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Diverging trends in unemployment in the United States and Europe: Evidence from Okun's law and the global financial crisis

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Abstract

The global financial crisis deeply impacted labour markets around the globe, particularly in a number of OECD countries. However, in such cases as the United States, some commentators have argued that the subsequent rise in unemployment has exceeded previous estimates of the elasticity of the unemployment rate with respect to output growth, a statistical relationship known as Okun's law. In line with the literature on this topic, the estimates of Okun's coefficients presented in this paper display considerable variation across countries, which captures the heterogeneity in the responsiveness of unemployment to the global financial crisis. In the United States, Canada, Spain and other severely affected economies, the coefficient increased sharply, departing from pre-crisis levels in the 2000s. In other countries where unemployment has remained subdued, namely Germany and the Netherlands, the coefficient has fallen dramatically. While different factors can potentially explain how the crisis has been transmitted to the labour market, the role of labour market institutions is the focus of this paper. In this regard, empirical evidence exploring the relationship between the shift in Okun's coefficients and such institutions confirms that the responsiveness in the unemployment rate during the Great Recession was lower in countries where workers are afforded greater employment protection (such as Germany).

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Preface

The primary goal of the ILO is to contribute, with member States, to achieve full and productive employment and decent work for all, including women and young people, a goal embedded in the ILO Declaration 2008 on *Social Justice for a Fair Globalization, and*[1] which has now been widely adopted by the international community.

In order to support member States and the social partners to reach the goal, the ILO pursues a Decent Work Agenda which comprises four interrelated areas: Respect for fundamental worker's rights and international labour standards, employment promotion, social protection and social dialogue. Explanations of this integrated approach and related challenges are contained in a number of key documents: in those explaining and elaborating the concept of decent work[2], in the Employment Policy Convention, 1964 (No. 122), and in the Global Employment Agenda.

The Global Employment Agenda was developed by the ILO through tripartite consensus of its Governing Body's Employment and Social Policy Committee. Since its adoption in 2003 it has been further articulated and made more operational and today it constitutes the basic framework through which the ILO pursues the objective of placing employment at the centre of economic and social policies.[3]

The Employment Sector is fully engaged in the implementation of the Global Employment Agenda, and is doing so through a large range of technical support and capacity building activities, advisory services and policy research. As part of its research and publications programme, the Employment Sector promotes knowledge-generation around key policy issues and topics conforming to the core elements of the Global Employment Agenda and the Decent Work Agenda. The Sector's publications consist of books, monographs, working papers, employment reports and policy briefs.[4]

The *Employment Working Papers* series is designed to disseminate the main findings of research initiatives undertaken by the various departments and programmes of the Sector. The working papers are intended to encourage exchange of ideas and to stimulate debate. The views expressed are the responsibility of the author(s) and do not necessarily represent those of the ILO.

José Manuel Salazar-Xirinachs
Executive Director
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[1] See http://www.ilo.org/public/english/bureau/dgo/download/dg_announce_en.pdf

[2] See the successive Reports of the Director-General to the International Labour Conference: *Decent work* (1999); *Reducing the decent work deficit: A global challenge* (2001); *Working out of poverty* (2003).

[3] See http://www.ilo.org/gea. And in particular: *Implementing the Global Employment Agenda: Employment strategies in support of decent work, "Vision" document*, ILO, 2006.

[4] See http://www.ilo.org/employment.

Acknowledgements

The authors are grateful to the OECD for assisting us with the data on turning points for OECD countries. The authors also appreciate comments received from Laurence Ball, Moazam Mahmood, Paul Swaim, and participants in ILO's Research Conference on "Key Lessons from the Crisis and Way Forward", 16-17 Febrruary 2011, which have helped improve this paper.

Foreword

The role of labour market institutions and policies in smoothening labour market adjustment after the global crisis of 2008 has received considerable policy attention. In light of the diversity of the unemployment outcomes, this paper questions the estimates of the elasticity of the unemployment rate with respect to output growth, a statistical relationship known as Okun's law. In line with the literature on this topic, Okun's coefficients presented in this study display a considerable variation across countries in the responsiveness of unemployment to the global financial crisis. In the United States, Canada, Spain and other severely affected economies, the coefficient increased sharply, exceeding previous estimates of Okun's coefficients and departing from pre-crisis levels. In other countries where unemployment has remained subdued, namely Germany and the Netherlands, the coefficient has fallen dramatically.

While different factors such as the nature of the shock, the economic structure, etc. can explain how the global financial crisis has been transmitted to the labour market, this paper investigates the role of labour market regulations in limiting employment losses and unemployment increases in OECD countries. In this regard, this paper makes an important contribution to the discussion on the crisis and the role of labour market regulations in allowing smoother adjustment; empirical evidence exploring the relationship between the shift in Okun's coefficients and such institutions confirms that the responsiveness in the unemployment rate during the Great Recession was lower in countries where workers are afforded greater employment protection (such as Germany).

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1. Introduction

Over the decades following the oil shocks of the 1970s and 1990s, the flexibility of the United States labour market had been heralded as a major factor behind lower unemployment rates than that found in most continental European countries. It was argued that strict employment protection legislation (EPL), 'over-generous' unemployment benefit, the existence of minimum wage, and strong unionization kept unemployment high in Europe as it discouraged job creation and resulted in labour market 'hysteresis' as reflected by both higher rates and duration of unemployment (see, for example, Blanchard and Summers (1986), Layard et al. (2005), Nickell (1997), Blanchard and Wolfers (2000)). Indeed, the unemployment rate averaged only 5.5 per cent in the United States over 1987-2007, compared to 8.6 per cent in Germany, 9.3 per cent in Italy and 9.7 per cent in France.[5] During this period, the United States had become accustomed to low unemployment rates, and in particular, low levels of long-term unemployment, along with subdued levels of inflation and macroeconomic volatility.

At the end of 2010, the labour market of the United States has swapped places with Europe in terms of unemployment levels. The global financial crisis deeply affected the world's largest economy, which slipped into recession at the end of 2007, deteriorated in 2008, and ultimately contracted by 2.6 per cent in 2009 (IMF 2010). During this period, a million workers have been laid off, particularly in the construction and manufacturing sectors, and as a result, total employment in the United States fell by 4.3 per cent from 2007 to 2009. At the same time, the unemployment rate soared from just 4.8 per cent in the fourth quarter of 2007 to 10.0 per cent two years later, the highest level since the recession of the early 1980s.[6] Due to an uncertain and fragile recovery in 2010 and 2011, unemployment has persisted at around 9.0 per cent. Long-term unemployment has become a reality for a country unaccustomed to such problems and the unemployment outflows rates have become unprecedentedly low: the percentage of the unemployed out of work for six months or more reached 46.2 per cent in May 2010 (the proportion has only fallen to 42.4 per cent in October 2011) (BLS 2011).

