight, this looks like a modest value in the context of 1931, when the average unemployment rate was 28.3%. However, in 1928, when the replacement rate

was significantly lower, the same scenario would have meant an unemployment rate that was 4.43% lower. In other words, that would have meant an average unemployment rate of 9.12% in the north of England, instead of the actual 13.46%.

Due to the strong persistence of unemployment, observed in the large coefficient estimated for the lagged unemployment rate, a low unemployment rate in the past increased the likelihood of a low unemployment rate in the present. In other words, for the north of England, it was essential for it to be in the best possible position before the Great Depression, which is why the negative impact of the replacement rate should not only be analysed by its direct effects, but also by its indirect impact on the unemployment rate path.

## 4.4 The cases of Lancashire, and West Riding in Yorkshire, and how the textile industry shaped labour frictions in the industrial north early in the Great Depression

After establishing the impact of the replacement rate and the temporary stoppages on the unemployment rate in the north of England, it is useful to examine in more detail what occurred in the two largest (in population terms) counties; Lancashire, and West Riding in Yorkshire. They were such a large share of the population that they ultimately determined the path of regional labour markets in the north-west and north-east regions, respectively. These counties, which were at the core of the British textile industry, and probably the most representative locations at the centre of the Industrial Revolution, found themselves in very different situations during the interwar period compared to their respective situations in the nineteenth century.

The high level of interwar unemployment in Lancashire, and West Riding in Yorkshire was strongly linked with the decline of the textile industry. In 1921, the textile industry,

excluding related trades such clothing or leather, accounted for 25% of non-agricultural employment in Lancashire, which was the base of the population insured by the Unemployment Insurance scheme, far away from the second largest group of distributive trades with a share of 12.5% (Lee, 1979). By 1931, even when the textile industry was in a period of accelerated decline, the textile industries still accounted for 20% of non-agricultural employment in Lancashire (Lee, 1979). For this reason, and considering the its population size, what occurred in the textile industry in Lancashire determined the employment situation, not only in that county, but the course of the entire regional market of north-western England. The other counties in the region, Cheshire, Cumberland, and Westmorland, had substantially smaller populations, which is why their influence was more limited, and cannot compare with Lancashire, which accounted for approximately 86%[1] of the insured population in the north-west of England region between 1928 and 1931. In this context, the main challenge for the labour market in the north-west of England region was to allow labour migration from the struggling textile industry towards the emerging industries within the area, or even other counties.

Similarly, although in a more nuanced situation, in the north-east of England region, West Riding in Yorkshire accounted for 55% of the insured population between 1928 and 1931. In West Riding in Yorkshire, again, the textile industry was the most significant employer, accounting for 21.4% of non-agricultural employment in 1921 (Lee, 1979). Even when by 1931, the share of the textile industry reduced to 17.7%, it remained the top employer in this county. As occurred with Lancashire, the size of that county determined the course of the entire regional market of the north east of England. Although in this case there were mid-size counties, like Durham or Northumberland, more oriented towards coal mining and were registering high unemployment rates since the mid-1920s, which also influenced the entire regional market, although not at the same level than West Riding in Yorkshire.

Figure 4.6 displays a monthly index to measure the evolution of the replacement rate for West Riding in Yorkshire, Lancashire, and the remaining parts of the north of England

[1]Estimation based on information provided from the Local Unemployment Index. See Appendix 4.1 for details.

between January 1928 and November 1931. In general terms, the trend showed an increase in replacement rate in three areas, although again April 1930 seemed to be a tipping point. As was presented in Section 4.1, this sudden increase is due to an increase in the paid benefits for dependents and young unemployed.

