

December 2014

SDN/14/11

IMF STAFF DISCUSSION NOTE

Youth Unemployment in Advanced Economies in Europe: Searching for Solutions

Angana Banerji, Sergejs Saksonovs, Huidan Lin, and
Rodolphe Blavy

INTERNATIONAL MONETARY FUND

INTERNATIONAL MONETARY FUND

European Department and Research Department

Youth Unemployment in Advanced Economies in Europe: Searching for Solutions

Prepared by Angana Banerji, Sergejs Saksonovs, Huidan Lin, and Rodolphe Blavy*

Authorized for distribution by Poul M. Thomsen

December, 2014

DISCLAIMER: This Staff Discussion Note represents the views of the authors and does not necessarily represent IMF views or IMF policy. The views expressed herein should be attributed to the authors and not to the IMF, its Executive Board, or its management. Staff Discussion Notes are published to elicit comments and to further debate.

JEL Classification Numbers: E24, J21, J20

Keywords: Youth employment, youth unemployment, Okun's law, business cycle, labor market factors

Authors' E-mail Addresses: ABanerji@imf.org; SSaksonovs@imf.org; HLin@imf.org; RBlavy@imf.org

* Led by Angana Banerji under the guidance of Petya Koeva Brooks and Mahmood Pradhan. We would also like to thank Shekhar Aiyar, Céline Allard, Larry Ball, Helge Berger, Olivier Blanchard, John Bluedorn, Jörg Decressin, Prakash Loungani, Paulo Medas, and other IMF colleagues, and seminar participants at the European Commission and the European Central Bank in June 2014 for their insightful comments. We are grateful to Jesse Siminitz, Xiaobo Shao, and Katherine Cincotta for their excellent assistance with research and document preparation respectively.

CONTENTS

EXECUTIVE SUMMARY	5
WHY FOCUS ON YOUTH UNEMPLOYMENT?	6
WHO ARE THE YOUNG UNEMPLOYED IN EUROPE?	8
WHAT IS DRIVING YOUTH UNEMPLOYMENT IN EUROPE?	10
A. Why the Unemployment Surge (“Flow” Problem)? The Lack of Growth	10
B. What Explains the High Unemployment Levels (“Stock” Problem)? Business Cycle and Labor Markets	13
WHAT IS THE SOLUTION TO THE YOUTH UNEMPLOYMENT PROBLEM IN EUROPE?	22
ANNEXES	
1. European Union Measures for Dealing with Youth Unemployment	25
2. Estimation Techniques	26
REFERENCES	29
BOXES	
1. Active Labor Market Policies: How Successful?	18
2. Germany’s Dual Vocational Training System	20
FIGURES	
1. Euro Area: Youth Unemployment Rate	6
2. Euro Area: NEET Rate, 15–24 years	6
3. Euro Area: Adult Unemployment Rate	7
4. Changes in the Youth Unemployment Rate since 2007	8
5. Euro Area Youth Unemployment Skill Levels	9
6. Reason for Temporary Work Contract among Youth, 2012	9
7. Euro Area: Effect of Output Changes on Unemployment	11
8. Elasticity of Youth Unemployment to GDP Components	11
9. Youth Employment by Sector, 2000–07	12
10. Average SME Share in Employment, 2008–13	12
11. Tax Wedges	14
12. Ratio of Minimum to Median Wage	14
13. Gross Benefit Replacement Rate	16
14. Inactivity Trap	16
15. Protection of Temporary Workers	17
16. Share of Temporary Workers Ages 15–24	17

17. Total ALMP Spending per Unemployed Person _____	19
18. Spending on ALMP Measures per Unemployed Person _____	19
19. Union Density _____	20
20. Market Efficiency Competition of Goods _____	21
21. Youth Unemployment Rate _____	23
22. Average Growth during Unemployment Reduction and Current Projections _____	23

ANNEX FIGURE

A1. Marginal Effects of Labor Market Factors on Youth Unemployment Rates _____	26
--	----

ANNEX TABLES

A1. Okun's Law Estimates _____	27
A2. Multivariate Model Estimates _____	28

EXECUTIVE SUMMARY

Europe has begun to recover from the global financial crisis, but the recovery is slow and tentative in the euro area. Output and investment remain well below pre-crisis levels. Unemployment is still unacceptably high, reducing the capacity of economies to grow as skills atrophy and talent migrates elsewhere. Youth unemployment is a particularly serious problem. The youth unemployment rate stood at an unprecedented 23 percent in the euro area in mid-2014, well above the rate in 2007. This reflects a combination of *sharp increases* in unemployment during the crisis, together with persistently *high levels* of unemployment, although the mix varies across countries.