The lack of flexibility on the hiring side, and the resulting long-term unemployment, has led many commentators to question some of the fundamental relationships in the US labour market. One such relationship that has received considerable attention is known as Okun's law. Using quarterly data for the post-second world war period (second quarter 1947-fourth quarter 1960), Arthur Okun (1962) found that a 3 per cent change in output is associated with a change in the unemployment rate of around 1 percentage point. On this basis, unemployment should have risen by only 0.78 percentage points between 2008 and 2009 (since the economy contracted by 2.6 per cent) rather than 4.5 points as witnessed over this period.[7] A number of studies such as Daly and Hobijn (2010) and Elsby et al. (2010) have subsequently debated the validity of Okun's law suggesting that relationship has departed from this 'rule of thumb' in the second half of 2009.[8] At the same time, the failure for hiring to take off in during a recovery is not a new phenomenon for the US:

[5] See EUROSTAT Labour Force Survey, http://epp.eurostat.ec.europa.eu/portal/page/portal/employment_unemployment_lfs/data/database

[6] See US Bureau of Labor Statistics (BLS); quarterly unemployment rate is seasonally adjusted; http://bls.gov/news.release/pdf/empsit.pdf.

[7] The average annual unemployment rate was 5.8 per cent in 2008, rising to 9.3 per cent in 2009, www.bls.gov.

[8] See, for example, http://economix.blogs.nytimes.com/2010/02/22/a-broken-economic-law/.

Gordon (2010) and others stress that the last three recessions (1990-1991, 2001, and 2007-2009) have all been followed by a 'jobless recovery' due to strong growth in productivity (sometimes described as 'labour hoarding').

This debate often obscures the fact that Okun's 'law' is nothing but a statistical relationship, and as recognized by a number of studies (see, for example, Knotek (2007)), the coefficient has actually varied over time in the context of both longer term trends and asymmetry over the business cycle. In the literature (and in this paper), asymmetry is used to denote the phenomenon where the correlation between the two series (change in the unemployment rate and output) differs over specific phases of the business cycle (Neftci 1984). The well-known lag in labour market recovery noted by IMF (2009), Reinhart and Rogoff (2009) and others is a reflection of this asymmetry. Identifying and analysing these patterns is not only important from an ex-post analytical perspective and explaining the impact of the business cycle on labour markets, but also in terms of the validity of this rule of the thumb, which is widely used in macroeconomic models and for forecasting purposes.

In comparison to the United States, much of continental Europe experienced almost the opposite situation in terms of the impact of the global financial crisis on employment and unemployment. Though the sovereign debt turmoil in 2011 is likely to change this scenario, the diverging patterns of adjustment during 2008-2010 are important in light of the "eurosclerosis" debate which blames a range of labour market institutions for the poor performance of job creation and high unemployment. Clearly, the situation varies within European countries, but, apart from Spain, Ireland and the Baltic States (the latter having very flexible labour legislation) unemployment rates in these countries have increased by far less during the global financial crisis, despite a more severe economic contraction. In this context, the resilience of the German labour market has understandably received considerable attention: GDP in Germany fell by an astonishing 4.7 per cent in 2009, but at the same time, unemployment increased by only 0.2 percentage points, from 7.3 per cent in 2008 to 7.5 per cent in 2009. Moreover, the German unemployment rate actually fell in 2010, reaching just 6.7 per cent in the third quarter of 2010 (versus 9.6 per cent in the US). Overall, the unemployment rate in the Euro-area increased by 1.9 percentage points over this period (from 7.1 per cent in 2008 to 9.0 per cent in 2009), before rising to 9.6 per cent in 2010. Those countries hit by their own collapsing housing bubbles, such as Spain, Ireland and the Baltic States, have also witnessed a massive surge in the number of jobless; in these economies, the unemployment rate increased by an average of 7.6 percentage points from 2008 to 2009, suggesting that the nature of the shock was another key determinant of labour markets outcomes.

This paper tries to shed some light on the diverging patterns in unemployment within OECD countries using Okun's law as a framework. By considering asymmetry in the adjustment process, it is possible to explore more precisely the various effects of the labour market institutions on unemployment during a period of growth or a period of downturn. In this respect, theory suggests that at the macro-economic level, EPL may act as a "stabilizer", in smoothening labour market adjustment to adverse macro economic shocks. At the same time, the impact of EPL in boom times should be more indirect, since, more rigid legislation is expected to reduce hiring (because of the anticipated cost of having to fire the worker in the future). Furthermore, as underlined by Harris and Silverstone (2001), the knowledge about the extent of asymmetry in the output-unemployment relationship is important for not only improving the accuracy of forecasts but also to understand the role of labour market reforms in responding to increases in unemployment.

The paper thus investigates the possible role of labour market institutions in explaining the different shifts in Okun's coefficients both across the business cycle and across countries. The rest of the paper is structured as follows. Section 2 provides

estimates of Okun's coefficients for most OECD countries, while Section 3 explores the role of labour market institutions in driving these diverging trends in Okun's law. Finally, section 4 concludes.

2. Diverging unemployment patterns in OECD countries:

2.1. What happened during the great recession?

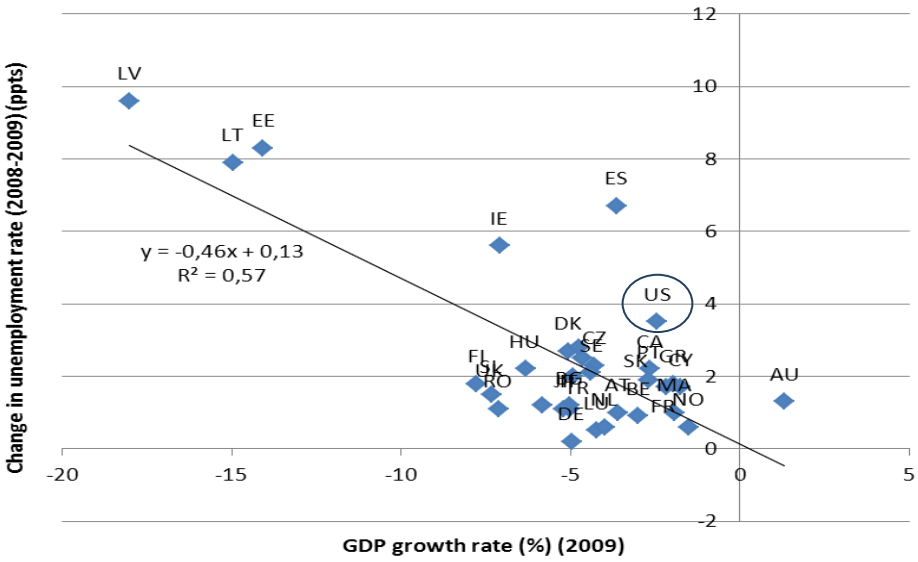
Before moving to the trends in unemployment, it is important to reflect on how labour markets adjust following an aggregate shock such as the global financial crisis. At the firm level there are two main channels for adjustment to external shocks in labour demand: working time and/or employment (both quantitative adjustment but imperfect substitutes) or wages (price adjustment) (Cazes et al. 2009). Cutting nominal wages is not a popular policy option and even employers in countries with flexible labour markets such as the United States are often reluctant to do so because of its impact on the morale of staff and n productivity levels (see, for example, Bewley, 1999). Depending on the sector and the nature of the shock, firms typically first try to use internal flexibility and adjust hours of work or reallocate workers within the enterprise before proceeding to external adjustment and dismiss workers due to cost considerations and the need to retain (especially skilled) workers.