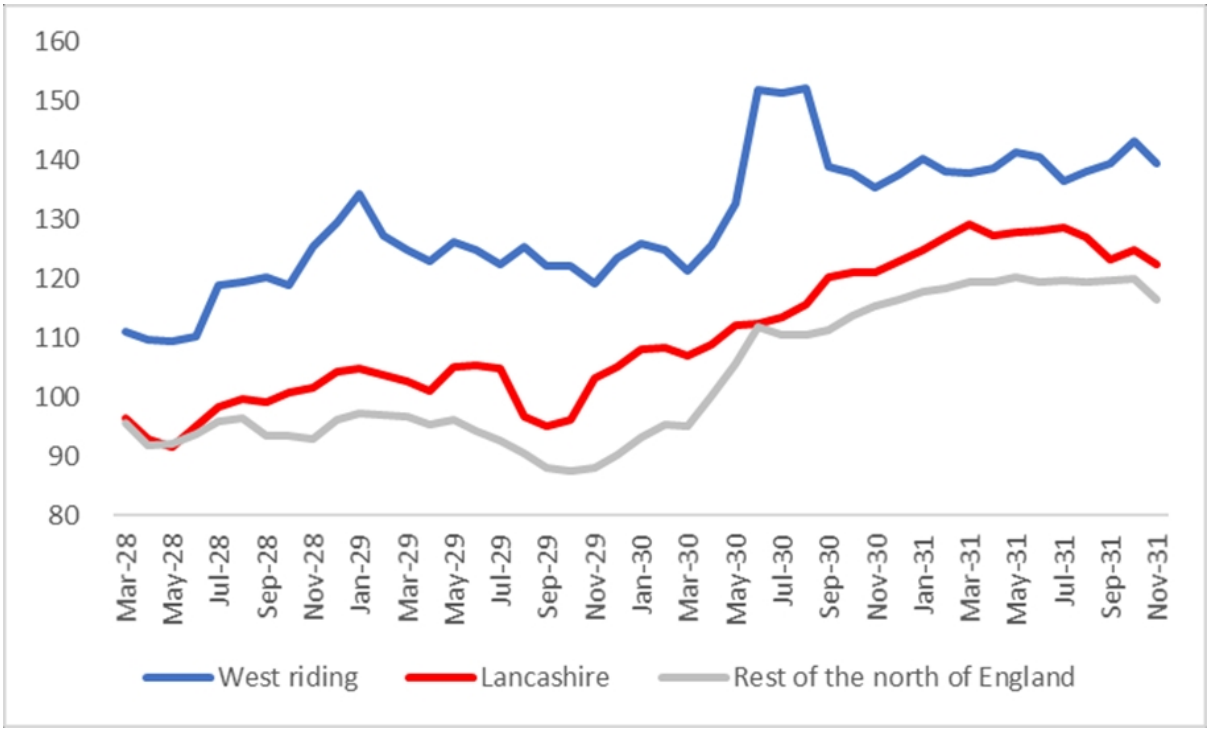


**Figure 4.6:** Replacement rates growth index in the north of England, January 1928 - March 1931 (January 1928 = 100; three months rolling average)

Source: Estimated based on the regional returns of Unemployment Insurance scheme for benefits and Chapman, 1953 for wages (see Appendix 4.2).

Despite the fact that the replacement rate increased everywhere across the north of England, it did so with a higher intensity in West Riding in Yorkshire, and Lancashire, which by October 1931, displayed increases of 45% and 31%, respectively, substantially higher than the 21% growth observed for the rest of the north of England. The strong increases in largest counties would be an important reason behind the high increase in internal labour frictions within the north of England found in Chapter 3, which was ultimately the main determinant of the rise in structural unemployment in Britain in the early phase of the Great Depression. Besides the increase in paid unemployment benefits, the other element which determined the behaviour of the replacement rate was

the average wages in the north, specifically in the textile industry.

Figure 4.7 displays the average annual earnings of wage-earners in Britain between 1922 and 1931. As expected, through deflation and persistent high unemployment, on average, wages tended to decline throughout the interwar period. However, the average wages in the textile industry were lower than those observed for the other declining industries such as mining and metal manufacturing, as well as the average for all industries and emerging sectors, such as retail. The relatively lower wages in the textile industry declined even further in 1930, when deflation and the rise in unemployment, (brought about by the Great Depression), gained intensity. With stability, and even increases in benefits, and wages being particularly low and/or even declining, it is not surprising that the strong rise in replacement rate was seen in the densely inhabited and textile-oriented counties of Lancashire, and West Riding in Yorkshire.

The labour frictions in Lancashire and West Riding in Yorkshire were not only increased by a rapid rise in the replacement rate between 1928 and 1931, but also by the gender composition of the unemployed pool. As presented in Table 4.4, the share of female unemployed in the total number of unemployed had a positive impact on the unemployment numbers. If women had a lower average job finding rate than the average unemployed person, these counties where women accounted for a larger share of the unemployed workers will display higher structural unemployment. This was the case for Lancashire and West Riding in Yorkshire, where the textiles industry employed a large number of female workers, many of which became unemployed with the onset of the Great Depression. As is shown in Figure 4.8, these two counties not only displayed a higher share of unemployed females than the rest of the north of England, but a major rise in that share was observed in early 1930, particularly in Lancashire.