This paper examines the factors driving youth unemployment in Europe. The analysis finds that the youth unemployment problem is multi-faceted:

- The lack of growth plays an important role in explaining the *upsurge in youth unemployment* during the crisis. The sharp decline in economic activity—the largest such decline since the Great Depression—can on average explain about 50 percent of the increase in youth unemployment during the crisis (and even more—70 percent—in vulnerable euro area economies). In most countries, youth unemployment is almost three times more sensitive to growth than adult unemployment. This is possibly due to the concentration of youth employment in cyclically sensitive sectors of the economy (such as construction) and the generally more fragile employment conditions of younger workers (temporary and part-time contracts), which make them more susceptible to the effects of the recession.
- The *high levels of youth unemployment* can be explained by both the output gap and labor market factors. Of particular relevance are labor costs (measured by the tax wedge and minimum wages relative to the median wage), especially for low-skilled labor; the opportunity cost of working (measured by unemployment benefits); and spending on active labor market policies (ALMPs) including programs that intervene in the market to address unemployment. Insufficient vocational training and pervasive labor market duality also affect youth unemployment rates.

There is no single solution to the youth unemployment problem. Policies need to be comprehensive, country-specific, and focused on reviving growth and advancing structural reforms.

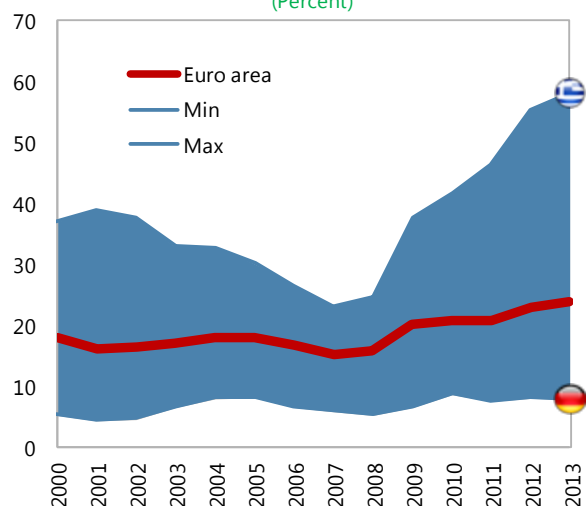
- Strong sustainable growth will be crucial, given the high sensitivity of youth unemployment to growth. Historically, euro area countries have reduced youth unemployment rates by growing far more robustly than they are expected to grow in the near future. Thus, the policy priority should be to boost aggregate demand in the euro area, especially through a strong accommodative monetary policy stance that complements the implementation of needed structural reforms.
- Labor market reforms that would also pay dividends include: lowering labor costs by reducing the tax wedge and reconsidering minimum wage policies (which largely affect youth) to increase labor demand; reforming unemployment benefits to better incentivize the transition from inactivity to work; improving skill levels and work-related training; and promoting cost-effective ALMPs.

WHY FOCUS ON YOUTH UNEMPLOYMENT?¹

A fragile recovery. Europe has begun to emerge from the global financial crisis. However, in the euro area, the recovery is slow and tentative, with output and investment well below precrisis levels. Countries are being held back in part by high borrowing costs and declining credit, especially countries that are grappling with the crisis legacies such as large output gaps, high debt, and high unemployment.

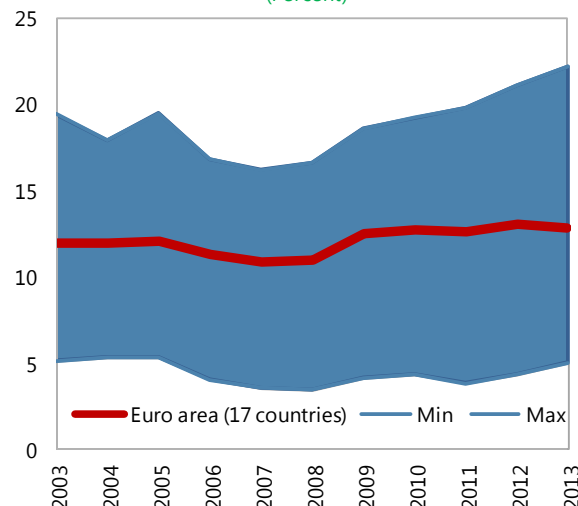
Historically high, increasingly long-term. Youth unemployment has increased sharply in Europe since the onset of the 2008 crisis, reversing a decade-long trend of modest declines.² Youth unemployment rates are currently at an unprecedented level in the euro area: 23 percent in mid-2014, well above the 15 percent rate in 2007 (Figure 1). Of even greater concern is the fact that the long-term youth unemployment rate—the share of unemployed for more than a year—has risen.