The balance between external and internal adjustment is one of the key issues in the debate on the global financial crisis, which has been stimulated by the notable variation in the adjustment of working hours, wages and employment across countries. For example, as much discussed during the crisis, (un)employment in Germany has adjusted by a small margin, while hours worked have decreased much more than in most European countries. According to some economists, this was due to the extensive use of short-time work (STW) schemes (Boeri and Bruckner, 2011); but others have suggested that, since the use of STW was not much greater than in recessions in the 1970s and 1980s, the use of such arrangements cannot alone explain the remarkable resilience of the German labour market.[9] In contrast, evidence for the United States reveals that employers resorted more towards external adjustment rather than internal mechanisms (namely, hours worked and wages). Changes in unemployment levels as response to output dynamics show the extent of external adjustment mechanisms.

Figure 1 illustrates the relationship between the changes in the unemployment rate from 2008 to 2009 and GDP growth in 2009, which shows that there has been great heterogeneity in the responsiveness of unemployment to the global financial crisis. Firstly, unemployment in the United States has risen far more than in other countries with a comparable economic contraction, though the increase in the Spanish unemployment rate departs even more from the average than the case of the US. The worst hit countries are Estonia, Ireland, Lithuania, and Latvia, which have all suffered both a severe fall in output and deterioration in the labour market. In the case of Germany, the Netherlands and some other European countries, the change in the unemployment rate was lower than the average.

[9] According to Dietz et al. (2010), the German short-time work scheme, 'Kurzarbeit', only accounted for 13.4 per cent of the fall in average hours worked in 2009.

Figure 1: Relationship between output and unemployment rate during the Great Recession in the United States and other OECD countries



Source: IMF WEO Database April 2010, EUROSTAT Labour Force Survey Database; calculations are authors.

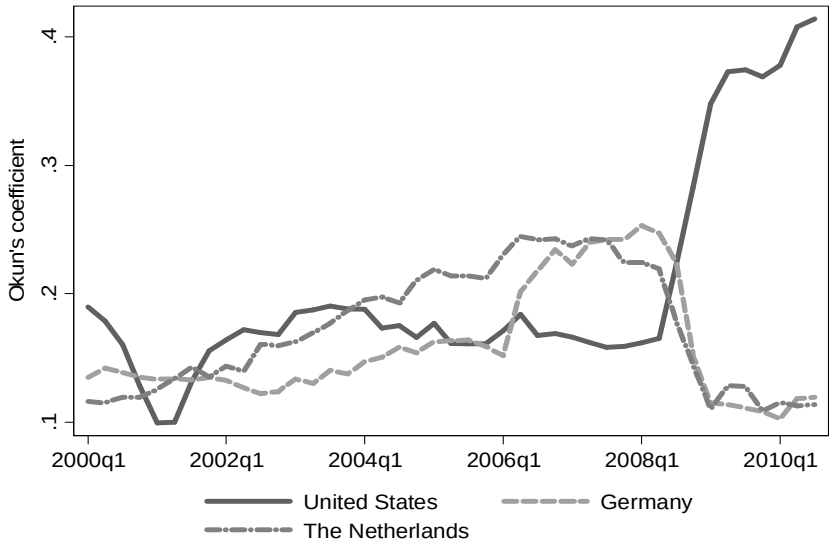
Moving on to a broader view on this statistical phenomenon, Figure 2 presents estimated Okun's coefficients for the United States, Germany and the Netherlands over 2000-2010. The Okun's coefficients are estimated using quarterly data and the first-difference version as presented in Okun (1962). The relationship between the change in the unemployment rate and the growth in GDP can be stated as the following linear specification:

$$\Delta u_t = \alpha - \beta y_t + \varepsilon_t, \qquad (1)$$

where Δu_t is the change in the unemployment rate from period t-1 to t, y_t the real GDP growth rate and ε_t a random error term. Similar to IMF (2010) and Knotek (2007), β is estimated using a technique known as rolling regressions, which means that equation (1) is estimated using different sample periods each covering *forty* quarters of data, starting with the first observation for the unemployment and GDP series. For example, in the case of the United States, the model is estimated first for the period 1990q3 to 2000q2. The sample period is then moved forward one quarter and re-estimated for the next sample period, i.e. 1990q4 to 2000q3. The final estimation in the sample corresponds to the period 2000q4 to 2010q3 since 2010q3 is the last observation in our dataset.

The Okun's coefficient estimates obtained from equation (1) using the rolling regression technique highlight considerable divergence during the Great Recession. As illustrated by Figure 2, the coefficient remained relatively stable over the 2000s in the United States, while it was increasing in Germany and the Netherlands where unemployment had been falling at a greater rate (and hence an increase in the elasticity) in the years leading up to the onset of the crisis. The first quarter of 2008 shows a dramatic deviation in the coefficient. In the case of the United States, it increased rapidly since the start of 2008 as the economy contracted and unemployment surged. At the same time, the coefficient fell markedly in Germany and the Netherlands, reflecting the point made in the introduction to this paper: output fell in these countries by more than 4 per cent in 2009 but unemployment barely moved.

Figure 2: Divergence in Okun's law in the United States, Germany, and the Netherlands during the global financial crisis, 2000q1 – 2010q3



Source: OECD, authors' calculations.

Notes: The coefficients are obtained from estimating equation (1) using a technique known as 'rolling regression'. The time period reported in the figure corresponds to the last period of each estimation window. For example, the coefficient reported for 2002q1 corresponds to the estimation over the window between 1992q2 and 2002q1.