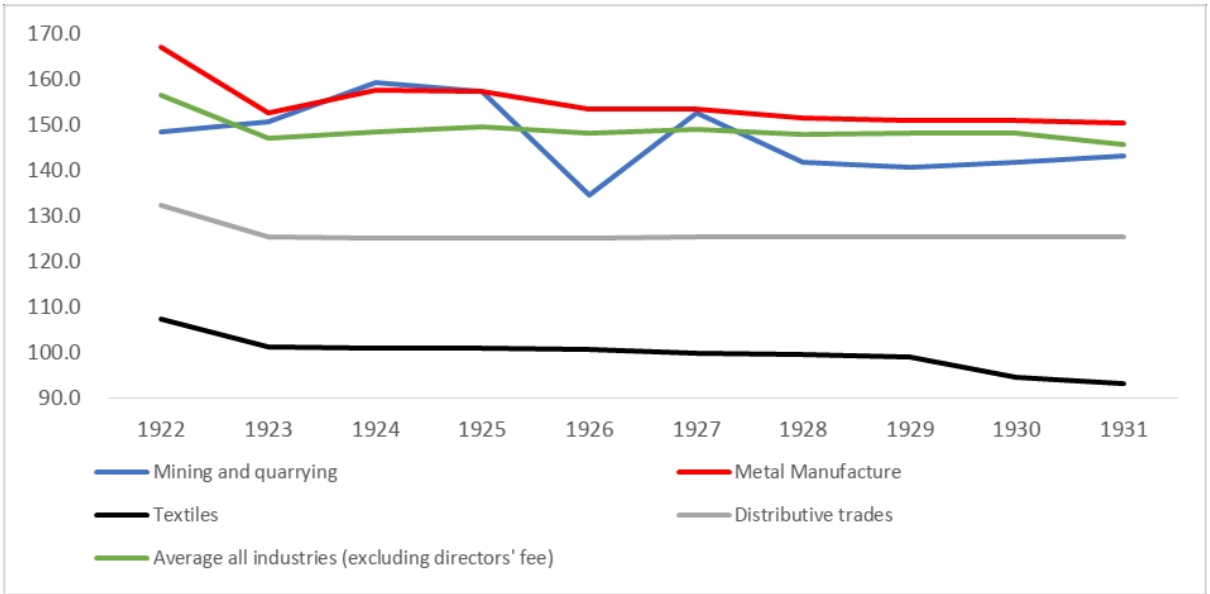


**Figure 4.7:** Average annual nominal earnings (wages and salaries) of wage-earners in Britain 1922-1931

Source: Chapman, 1953.

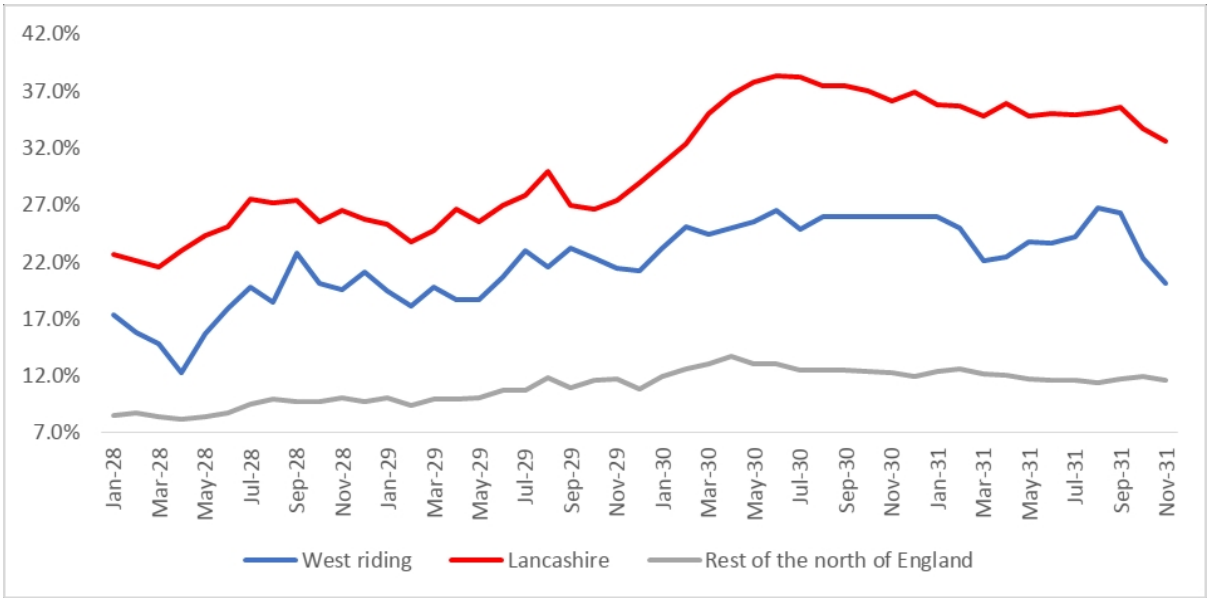


**Figure 4.8:** Monthly share of female unemployed within the unemployed pool, January 1928 – November 1931

Source: Regional returns of the Unemployment Insurance administration scheme.

A final and important element which characterised Lancashire and West Riding in Yorkshire, and which contributed to the significant labour frictions in the north of England, was the high share of temporary stoppages within the unemployed pool. In the two

largest counties of the north, the temporary stoppage conditions among the unemployed were substantially higher than in the rest of the country. It is plausible to assume that a substantial number of these furloughed workers, which were usually called back to work after two weeks, opted for to queue for their turn to be called back to work, probably in the textile industry or another declining sector, rather than to migrate to the emerging services sector or new industries. In this case, the deterrence effect identified in the econometric estimations was characteristic of Lancashire and West Riding in Yorkshire, which due to their population size, exerted a significant impact on labour frictions for the entire north. This conclusion is in line with that of Thomas (1988), who maintained that unemployment in many cases was due to a shared condition.