Figure 1. Euro Area: Youth Unemployment Rate (Percent)



Source: Eurostat.

Figure 2. Euro Area: NEET Rate, 15-24 years (Percent)



Note: NEET = Not in Education, Employment, or Training.

Source: Eurostat.

Not a statistical quirk. The trends look worrisome, no matter how youth unemployment is measured. Some have argued that the severity of the youth unemployment problem is merely a statistical artifact, that is, an overestimation due to the smaller, more volatile size of the youth labor force that occurs because younger people dip in and out of the labor force while pursuing their education. Indeed, the headline numbers do vary significantly depending on whether the incidence of unemployment is measured as a share of the youth labor force (the unemployment rate) or the total youth population (the unemployment ratio).³ This is why the NEET rate—defined as the share

¹ A more comprehensive discussion and technical analysis can be found in IMF (2014a) and Banerji, Lin, and Saksonovs (2014).

² Henceforth, youth refers to individuals aged 15–24 years, and adults refer to individuals aged 25–64 years.

Unemployment refers to the unemployment rate defined as the number of unemployed as a ratio to the labor force.

³ Both measures could potentially be subject to measurement bias by not accounting for, on the one hand, those who leave the labor force to pursue education (the unemployment rate), or, on the other hand, those who stay out of

(continued)

of the labor force not employed or involved in further education or training (i.e., the share that is idle)— is considered the most accurate measure of youth unemployment. And the NEET rates also paint a worrisome picture, showing that mild improvements that occurred before the crisis have now been reversed (Figure 2).

Larger than adult unemployment. Adult unemployment rates also ticked up sharply after the crisis and are at historic highs in some countries (Figure 3), but less so than youth unemployment.

Unemployment rates typically tend to be higher for youth than for adults, but these differences have increased sharply since the beginning of the global crisis. In sheer numbers, however, there are many more adults unemployed in the euro area: there were some 17 million adults compared with 3½ million young unemployed workers in 2013.

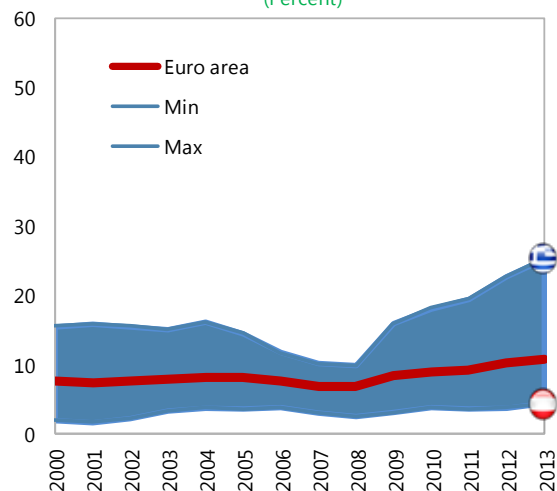
Significant social and economic consequences.

High unemployment rates are symptomatic of a weak recovery in the euro area. Large and persistent youth and adult unemployment rates lower potential output due to hysteresis effects (skill attrition and depreciated human capital), the outward migration of skilled labor,⁴ and an increase in social and political

resistance to reforms. In particular, the higher the rate of long-term unemployment, the larger is the potential for hysteresis effects. Research has also documented the fact that high youth unemployment tends to erode social cohesion and institutions, and foster crime, all of which are detrimental to medium-term growth prospects. For individuals, long spells of unemployment have been found to lead to “scarring”—a lower probability of future employment and lower wages. Finally, high and persistent youth unemployment could undermine the sustainability of spending on social safety nets in a rapidly ageing euro area.⁵

Moving up the policy agenda. Policymakers are increasingly focused on tackling youth unemployment. Policies to resolve this issue have been formulated at both the European Union and national levels. The most notable examples are the Youth Guarantee Scheme and the Youth Employment Initiative, aimed at providing European Union funds to support ALMPs for young people not in education, employment or training (NEET) in regions with high youth unemployment (see Annex 1). Preliminary estimates are that some 0.2 percent of euro area GDP annually could be used to finance these initiatives.