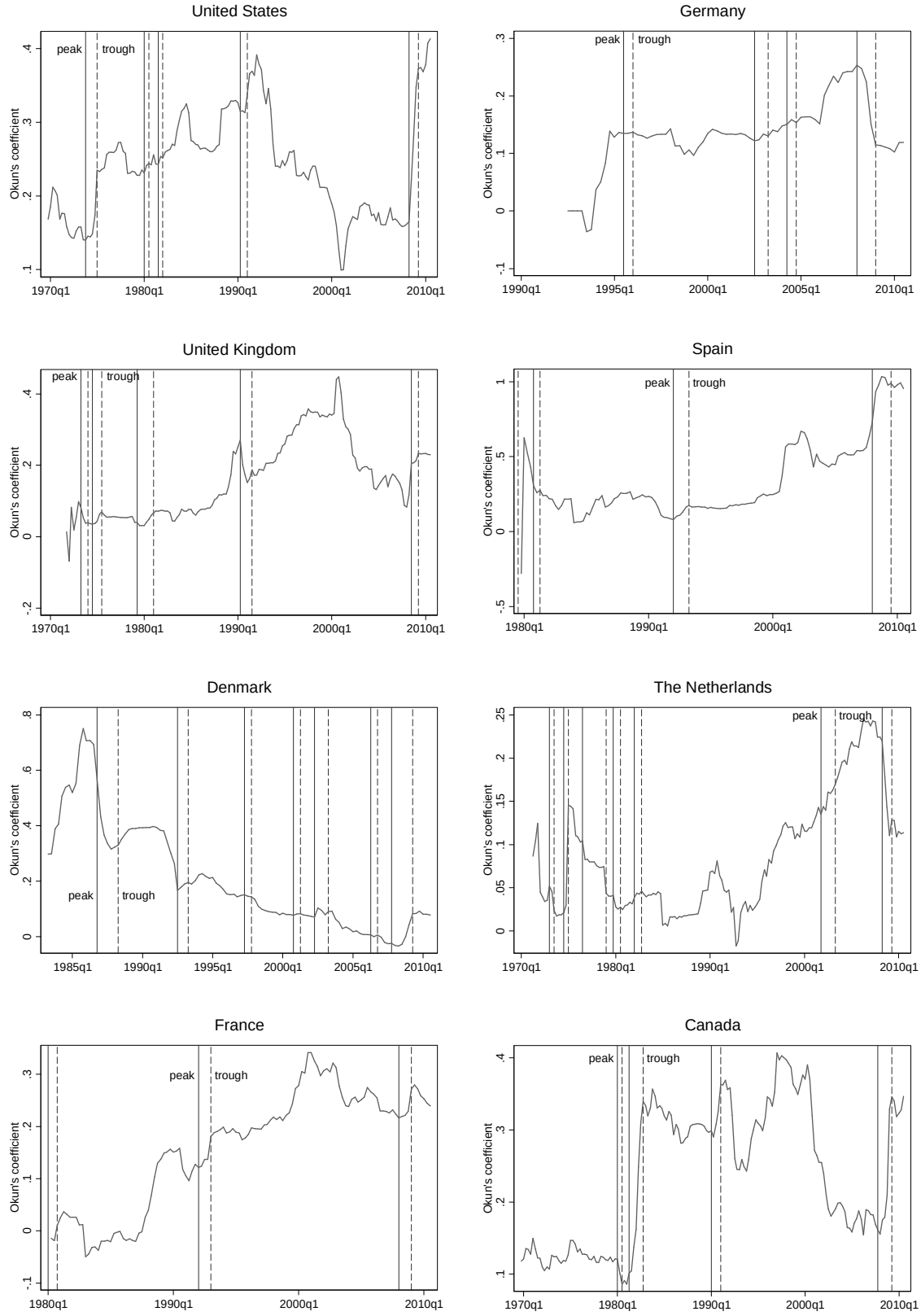
2.2. A longer term view: Okun's law over the business cycle

In order to better understand the previous divergence in unemployment elasticities, the Okun's coefficients are estimated over a much longer period using the same methodology as described above. This produces a series of estimates for β that varies over time, which, in turn, provides a useful description of the longer trends of the coefficient. Figure 3 presents the estimates for a number of OECD countries for the (1970- 2010) period; this yields an illustration of both different levels and varying trends over a span of three or four decades. In order to detect movements in the coefficient over the business cycle, it is necessary first to date the business cycles in terms of delineating phases of recession and expansion. As in IMF (2010), this paper follows a 'standard' approach in dating business cycles by using the level of output instead of the output gap (deviation of output from its long-run trend).[10] It uses quarterly changes in real GDP level series to identify local peaks and troughs (turning points).[11] The recession phase is

[10] Studies such as Harding and Pagan (2002) highlight the limitations of detrending series. Furthermore, as underlined by Knotek (2007), the problem with the output gap version is that neither potential output nor the natural unemployment rate is directly observable. As such, the gap approach leads to the identification of different business cycles to depend on the selected filtering methodology. For example Lee (2000) compares the Okun´s coefficients obtained for a series of OECD countries using three different filtering methodologies. He finds that there are sensible differences in the resulting Okun´s coefficient depending on the methodology used.

[11] The authors are grateful to the OECD, particularly Paul Swaim, for assisting us with the data on turning points for OECD countries.

Figure 3: Okun's law in selected OECD countries, 1970-2010 (quarterly data)



Source: OECD, authors' calculations

Notes: The solid vertical line denotes a peak in the business cycle, i.e. the start of a recession, while the dashed vertical line marks a trough in the business cycle, i.e. the start of an expansionary phase. The period reported in the figure corresponds to the last period of the estimation window. For example, the coefficient reported for 2002q1 in the figure corresponds to the estimation over the window between 1992q2 and 2002q1.

defined as the peak to the trough, and symmetrically, the recovery phase is defined as the trough to the point where GDP returns to the peak level before the recession.

Taking a longer term perspective confirms the diverging trends between countries but also reveal considerable variation over time. An upwards trends in the estimated Okun's coefficient is evident in such countries as Spain, the Netherlands and France, while in Denmark, the coefficient has been falling since the mid-1980s (Figure 3). In other countries, there are large movements across time. This overall instability in the Okun's parameter is found elsewhere in the literature (see, for example, IMF (2010), Knotek (2007), and Lee (2000)) and reflects both changes over the business cycle and structural movements in the relationship.[12] The graphs presented in Figure 3 show indeed that, in many countries, unemployment is more likely to rise during recessions than decrease during periods of expansion, though this asymmetric behaviour differs across countries.

In order to characterize the scope of the asymmetry, it would useful to study the cyclical sensitivity of labour flows given each national institutional setting.[13] Linking such a flows analysis with a more macro one (Okun's law) would contribute to a comprehensive and in-depth understanding of the OECD labour markets' adjustment. However, such empirical work would require comparable micro data to analyze the cyclical behaviour of job creation and destructions (and workers flows and labour turnover), and how these flows relate to aggregate unemployment levels given the labour market institutions in place in each country. Such datasets are not systematically available or comparable. For this reason, the paper focuses on how labour market institutions can explain cross-country differences in shifts in the estimated Okun's coefficients during periods of recession.

A number of studies have investigated the extent of asymmetry in Okun's law. Lee (2000) finds mixed evidence of asymmetry in Okun's coefficient for sixteen OECD countries depending on the methodology used. Using data for seven OECD countries, Harris and Silverstone (2001) find that failure to take into account of asymmetries would see a rejection of the hypothesis that there exists a long-run relationship between unemployment and output. They also find that in the short-run, unemployment adjustments to deviations of GDP from its long-run equilibrium differ depending on whether the economy is in a period of expansion or recession. While their results suggest that unemployment adjusts in the expected manner during downturns it shows also that in most countries unemployment rates continue to increase but at a lower rate during an upturn.

Silvapulle et al. (2004) lists several theoretical arguments to explain the asymmetric behaviour of Okun's coefficient over the business cycle. One argument is that since labour market institutions restrict the ability of employers to lay off workers, unemployment responds less to output changes during phases of contraction than ones of expansion. Alternatively, another argument is that employers tend to be more pessimistic during recessions than they are optimistic during an upturn, in the sense that bad news is believed more quickly than good news. Thus, unemployment responds more strongly to output changes during a contraction than an expansion. Silvapulle et al. (2004) propose

[12] Lee (2000) finds strong evidence of structural break around the 1970s that is attributed to: (i) changes caused by rising female labour force participation; (ii) productivity and wage slowdown; and (iii) corporate restructuring.