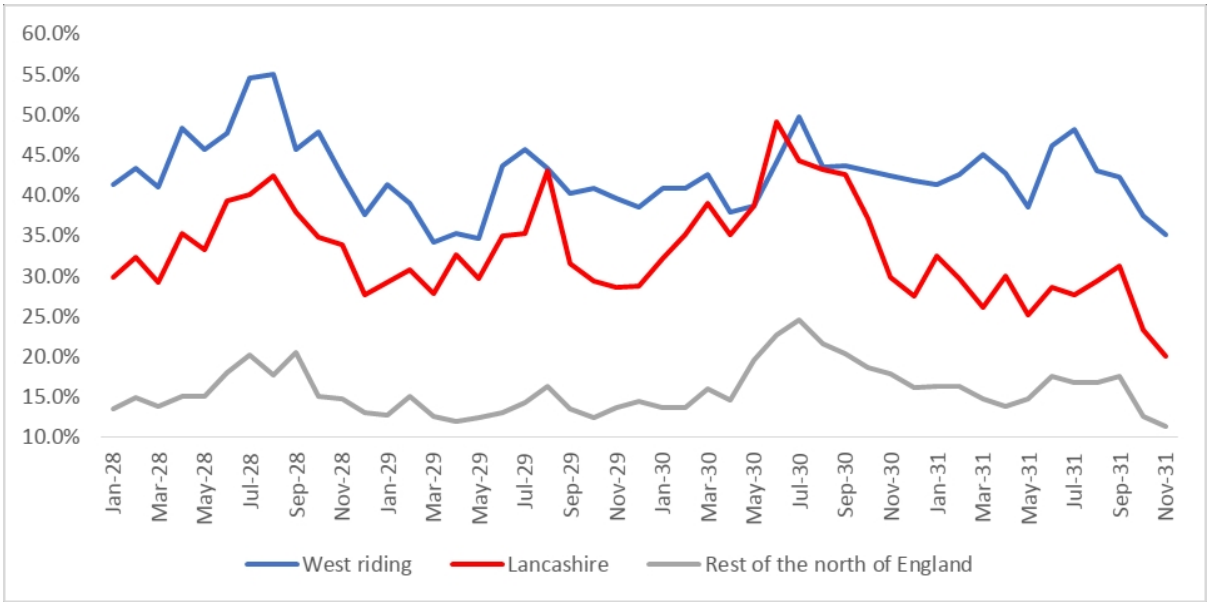


**Figure 4.9:** Monthly share of temporary stoppages within the unemployed pool, January 1928 – November 1931

Source: Regional returns of the Unemployment Insurance administration scheme.

The intersection of an important rise in the replacement rate, the deterrence effect caused by the temporary stoppages, and a high concentration of unemployed females led to a substantial increase in structural unemployment in Lancashire and West Riding in Yorkshire, which due to their population size, finally shaped the labour market of the entire north of England, and finally became in the main the determinant of labour friction during the period of the strong worsening of labour frictions between 1928 and 1931. All

**Table 4.5:** Econometric estimations results Dependent variable: Unemployment$_{(t)}$

| **Variable** | **(5) North of England excluding Lancashire and West Riding of Yorkshire (Weighted)** |
|---|---|
| Unemployment rate$_{(t-1)}$ | 0.96*** (0.019) |
| Vacancy rate$_{(t)}$ | -8.278*** (2.663) |
| Vacancy rate$_{(t-1)}$ | 1.716(2.671) |
| Replacement rate$_{(t)}$ | 0.14*** (0.039) |
| Replacement rate$_{(t-1)}$ | -0.016(0.042) |
| Female$_{(t)}$ | -0.053(0.054) |
| Female$_{(t-1)}$ | 0.087(0.056) |
| Juveniles$_{(t)}$ | 0.165* (0.094) |
| Juveniles$_{(t-1)}$ | 0.067(0.094) |
| Temporary Stoppages$_{(t)}$ | 0.244*** (0.019) |
| Temporary Stoppages$_{(t-1)}$ | -0.169*** (0.019) |
| | |
| Constant | -0.005*** (0.001) |
| | |
| Vacancy rate square | Yes |
| Obs | 360 |
| Wald Chi2(13) | 15,667.78 |

Notes: (1) * indicates statistical significance at the 10% percent level, ** at the 5% percent level, and *** at the 1% level. (2) Standard errors are reported in parentheses.

these elements were ultimately related to the performance of the textiles industry, the 'steam industry' of the Industrial Revolution, which in the late 1920s, went into definitive decline.

Finally, it is worth pondering how different the north of England would have been without its two large textile centres. Table 4.5 displays the results of an econometric estimation similar to Model 1 presented in Table 4.4, but excluding Lancashire, and the West Riding of Yorkshire. The results show that the impact of the replacement rate increased to 14%, while the impact of the share of unemployed females disappeared. This is probably explained by the case that the mining-oriented counties would have had a greater influence. However, these counties did not have a large enough population to determine the course for the entire north of England's labour market as Lancashire and the West Riding of Yorkshire did.

## 4.5 Conclusions

This article explains the particularly high level of internal labour friction in northern England found in Chapter 3, which was also the main determinant of structural unemployment at the national level. Through an econometric analysis using monthly observations of 18 counties in northern Britain, composed of northern England and Scotland, between January 1928 and November 1931, this chapter finds that structural unemployment is largely explained by the replacement rate and a deterrence effect caused by temporary stoppages. The former variable experienced an important increase as a result of strong wage deflation and the mild nominal increase in unemployment benefits. The effect of the increase in benefit was particularly strong in the largest (most populated) counties in northern England, which were also influenced by the particularly low wages in the textile sector. In these counties, a higher prevalence of temporary stoppages was also observed, which, according to econometric results, led to a "deterrence effect", reducing unemployed workers' incentives to migrate toward industries or locations with better employment prospects. This deterrence effect is also observed, and even more intensely, in

the case of Scotland. However, unlike northern England, temporary stoppages were more prevalent only in the smaller counties and therefore had a substantially lower impact on aggregate labour frictions for Scotland.

The econometric results also show that the share of unemployed females within the unemployed pool had a positive impact on the counties' structural unemployment rates. According to that finding, unemployed females would display a lower job finding rate once the labour demand is taken into consideration in the analysis, as this current chapter does. The share of unemployed females and the replacement rate displayed particularly high growth in the densely populated counties of Lancashire and West Riding in Yorkshire, which alongside the deterrence effect caused by the temporary stoppages, the large number of unemployed ultimately determined the high overall level of labour friction in northern England.