Figure 3. Euro Area: Adult Unemployment Rate (Percent)



Source: Eurostat.

the labor force because of the lack of jobs (the unemployment ratio). This paper uses the unemployment rate for expositional purposes and for easier comparison with the literature.

⁴ For example, there is evidence that Latvian emigrants during the crisis were slightly younger and slightly more educated than the average population (Hazans, 2011; Blanchard, Griffiths, and Gruss, 2013).

⁵ See, for example, ILO (2010) and Giuliano and Spilimbergo (2009). Banerji, Lin, and Saksonovs (2014) has more references.

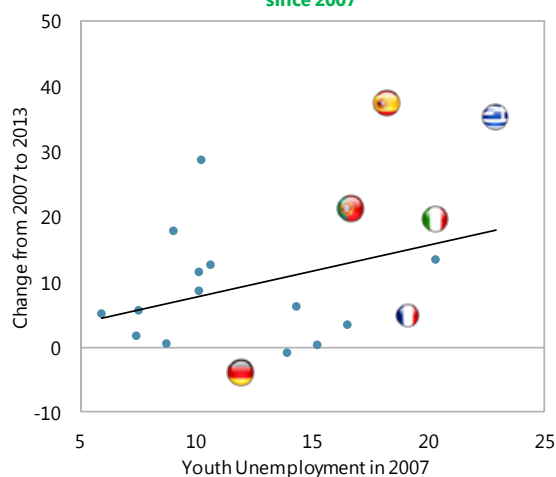
Improving our understanding. Despite the increasing policy focus on youth unemployment, there is relatively little analysis of the nature and drivers of this phenomenon.⁶ Most research tends to focus on total unemployment. This paper tries to fill this gap by documenting the main trends in youth and adult unemployment before and after the crisis in advanced European countries, especially in the euro area. It attempts to distill the main underlying reasons for the large increases in youth and adult unemployment and outlines elements of a comprehensive strategy to address the problem. The analysis covers 22 advanced European countries—18 in the euro area, as well as Denmark, Sweden, Norway and the United Kingdom. The analysis is based on annual data from 1980 to 2012, although the actual sample size varies depending on data availability. The stylized facts go beyond 2012 if data are available, but the full analysis could not be extended beyond 2012 at this stage given data gaps.

WHO ARE THE YOUNG UNEMPLOYED IN EUROPE?

Wide divergence across countries. The crisis has exacerbated previously large cross-country differences in labor market dynamics. The hardest hit euro area countries experienced unprecedented increases in youth unemployment rates, reaching levels ranging from 25 percent in Ireland to 43 percent in Spain on average during 2007–13 (Figure 4). In contrast, in countries that fared better economically, youth unemployment rates increased only marginally (Austria, Netherlands) or even fell (Germany).

Crisis-related or pre-existing condition? While the global crisis is a natural reference point for discussions about youth unemployment, the problem predates the crisis in some, but not all, European countries. For example, Ireland and Cyprus, experienced large increases in youth unemployment after the crisis from relatively low precrisis levels. In such cases, the crisis seems to have been the main driving force behind the current high unemployment rates. At the other end of the spectrum are countries like Belgium, France, Finland and Sweden, with above-average precrisis unemployment rates, but small increases since the crisis. In these countries, youth unemployment appears to be largely a function of conditions that existed before the crisis. A third category, which includes the hardest-hit countries such as Greece, Spain, and Italy, experienced large increases in youth unemployment after the crisis. But they also had relatively high—i.e., above average—youth unemployment rates to begin with. In these cases, the crisis appears to have exacerbated an existing problem. Thus, any analysis of youth unemployment in Europe would need to address both the stock and the flow problem.