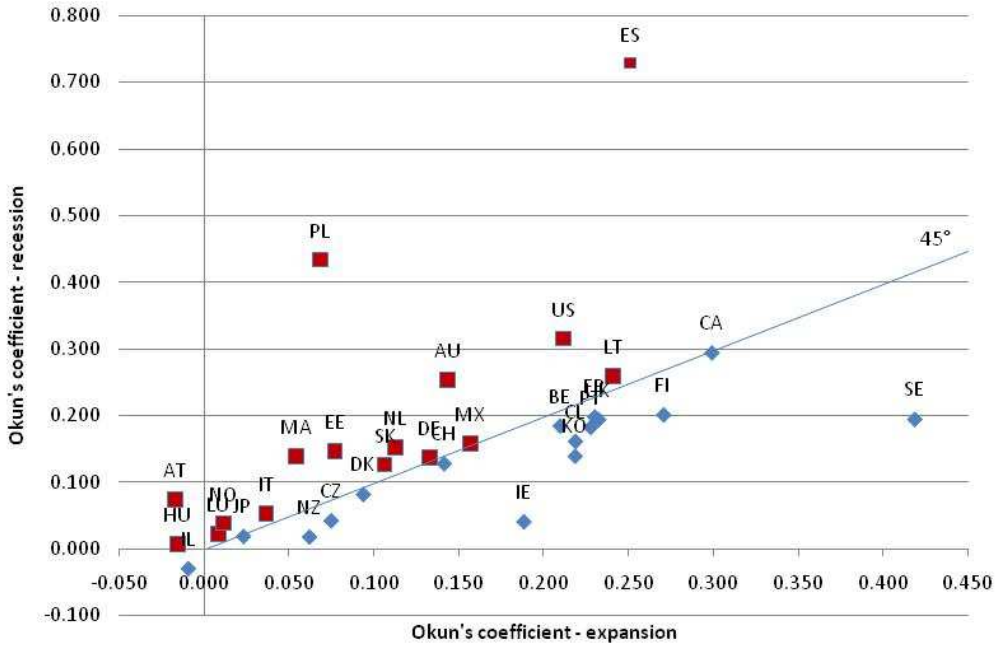
[13] Clearly both inflows into unemployment as well as outflows from unemployment play crucial roles in accounting for the level of unemployment stocks over the business cycle

that the second argument is more relevant for the US, while the first version is likely to be more valid for Europe. Courtney (1991) attributes asymmetry to factor substitution during cycles (involving a non-constant relationship among hours, labour force participation and capital), while Campbell and Fisher (2000) suggest that aggregate asymmetries in job creation and destruction are due to microeconomic asymmetries in adjustment costs. In a more recent paper, Beaton (2010) applies a time-varying parameter methodology for USA and Canada and finds evidence of asymmetric behaviour in Okun's law over the business cycle.

Turning to the results presented in this paper, Figure 4 displays the average estimated Okun's coefficient from equation (1) for the period 1990q1 to 2010q3 (distinguishing between the average for phases of recession and expansion). It shows that unemployment is more responsive during recessions in a wide range of countries (denoted by the square marker). In particular, the Okun's coefficient is far larger during recessions in such countries as Spain (0.729 versus 0.251), Poland (0.433 versus 0.069), and the United States (0.315 versus 0.211). However, there are many countries clustered around the 45 degree line indicating that unemployment reacts in more or less a symmetric manner over the business cycle. In some countries such as Ireland and Sweden, Okun's coefficient is, in fact, much larger during phases of expansion than in times of contraction.

Overall, these empirical insights point to a non-linear, asymmetric relationship between changes in output and unemployment in a number of countries. While a range of studies has already explored this statistical finding, less has been said about the role of labour market institutions in contributing to this asymmetry. For this reason, Section 3 aims to provide some further insights on this issue.

Figure 4: Okun's coefficient in phases of expansion and recession in OECD countries, average 1990q1 – 2010q3



Source: OECD statistics, authors' calculations.

Notes: Recessions and recoveries are defined respectively as the phases between a peak-to-trough and trough-to-end with respect to GDP levels

3. The role of labour market institutions in driving variation in unemployment adjustment

3.1. Theoretical arguments

The effects of labour market institutions on labour market outcomes have been extensively studied, both theoretically and empirically. The intention here is not to reopen the Pandora's Box but rather to focus on the key institutions likely to have an impact on firms' extensive margin of adjustment: employment protection legislation (EPL), unemployment insurance schemes (UI) and the unionization. Most labour market institutions are expected to affect both employers' and employees' decisions, making the overall net labour market effects likely to vary by size of firm, type of activity and according to the economic conditions.

As for EPL, the main argument for employment protection relates to employees security at work, in employment and income, and the advantage of a stable employment relationship that encourages investment in human capital and thereby upgrade the productivity of the worker. Another argument in favour of EPL refers to the willingness of workers to accept technological change and internal job mobility, with a potential increase of productivity. At a macro-economic level, EPL may also be seen as a "stabilizer", in smoothening labour market adjustment to adverse macro economic shocks. The main argument against employment protection is that it constrains firms' behaviour by raising labour costs and hence it may reduce total employment. This brief overview of theoretical arguments suggests that the effects of EPL on *stock* variables such as labour costs, (un)employment and productivity are uneasy to assess, some being favourable and some unfavourable. Theoretical models are more straightforward on EPL effects on *flow* variables: most of them indicate rather clearly that employment should be more stable and individual employment relationships more durable when EPL is stricter. In other words, given a constant cyclical wage pattern, higher firing costs stabilize employment in economic downturns but also deter employers from hiring in upturns. With higher turnover costs, firms may thus become more cautious about adjusting their workforce with the resulting effect of reducing labour turnover, i.e. inflows into unemployment and outflows from unemployment back to employment. So, when EPL is less stringent, job turnover is more cyclical (for example, as witnessed in the United States), while a more protective EPL reduces job destruction in recessions as well as the variability of layoffs and limits the contribution of inflows to fluctuations in unemployment (as in many continental European economies) (Bertola et al. 1999).

A substantial empirical literature has explored these findings using a variety of EPL measures together with both cross-sectional and longitudinal data.[14] Though the evidence tends to be inconclusive, it does give some support to theoretical predictions. While aggregate unemployment levels are not strongly correlated with cross-sectional indicators of EPL, unemployment stocks do seem to be more stable when EPL is more stringent. Moreover, the cyclical volatility of employment is much more pronounced in the relatively less-regulated labour markets of the United States and the United Kingdom than in continental Europe (such as France or Germany) (Bertola and Ichino 1995; OECD 2009; Elsby et al. 2009).

[14] Given the elusive and complex nature of EPL, many have argued that the difficulty of getting clear-cut results on the impact of EPL on labour market performance may be due to the lack of satisfactory indicators.