The chapter untangled one of the most intriguing and debated topics in British labour history—the drivers behind high structural interwar unemployment. Even though this chapter only examines one subperiod (1928-1931) within the interwar period, it was precisely during these years when structural unemployment, measured by the outward shift in the Beveridge curve, experienced its highest increase. For these reasons, the conclusions reached in the current chapter are useful in understanding the persistently high unemployment that shaped the 1930s, a situation that only the rearmament campaign could reduce.

Despite the important findings obtained in this chapter, some important questions remain for further research, such as why the replacement rate did not have the same impact on Scotland's structural unemployment as it did in northern England. Likewise, it would be useful to establish if the replacement rate had the same impact on other parts of Britain beyond northern England and Scotland, which were examined in this chapter.

# Appendix 4.1

## Descriptive statistics for variables used in the econometric estimations

| Non-weighted north of England | | | |
|---|---|---|---|
| **Variables** | **Number of Observations** | **Mean** | **Standard deviation** |
| Unemployment rate | 470 | 16.97% | 7.81% |
| Job vacancy rate | 470 | 0.19% | 0.16% |
| Replacement rate | 470 | 25.58% | 3.84% |
| Share of female Unemployed | 470 | 15.61% | 9.41% |
| Share of juvenile Unemployed | 470 | 5.66% | 1.45% |
| Share temporary Stoppages | 470 | 21.48% | 12.53% |
| **Weighted north of England** | | | |
| **Variables** | **Number of Observations** | **Mean** | **Standard deviation** |
| Unemployment rate | 470 | 1.90% | 2.83% |
| Job vacancy rate | 470 | 0.01% | 0.02% |
| Replacement rate | 470 | 2.54% | 3.37% |
| Share of female Unemployed | 470 | 2.25% | 4.14% |
| Share of juvenile Unemployed | 470 | 0.53% | 0.66% |
| Share temporary Stoppages | 470 | 3.05% | 5.10% |

| Non-weighted Scotland | | | |
|---|---|---|---|
| **Variables** | **Number of Observations** | **Mean** | **Standard deviation** |
| Unemployment rate | 376 | 14.85% | 7.12% |
| Job vacancy rate | 376 | 0.12% | 0.10% |
| Replacement rate | 376 | 25.95% | 4.11% |
| Share of female Unemployed | 376 | 22.07% | 9.60% |
| Share of juvenile Unemployed | 376 | 4.93% | 1.66% |
| Share temporary Stoppages | 376 | 15.91% | 12.06% |
| **Weighted Scotland** | | | |
| **Variables** | **Number of Observations** | **Mean** | **Standard deviation** |
| Unemployment rate | 376 | 2.12% | 3.68% |
| Job vacancy rate | 376 | 0.01% | 0.02% |
| Replacement rate | 376 | 3.17% | 4.36% |
| Share of female Unemployed | 376 | 2.24% | 2.62% |
| Share of juvenile Unemployed | 376 | 0.72% | 1.09% |
| Share temporary Stoppages | 376 | 1.62% | 2.19% |

| Non-weighted north of Britain | | | |
|---|---|---|---|
| **Variables** | **Number of Observations** | **Mean** | **Standard deviation** |
| Unemployment rate | 846 | 16.03% | 7.58% |
| Job vacancy rate | 846 | 0.16% | 0.14% |
| Replacement rate | 846 | 25.7% | 4.0% |
| Share of female Unemployed | 846 | 18.5% | 10.0% |
| Share of juvenile Unemployed | 846 | 5.3% | 1.6% |
| Share temporary Stoppages | 846 | 19.0% | 12.6% |
| **Weighted north of Britain** | | | |
| **Variables** | **Number of Observations** | **Mean** | **Standard deviation** |
| Unemployment rate | 846 | 1.0% | 1.8% |
| Job vacancy rate | 846 | 0.0% | 0.0% |
| Replacement rate | 846 | 1.4% | 2.1% |
| Share of female Unemployed | 846 | 1.2% | 2.5% |
| Share of juvenile Unemployed | 846 | 0.3% | 0.4% |
| Share temporary Stoppages | 846 | 1.5% | 3.1% |

# Appendix 4.2

## Wages series for the replacement rates in counties

The monthly series of replacement rates for the counties used in the econometric estimations presented in Chapter 4 were obtained from different sources. For the counties' paid unemployment benefits, data was used that corresponded to the week closest to the middle of a given month, reported in the regional Unemployment Insurance administration returns, following the methodology of Local Unemployment Index publication. For wages, a combination of information presented by Chapman (1953) and Lee (1979) was used an annual estimation. The former provides yearly information, based mainly on the 1924 and 1930 industrial censuses, on wages by industry for the interwar period. On the other hand, Lee (1979) displayed the employment composition of counties, based mainly on the population census, for each decade between 1841 and 1971. For this article, information for 1921 and 1931 was taken, and each industry's share in each county was estimated, excluding the agricultural sector which was not included in the Unemployment Insurance scheme for the period analysed in Chapter 4. Once the industries' share in employment for 1921 and 1931 were established, the shares for the years in between were estimated following Holt-Winter's methodology (Winters, 1960) for interpolation. Evidently the interpolation for the shares between 1922 and 1930 is a less precise estimation than observing the actual shares. However, contrasting the employment compositions of 1921 and 1931 presented in Table **??**, the industrial adjustment was gradual rather than radical. Even though during the interwar period Britain faced a substantial industrial change in the aggregate, year-on-year, this transformation was gradual. For this reason, it is plausible to assume that the employment composition was stable in general terms, and the interpolations introduce the required flexibility to reflect the main trends, such as the strong rise of the retail trade or the shrinkage of the textile industry. Table **??** displays the employment compositions in 1921 and 1931.