Figure 4. Changes in the Youth Unemployment Rate since 2007

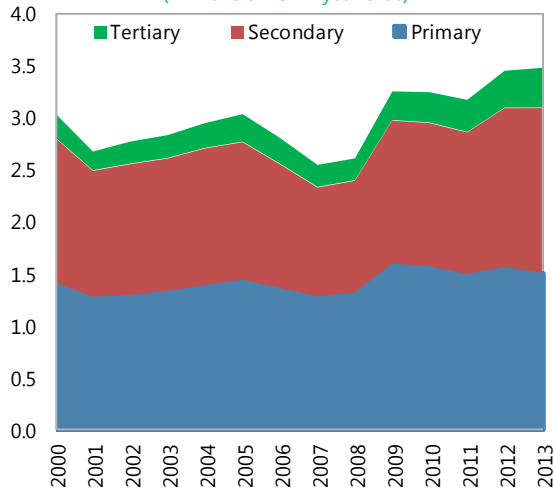


Sources: Eurostat; and IMF staff estimates.

⁶ Papers that specifically look into the drivers of youth unemployment include Bertola, Blau, and Kahn (2007), Bernal-Verdugo, Furceri, and Guillaume (2012), Choudhry, Marelli, and Signorelli (2012), and the European Commission (2013b, 2014).

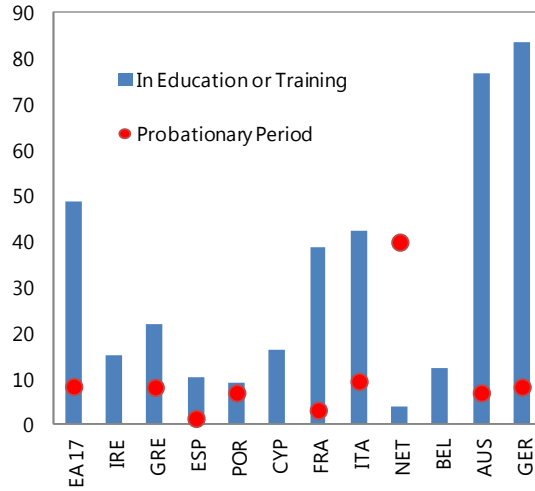
Generally low-skilled. Youth unemployment tends to be concentrated among those with primary levels of education. While young individuals with secondary and tertiary education levels have not been immune to rising unemployment during the crisis, individuals with lower education levels have had worse employment outcomes. In contrast, the majority of employed youth (58 percent on average in 2013) have upper-secondary and post-secondary non-tertiary education (Figure 5).

Figure 5. Euro Area Youth Unemployment Skill Levels
(Millions of 15-24 year olds)



Source: Eurostat.

Figure 6. Reason for Temporary Work Contract Among Youth, 2012
(Percent of Unemployed)



Note: Missing red dot indicates missing data.

Source: Eurostat.

More precarious employment conditions. Youth tend to be hired more frequently on temporary contracts than adults (on average 37 percent and 9 percent, respectively, of employed individuals in 2013, virtually unchanged since 2007). However, the prevalence of temporary contracts varies widely across countries, and so does the nature of the temporary work. Survey data suggest that temporary contracts for the youth are associated with education, training, or a probationary period in countries such as Germany, Netherlands, and Austria (these countries also happen to have low youth unemployment rates) (Figure 6). On the other hand, the share of those on temporary contracts due to education, training, or a probationary period is relatively smaller in Greece, Spain, and Portugal. Part-time employment is also more frequent for youth than it is for adults, and has increased since the crisis (33 percent in 2013). Finally, youth employment tends to be more concentrated than adult employment (63 percent of young workers are employed in the top three occupations).

WHAT IS DRIVING YOUTH UNEMPLOYMENT IN EUROPE?

Multifaceted problem. The stylized facts indicate that the youth unemployment problem in advanced European countries is a combination of big changes since the start of the global crisis (the “flow”), juxtaposed against a wide range of initial conditions in youth labor markets across countries (the “stock”). The solutions, therefore, need to address not just the sharp increases in youth unemployment during the crisis, but also the high levels that existed before the crisis.

Key questions. Drawing on the labor market literature, this paper tries to address the following two questions, and compares and contrasts the answers for the youth versus the adult labor market:

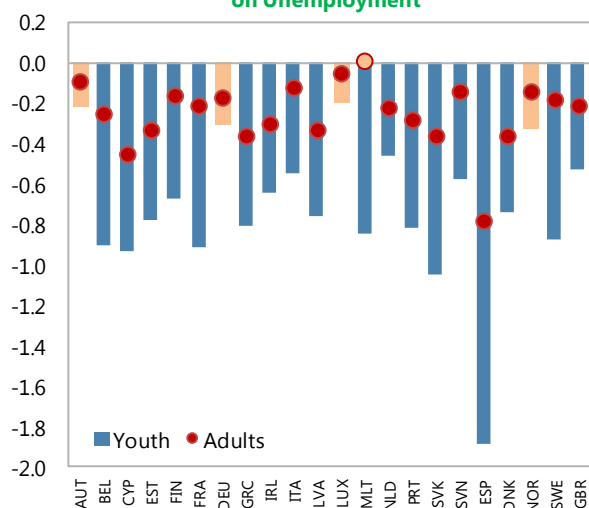
- First, to what extent can the **sharp increases** in youth unemployment during the crisis be attributed to output declines? Are there other factors at play?
- Second, which factors explain the **high levels** of youth unemployment? What role, if any, does the institutional setup and features of the labor market play in this regard?

A. Why the Unemployment Surge (“Flow” Problem)? The Lack of Growth

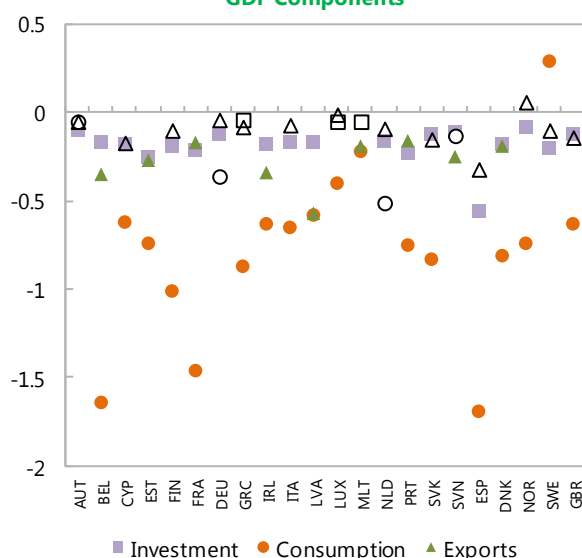
Significant role of output growth... The analysis unambiguously confirms that economic activity has been the most important determinant of changes in unemployment in Europe.⁷ This is true regardless of how economic activity is measured (GDP growth or the output gap). Countries that have witnessed the largest decline in economic activity since the crisis tend to be those with the biggest increases in youth unemployment rates. Changes in output, on average, explain around 50 percent of the changes in youth unemployment rates and around 60 percent of changes in adult unemployment rates across all advanced European countries (Figure 7). But in vulnerable euro area countries, changes in output explain about 70 percent of the increase in youth unemployment during the crisis. The role of growth is also significant for the rise in long-term youth unemployment rates.

...especially consumption growth. Looking beyond aggregate output growth into its different components—consumption, investment and exports—the largest increases in both youth and adult unemployment rates are associated with weaknesses in consumption growth (Figure 8). The relationship between changes in unemployment rates and export growth is not particularly strong. This finding is consistent with the high concentration of youth employment in sectors and occupations that cater to the consumption needs of the economy.

⁷ Many studies have found that changes in unemployment rates are negatively related to output growth (the Okun’s Law), but that relationship is less well documented in terms of unemployed youth. The Okun’s law was proposed by Arthur Okun in 1962 (Ball, Leigh, and Loungani, 2013, provides more discussion).

Figure 7. Euro Area: Effect of Output Changes on Unemployment


Note: Shaded bars and dots indicate insignificant results.
Sources: Eurostat; and IMF staff estimates.

Figure 8. Elasticity of Youth Unemployment to GDP Components


Note: Unfilled shapes indicate statistically insignificant coefficients.
Sources: Eurostat; and IMF staff estimates.

Variable cross-country sensitivity to growth. Output fluctuations affect unemployment rates differently across countries. The impact is much larger in vulnerable euro area economies. For instance, one additional percentage point of annual GDP growth is associated with a decline in the youth unemployment rate by an estimated 1 percentage point in Greece and Portugal, and by almost 2 percentage points in Spain. At the other end of the spectrum are countries where the estimated impact of growth is almost nonexistent (e.g., Austria). But even in these cases, some studies have found that output fluctuations play an important role if they are measured by the number of hours worked. For example, in Germany, employers responded to the global crisis by hoarding skilled labor, thereby reducing hours worked.⁸

Larger impact on youth. Youth unemployment rates are, on average, almost three times as sensitive to output growth as adult unemployment rates. This relationship holds true in every country, notwithstanding wide variations in employment dynamics across countries. This may be due to the concentration of youth unemployment in cyclically sensitive industries and in small and medium enterprises (SMEs).⁹