The unemployment insurance system is another labour market institution that has been argued to drive cross-country differences in unemployment patterns. Unemployment compensation systems do vary quite dramatically between countries and features with respect to the level of the unemployment benefits, its duration and the conditions of eligibility, which may impact both firms' decisions to hire and fire workers in response to changing economic circumstances and employees' decisions to stay or leave their current jobs. According to theoretical arguments, job destruction should be higher and job creation lower, the higher are unemployment benefits (see, for example, Bertola (1993); Mortensen and Pissarides (1994); Millard and Mortensen (1994)). As for labour supply effects, some economists have argued that increasing the generosity of the unemployment scheme (level of the benefits or its duration) as well as extending its coverage leads to an increase in the unemployment rate because getting benefits act as a disincentive to undertake job search (by increasing the reservation wage of the unemployment); this effect is, however, likely to vary with the tightness of the labour market.

Empirical research on this issue has mostly focused on the effect of the level of the benefits to previous wage (replacement ratio), as well as the effect of a change in the duration of the entitlement, on long- term unemployment (see, for instance, Nickell (1997); Layard et al. (2005); Valetta (2011)). Less work has been done on the relationship between unemployment schemes and labour market flows. One attempt has been made by Boeri and Garibaldi (2008) who found that less generous unemployment benefits in Europe contributed over the last fifteen years to increased labour market mobility, measured either in terms of unemployment turnover, mobility indices for transition matrices or job to job flows.[15] However, the 'discouragement' effect of unemployment insurance on job search is likely to be much lower during a recession.

The strength (coordination and coverage) of unions is also an important institutional variable to consider: clearly, in countries where unions have a strong bargaining power, employers have to go through a more lengthy process to dismiss workers (particularly for collective dismissals). Unions, and more generally the industrial relations systems, also play a crucial role in determining wage flexibility in response to economic shocks. In that context, coordination is a particularly important aspect of ensuring consensus in bargaining on macroeconomic objectives; but unions may also set employment goals and accept wage restraint, trading wage moderation against additional employment creation (or preservation of employment during a crisis). Ultimately, trade union policy will be a key variable influencing labour market outcomes.

Finally, one could also acknowledge a more indirect effect of labour market institutions in general, namely their role in reducing uncertainty, which is in itself a potential driver of asymmetric behaviour of employers and workers. Looking beyond the immediate impact of a downturn, a recession may also engineer structural changes such that laid-off workers are unable to find new jobs because they do not have the skills demanded in a post-recession economy, which can result in long-term unemployment driven by such a skills mismatch. This is currently a major issue in the United States where there is considerable discussion about whether the Beveridge curve has shifted outwards, reflecting a poorer match between the unemployed and available vacancies (see, for example, Elsby et al. (2010)).

[15] Job to job flows are very important workers flows which may actually explain cross-country differences in the way labour markets adjust: typically the coexistence of low unemployment turnover and large job turnover rates can for example be explained by the occurrence of many direct shifts of workers from one job to another.

3.2. Empirical insights

There are different approaches to exploring the empirical relationship between Okun's law and labour market institution variables. IMF (2010) estimates a long-run relationship between the unemployment rate and output, resulting in what the report calls a 'dynamic beta'. This study finds that the responsiveness of unemployment to output has increased over time in many OECD countries reflecting changes in employment protection legislation, unemployment benefits and the growth of temporary work: weaker EPL and a higher share of temporary workers being associated with a larger estimate of the dynamic beta.

Rather than exploring this avenue, this section considers how labour market institution variables are related to shifts in the estimated Okun's coefficient over the business cycle.[16] The rationale for taking this approach is provided by the evidence displayed in Figure 2, which reveals remarkable divergence in the coefficient across countries during the global financial crisis. Indeed, the upward shift in the US and the downward shifts in countries such as Germany and the Netherlands are likely to reflect, at least in part, differences in labour market institutions. In this regard, it is expected that the elasticity of the unemployment rate to output should increase more in countries where dismissal protection is weaker.[17]

To identify whether such a relationship exists from a statistical point view, Figure 5 illustrates the relationship between the shift in the estimated Okun's coefficient (using equation (1)) and the strictness of employment protection legislation (using the OECD EPL index). The shift is the percentage change in the Okun's coefficient from the peak in GDP to the subsequent trough during the period of the global financial crisis (2007-2010). As expected, there is a negative and significant relationship between EPL and the shift in Okun's coefficient during the global financial crisis. The relationship is significant at the one per cent level and it explains 24 per cent of the variation in the data (29 per cent if Estonia is excluded from the sample).[18] A noted above, in such countries as Germany (DEU) and the Netherlands (NLD), the sensitivity of the unemployment rate to output actually fell during the global financial crisis. The main form of adjustment to the crisis in these countries was through a reduction in working hours rather than lay-offs. This was due to a range of factors such as the cost of dismissing workers along with policy measures that facilitated this adjustment process (short-time schemes such as the Kurzarbeit programme in Germany and the Dutch Deeltijd WW initiative).

The same relationship is more robust and the coefficient higher when the index for EPL governing regular contracts is used (the relationship explains 28 per cent of the variation – 36 per cent if Estonia is excluded). The EPL index for temporary contracts is on the other hand less correlated with the shifts across countries (the relationship explains only twelve per cent of the variations; 16 per cent if Estonia is excluded).

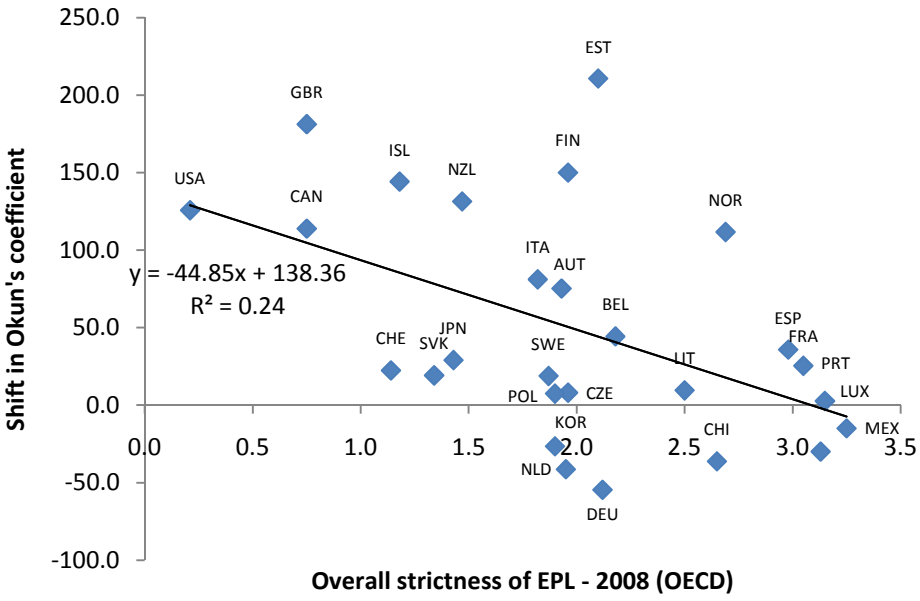
[16] Other specifications, which consider the relationship between size of the Okun's coefficient and labour market institutions, have been estimated, but generally do not provide any clear results (available upon request from the authors). See also Cazes and Verick (2011).