**Table 4.6:** Employment compositions United Kingdom, 1921 and 1931

| **Industry** | **Employment composition 1921** | **Employment composition 1931** |
|---|---|---|
| Agriculture, forestry and fishing | 7.3% | 6.3% |
| Mining and quarrying | 7.4% | 5.7% |
| Food, drink and tobacco | 3.3% | 3.4% |
| Coal and petroleum products | 0.0% | 0.1% |
| Chemical and allied industries | 1.3% | 1.1% |
| Metal Manufacture | 2.6% | 2.0% |
| Mechanical engineering | 3.7% | 2.5% |
| Instrument engineering | 0.2% | 0.3% |
| Electrical engineering | 0.9% | 1.3% |
| Shipbuilding and marine engineering | 2.1% | 1.0% |
| Vehicles | 2.0% | 2.2% |
| Metal goods not elsewhere specified | 2.1% | 1.7% |
| Textiles | 6.9% | 5.9% |
| Leather, leather goods and fur | 0.5% | 0.4% |
| Clothing and footwear | 4.6% | 4.4% |
| Brick, pottery, glass, cement, etc | 1.2% | 1.3% |
| Timber, furniture, etc | 1.6% | 1.5% |
| Paper, printing and publishing | 2.0% | 2.3% |
| Other manufacturing industries | 0.9% | 1.0% |
| Construction | 4.2% | 5.0% |
| Gas, electricity and water | 0.9% | 1.2% |
| Transports and communication | 7.2% | 8.1% |
| Distributive trades | 11.8% | 14.5% |
| Insurance, banking, finance and business services | 1.8% | 2.1% |
| Professional and scientific services | 3.1% | 4.7% |
| Micellaneous services | 12.6% | 14.2% |
| Public administration | 7.8% | 5.5% |
| Not classified | 0.1% | 0.4% |

Source: Lee (1979).

A county's expected wages was obtained by the weighted sum of each industry share in the county's employment figures multiplied by the nominal wage for that industry reported by Chapman (1953). In other words, the county's wage is the weight sum of the wages for each industry, using the employment share of each in industry as weight, which were specific for each county. It is worth mentioning that nominal wages were used, rather than actual wages, in order make them comparable with the paid unemployment benefits. According to the methodology used in Chapter 4 for the wages estimation, there is the underlying assumption that wages in a given industry are the same at the national level without considering any regional differences. This assumption could introduce an upward bias for these regions with wages below the national average. However, this problem in the case of Chapter 4 is mitigated by the fact that estimations are limited to the north of England and Scotland, in which there was a substantial concentration of the first 'industrial revolution' industries. It is plausible to assume that the average wage in the textile sector is essentially determined by the wages paid in Lancashire and Yorkshire, with a marginal influence from the more prosperous areas in the south. It is also plausible to assume that London and Middlesex were areas that had wages over the national average, and therefore were the areas which introduced the upward shift. However, the industries that predominated the south displayed a lower share in the north, which limited the potential upward shift of the counties' wages. The average wages in these northern counties were mainly determined by the industries which were precisely concentrated in these same counties.

# Chapter 5

## Conclusions

This thesis examined a problem widely studied in the literature from a different perspective, offering new answers for long-held questions about the high and persistent unemployment in interwar Britain. Such a new perspective is based on two approaches—the search and matching models and the regional perspective—two areas largely understudied in the previous literature. On the one hand, this thesis is part of the search and matching tradition for its analysis of analysing labour economic problems. This approach provides a more complete analysis since it considers both sides of the labour market, in contrast to an exclusive focus on the labor supply in the previous literature. The search and matching approach allowed us to separate "structural unemployment", caused by labour frictions, from unemployment, which was merely the result of business cycle fluctuations.

The focus of this thesis was to identify the labour frictions behind British interwar unemployment. To reach that objective, the current work moved through different levels of disaggregation from the aggregate/national assessment in Chapter 2 to the regional perspective in Chapter 3, until finally reaching a local/county analysis in Chapter 4. Each chapter allowed a systematic examination of the different layers of the interwar labour frictions until finally identifying how the intersection of the industrial agglomeration, wage deflation, the initial design of unemployment benefits, and the "deterrence" effect caused by temporary stoppages led to persistently high unemployment throughout the entire interwar period.

Chapter 2, used the matching function approach to quantify and track the evolution of the level of labour frictions at the national level between 1921 and 1934. It found a substantial level of labour friction, mainly since the second half of the 1920s onward when a significant deterioration of matching efficiency commenced. This article found a structural break in the matching efficiency path in March 1927, which is associated with an uneven regional recovery from the 1926 General Strike and Coal Stoppages, which, although it mainly affected the great staple industries located in the north of Britain and Wales, also had a minor impact on the south. Even though the 1926 Coal Lockout triggered the rise of labour frictions, there were latent elements that made that rise inevitable, to a certain extent. The most important of these elements were the simultaneous emergence of the service sector, which brought about a high volume of job opportunities, for example in retail, and the decline of the great staple industries, particularly of coal mining and the textile industries, which had been important employers since the Industrial Revolution era.