[17] Of course, a range of non-labour market variables can also potentially explain the variation in this divergence across countries, such as openness (trade-GDP ratio) and the nature of credit markets (credit-GDP ratio and credit market regulation). These dimensions are not explored in this paper.

[18] This finding holds when using other indices for labour market regulation (not reported here) such as the Fraser Freedom Indices for labour market regulation and the hiring and firing regulation.

In order to check the robustness of these findings, and since it can be argued that using percentage changes could be misleading given the great heterogeneity of the pre-crisis coefficients, Figure A1 in the appendix displays the results based on the shift in levels of the Okun's coefficient. The relationship is still significant although now at the 5% level and explains only thirteen per cent of the variation in the data. Using the level version leads to Spain being an outlier. This may be explained by the fact that, already from the early 2000s, unemployment was becoming more and more sensitive to output growth (which was driven by the boom in the construction sector prior to the onset of the crisis). The coefficient reached almost 0.6 just before the crisis, a level far above all others countries reviewed in this paper. Since the objective of this section is to assess if there is a relationship between the change in Okun´s coefficient and various labour market institutions across countries, it is more accurate to use the shift in percentage change since it allows a normalization across countries.

Figure 5: Relationship between employment protection legislation and shift in Okun's coefficient during the global financial crisis, 2007-2010



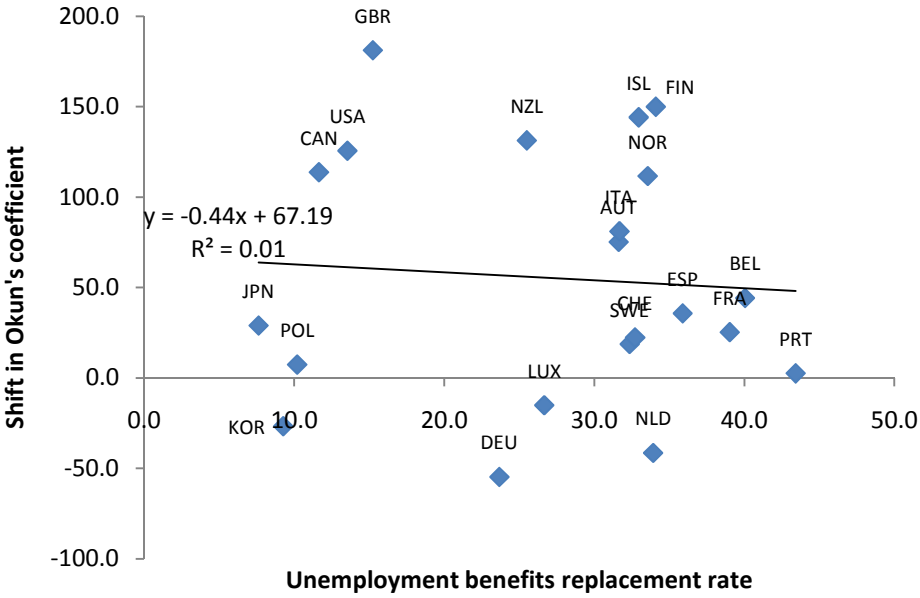
Source: OECD statistics, authors' calculations.

Notes: Shift = the percentage change in the estimated Okun's coefficient between the peak of GDP to the subsequent trough. Outliers where the shift was greater than 250% or less than -250% were removed (this represented three observations). Country codes: AUT=Austria; BEL=Belgium; CAN=Canada; CHI=Chile; CZE=Czech Republic; EST=Estonia; FIN=Finland; FRA=France; DEU=Germany; ISL=Iceland; ITA=Italy; JPN=Japan; KOR=Korea; LIT=Lithuania; LUX=Luxembourg; MEX=Mexico; NLD=Netherlands; NZL=New Zealand; NOR=Norway; POL=Poland; PRT=Portugal; SVK=Slovak Republic; ESP=Spain; SWE=Sweden; CHE=Switzerland; GBR=United Kingdom; USA=United States.

As said before, the key features of the unemployment compensation systems are likely to affect unemployment patterns. However, there is no evidence of a significant relationship between the unemployment benefits replacement ratio and the shift in the Okun's coefficient over the crisis period (Figure 6). This contrasts the result of IMF (2010), which finds that the estimate of the long-run Okun's coefficient is positively associated with the unemployment benefits replacement ratio. IMF (2010) argues that this is evidence that the job destruction effect of unemployment insurance outweighs the job

creation effect. These results do not, however, detract from the broader role of unemployment benefits as an automatic stabilizer, which in turn helped smooth consumption during the crisis.[19]

Figure 6: Relationship between unemployment benefits replacement rate and shift in Okun's coefficient during the global financial crisis, 2007-2010



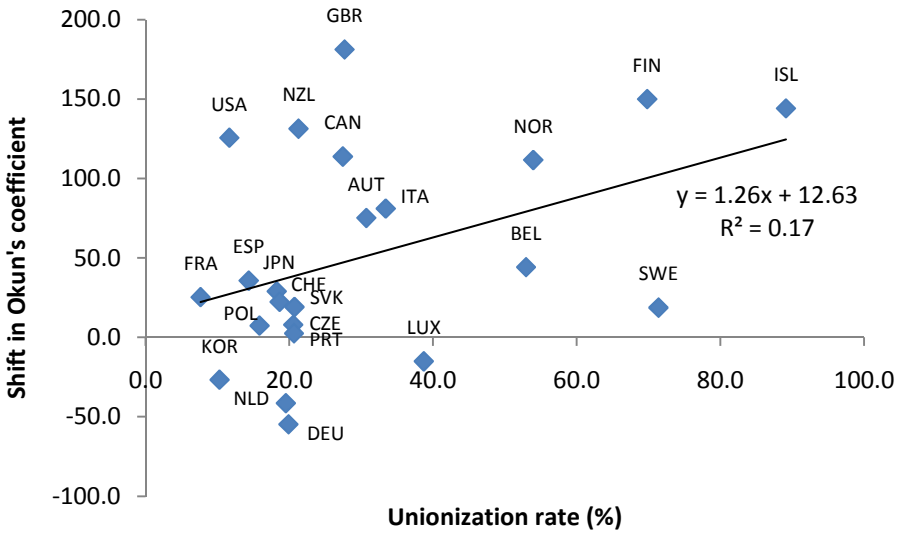
Source: OECD statistics, authors' calculations.

Notes: Shift = the percentage change in the estimated Okun's coefficient between the peak of GDP to the subsequent trough. See Figure 5 for country codes.