In sum, Chapter 2 answered the first and necessary question for this thesis: to what extent the observed persistent unemployment in interwar Britain was a result of labour frictions or the deterioration of labour demand. Chapter 2 found a substantial level of labour frictions, which has increased since the mid-1920s onward once Britain experienced an uneven impact and recovery from the 1926 Coal Lockout. After that point, Britain experienced a divided labour market with mass unemployment coming from declining industries concentrated in northern England, Scotland, and Wales and an abundance of job vacancies in southern England as a result of a booming service sector.

That geographical divide, alongside the presence of a substantial level of labour frictions, was the motivation for the analysis of Chapter 3, which examined the extent to which the high level of labour frictions in interwar Britain was explained by spatial mismatching due to unemployed workers and job vacancies being located in different regions. Chapter 3 moved toward the second layer of interwar unemployment. If that problem was essentially a result of labour frictions, which could also be defined as structural unem-

ployment, the next question is about the explanation of that friction. Chapter 3 found that geography, i.e., spatial mismatching between regions, was important and explained 21% of the structural unemployment between April 1922 and November 1931. However, the main determinants of structural unemployment, measured by shifts in the Beveridge curve, were labour frictions within the regions, particularly in northern England. The internal labour friction in that macroregion, which is actually composed of the northeast and northwest regions, accounted for 42% of the aggregated level of labour frictions in that period, despite on average the 35% for of the insured population This finding reveals that north-south labour mobility has the potential to significantly reduce structural unemployment. However, beyond internal migration, the core of the problem was internal friction within northern England.

Northern England was different from the other depressed areas of so-called "outer" Britain, namely, Scotland and Wales. These two countries displayed high and persistent unemployment, but in those cases, the reason was the lack of employment opportunities. Unlike Scotland and Wales, unemployment in northern England was not demand-driven but structural in nature, in the sense that it was a result of labour frictions and not merely explained by the lack of job opportunities in this region.

Chapter 4 again presents a new piece of the British interwar unemployment puzzle, the reasons behind the high level of labour frictions in northern England, by examining the labour market through county-level disaggregation. By a set of dynamic panel data models that uses monthly observations between January 1928 and November 1931 to capture regional information on paid unemployment benefits, Chapter 4 identifies the drivers of structural unemployment in 18 counties located in northern England and Scotland. The econometric results found that the replacement rates, the share of unemployed females, and the temporary stoppages within the unemployed pool explain the high level of structural unemployment in the analysed counties.

In addition to the counties in northern England, Chapter 4 also included Scottish counties in its analysis because of the shared characteristics between the two territories. Never-

theless, in the case of Scotland, the high levels of unemployment were explained by low labour demand. Also, it is worth noting that although Chapter 4 only analyses a subperiod (1928-31) within the entire interwar period, it was precisely those years that coincided with the Great Depression, when the maximum expansion of structural unemployment occurred, as was found in Chapters 2 and 3.

The determinants of structural unemployment found in Chapter 4 answer why internal labour frictions were particularly high in northern Britain. Both variables—the replacement rate and the share of unemployed women—increased significantly in the two most populated counties of the region, Lancashire and West Riding in Yorkshire, and they were both largely dependent on employment in the textile industry. Due to their population size, those counties finally determined the course of the entire northern labour market. In addition, the large share of temporary stoppages in those two counties, although lower than in the case of Scotland, provoked a "deterrence" effect among unemployed workers, which reduced their incentives to permanently migrate toward industries or locations with better employment prospects.

The replacement rates in Lancashire and West Riding in Yorkshire saw a substantial expansion as a result of the particularly low wages in the textile industry, well below the national average, and the strong deflation of the early years of the Great Depression. These elements led these counties to experience the highest increase within the north, explaining their growth in structural unemployment. In addition, the lower job-finding rate for female workers strongly impacted those two counties, where their participation in the labour market has historically been higher due to their involvement in the textile industry.

A similar situation occurred in the coal mining regions in the mid-1920s, which explains the structural break found in Chapter 2 and the first large outward shift in the Beveridge curve observed in Chapter 3. Although the "coal mining" counties, such as Durham or Northumberland, displayed high levels of persistent unemployment, they did not have the population size of Lancashire and West Riding in Yorkshire, which is why their impact

did not have the same magnitude. The sequential collapse of two representative industries of the Industrial Revolution, coal mining in the mid-1920s and textile in the late 1920s, were registered by the two measurements of labour frictions: the matching function and the Beveridge curve shaped the interwar labour market. However, the decline of the textile industry would have the greatest impact on labour frictions due to its location and gender composition.

Putting together the findings of Chapters 2, 3 and 4 allow us to detangle the reasons behind the high and persistent unemployment in interwar Britain. Great Britain essentially faced a structural unemployment problem, which although partially explained by spatial (interregional) mismatching, was primarily due to internal labour friction in one specific area: northern England. What lies behind the particular high labour friction in that region was the intersection of deflation and low wages in the textile industry, the gender composition of the same industry, and the "deterrence" effect caused by the temporary stoppages. Those elements had the highest impact precisely in the two most populated counties in northern England, which, due to their size, shaped the regional and national level of labour frictions and therefore the high level of interwar unemployment.

This thesis does not examine in detail what occurred from the mid-1930s to the onset of the Second World War when unemployment remained high despite the changes in the unemployment insurance scheme and monetary policy. During this period, the main driver of structural unemployment was most likely long-term unemployment, a problem that was certainly more complicated to fix than the industrial and regional mobility challenges of the 1920s and early 1930s. However, the depressed places in the late 1930s were essentially the same as those earlier in the decade (see Figure 5.1), indicating a high level of path dependency. As observed in Chapter 3, the national Beveridge curve did not recover between 1931 and 1934 from the strong outward shift observed in 1929 and 1931, indicating that the increase in the level of labour frictions was probably permanent. In that sense, the current thesis could be labeled the "origins" of structural unemployment in interwar Britain.

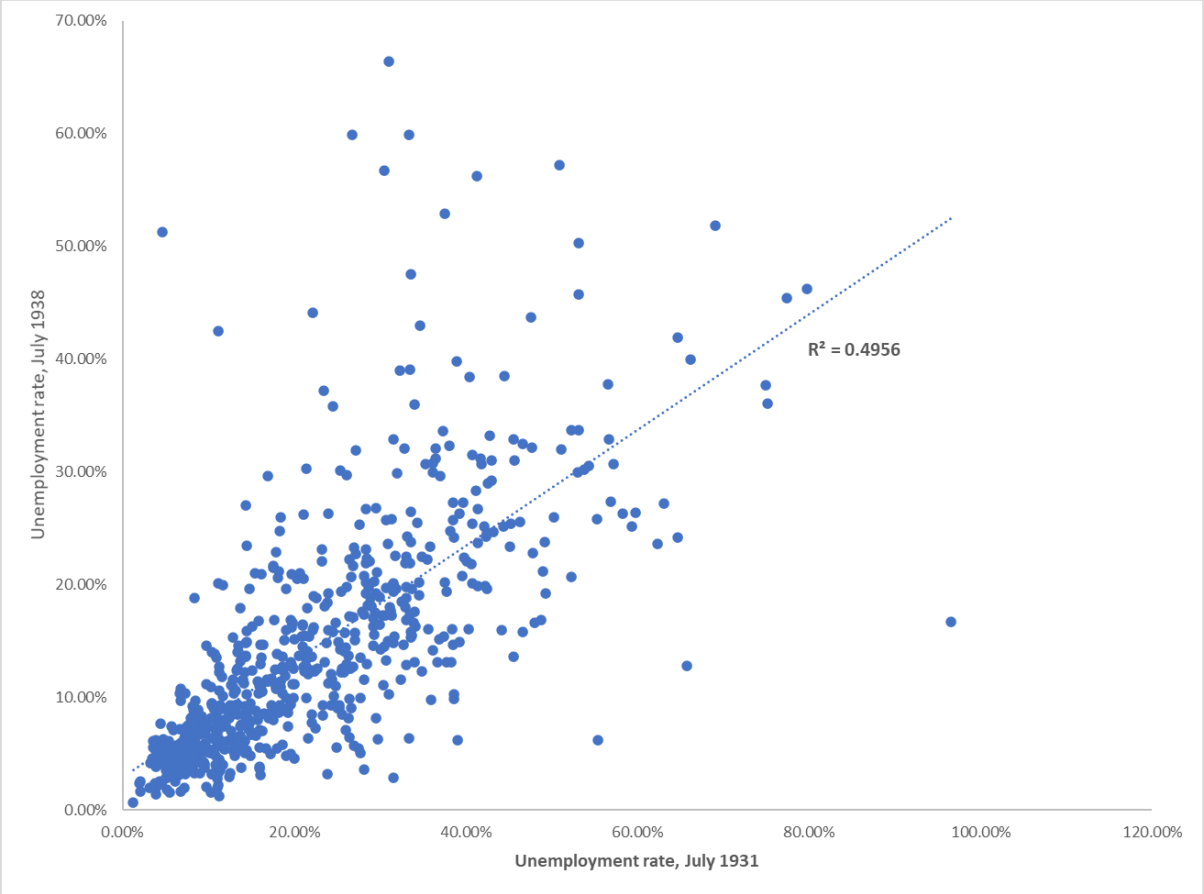


**Figure 5.1:** Local Unemployment rates (679 largest cities and towns), July 1931 and July 1938.

Source: Local Unemployment Index

It may be the case that the original problem was one of spatial/industrial mismatching, which then transformed into a problem of long-term unemployment. This would explain the persistent high structural unemployment, despite a change in the nature of labour frictions. This point requires further research but raises questions about timing in policy intervention. Delaying a convenient policy intervention, such as facilitating intraregional and interregional labor mobility, could have reduced its payoff over time, as structural unemployment became a more complex problem with the rise of long-term unemployment that likely required more costly interventions, including retraining or higher incentives for firms to hire unemployed individuals in that condition.

This thesis not only offers a plausible explanation for British interwar unemployment that could be useful in analysing other cases of accelerated deindustrialisation but also high-

lights a new set of regional sources, which could be useful for further research. As Booth and Glynn stated in 1978, "British interwar unemployment was essentially a regional problem" and as such, the answers lie in the regional analysis and sources.

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