Figure 7 illustrates the relationship between the unionization rate and the shift in the Okun's coefficient. The data show a positive but weak relationship between the two variables from the peak to the trough, contrary to expectations. Indeed, one should expect that in countries where unionization is stronger, unemployment adjusts more slowly during a crisis. Interestingly, the positive correlation presented in Figure 7 seems to suggest the opposite, but no conclusions can be drawn since the relationship is not statistically significant and is only due to a number of outliers, namely Iceland and Finland; while dropping these observations results in a flattening of the trend line, indicating that there isn't an underlying statistical correlation between the unionization rate and the shift in the Okun's coefficient. Moreover, there are well-known problems in using the unionization rate as an indicator of union bargaining power (for example, in the case of France where the number of unionized workers is very low, collective agreements cover the majority of workers). However, using data on the coverage of collective bargaining (Figure A2 in the Appendix) from Venn (2009) reveals an even weaker statistical relationship.

[19] This has been argued by Olivier Blanchard, Chief Economist of the IMF along with ILO during the crisis period; see, for example, Blanchard et al. (2010) and ILO (2010).

Figure 7: Relationship between the unionization rate and shift in Okun's coefficient during the global financial crisis, 2007-2010.



Source: OECD statistics.

Notes: Shift = the percentage change in the estimated Okun's coefficient between the peak of GDP to the subsequent trough. See Figure 5 for country codes.

4. Conclusion

Over the decades following the oil shocks of the 1970s and 1990s, the flexibility of the United States labour market had been widely heralded as a major factor behind lower unemployment rates than that found in most continental European countries. It was argued that strict employment protection, minimum wages, and strong unionization kept unemployment high in Europe as it discouraged job creation and resulted in labour market 'hysteresis' as reflected by both higher rates and duration of unemployment.

At the end of 2010, the labour market of the United States couldn't look more different. The global financial crisis resulted in the most severe deterioration in the US labour market since the Second World War. This is reflected in both the unprecedented increase in the unemployment rate and the persistence of the rate well into the recovery phase. Due to an uncertain and fragile recovery in 2010 and 2011, unemployment has persisted at around 9.0 per cent. Long-term unemployment has become a reality for a country unaccustomed to such problems and the unemployment outflows rates have become unprecedentedly low: the percentage of the unemployed out of work for six months or more reached 46.2 per cent in May 2010 (the proportion has only fallen to 42.4 per cent in October 2011) (BLS 2011). At the same time, unemployment has remained subdued in a number of continental European countries, notably the ones that have often been labelled sclerotic in the past such as Germany and Italy, though the current sovereign debt crisis in the Eurozone will have negative implications for the labour market over 2011-2012.

The results presented in this paper confirm that Okun's coefficient varies across countries and time, where the latter is due to both longer term trends and movements in output over the business cycle. Focusing on the period of the global financial crisis, the findings show that there was considerable divergence in the rolling regression estimates of Okun's coefficient during 2007-2010. In the United States, Canada, Spain and other badly affected economies, the coefficient increased rapidly, departing from pre-crisis levels and suggesting high volatility of those labour markets. In other countries where unemployment has remained subdued due to greater adjustment of working hours, namely Germany and the Netherlands, the coefficient has fallen dramatically.

As recognized by the literature, it is expected that unemployment reacts differently to a downturn than to an upswing in the economy. This paper delves deeper into why unemployment adjustment should be asymmetric over the business cycle, focusing on how labour market institutions impact these movements. Using data from the recent global financial crisis, results are presented on the relationship between the shift in the sensitivity of the change in the unemployment rate to output during a recession and labour market institutions (employment protection legislation, unemployment benefits and unionization). The simple correlations reveal that there is indeed a negative relationship between the strictness of employment protection and the shift. In other words, these findings confirm that the responsiveness in the unemployment rate during the global financial crisis was lower in countries where workers are afforded greater protection (such as Germany).

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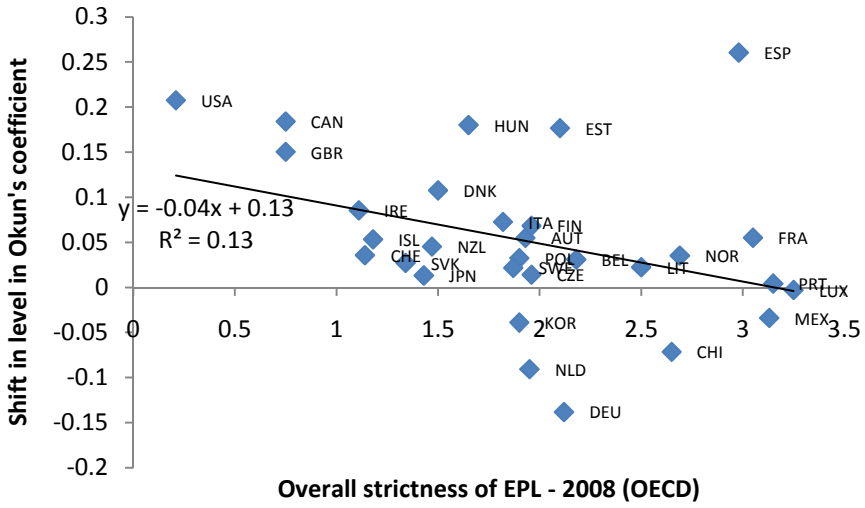
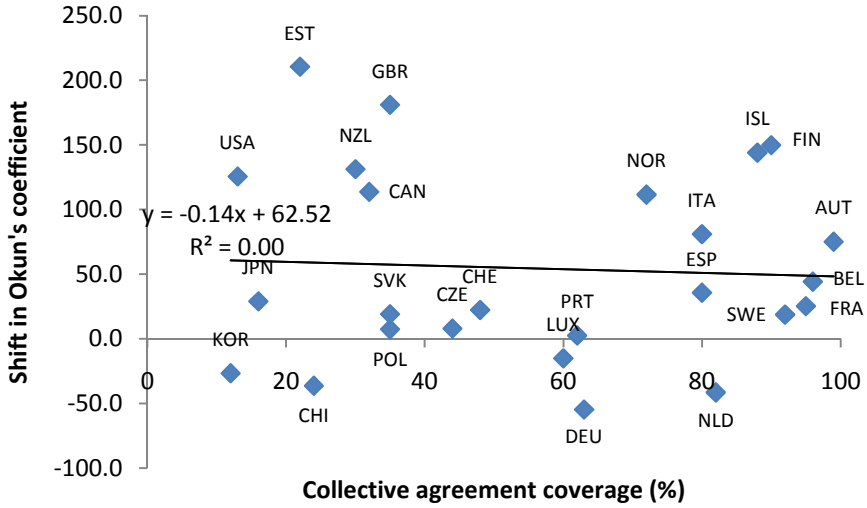
Appendix

Figure A1: Relationship between employment protection legislation and shift *in level* in Okun's coefficient during the global financial crisis, 2007-2009



Source: OECD statistics, author's calculation
Notes: Shift = the absolute difference in the estimated Okun's coefficient between the peak of GDP to the subsequent trough. Okun's coefficient is calculated using the difference version of Okun's law

Figure A2: Relationship between coverage and shift in Okun's coefficient during the global financial crisis, 2007-2010



Source: OECD statistics and Venn (2009)
Notes: Shift = the percentage change in the estimated Okun's coefficient between the peak of GDP to the subsequent trough.

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