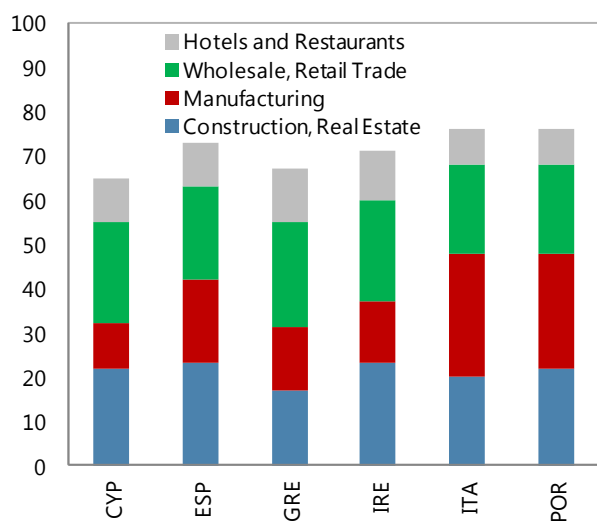
Concentration of youth employment. Youth employment is concentrated in sectors that tend to be more sensitive to the business cycle: manufacturing, wholesale and retail trade, and hotels and restaurants (Figure 9). Before the crisis, these sectors comprised between 65–75 percent of youth

⁸ Some authors have noted that German unemployment rates declined after the crisis because firms hoarded labor given their prior experiences with labor shortages. Instead of layoffs, German companies resorted to a decrease in average hours worked per worker, facilitated by reforms that increased working-hour flexibility at the firm level in the form of the short-time work scheme (Kurzarbeit) and by much greater wage bargaining flexibility (Reisenbichler and Morgan, 2012).

⁹ SMEs are defined as firms with less than 250 employees, turnover of less than 50 million euros, or a balance sheet of less than 43 million euros.

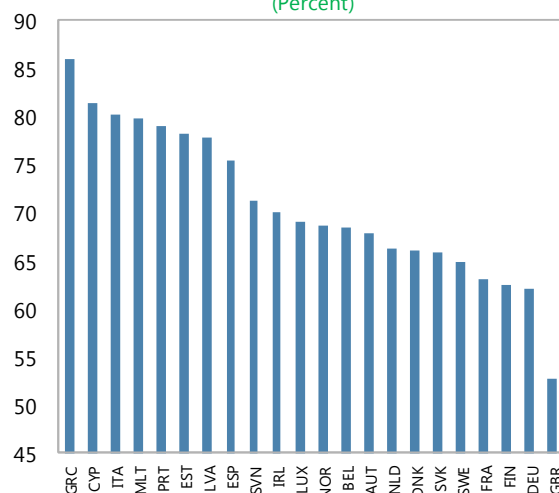
employment in countries where youth unemployment increased the most after the global crisis.¹⁰ These sectors have been hit hard by the crisis (e.g., the collapse of the housing boom has affected the construction sector). Moreover, SMEs employ the majority of the labor force, with the average employment share especially high in some Southern European countries—more than 75 percent for Spain, Italy and Portugal, for example (Figure 10). SMEs face unique financial constraints in the current environment of financial fragmentation and private sector deleveraging. This appears to increase the extent to which youth unemployment rates respond to growth; a higher SME share of employment implies a more pro-cyclical youth unemployment rate.

Figure 9. Youth Employment By Sector, 2000-07
(Percent)



Sources: Eurostat; and IMF staff estimates.

Figure 10. Average SME Share in Employment
2008-13
(Percent)



Note: SME = small and medium enterprises.

Sources: European Commission; and IMF staff estimates.

Beyond growth. Overall, output changes explain much of the increase in youth unemployment rates (the “flow” problem). Excluding countries most negatively affected by the crisis—Greece, Portugal, Spain, Latvia, and Ireland—output growth explains, on average, about 35 percent of the changes in youth unemployment rates across advanced European countries. For example, France and Italy both have high youth unemployment rates but output growth explains only 33 and 27 percent respectively of the increase. Clearly, there are other factors at play.

Contribution of labor markets to the flow problem. The labor market factors selected for this analysis seem to have little bearing on the changes in youth and adult unemployment rates for most countries.

- *This is not surprising...* Although labor market factors vary widely across countries, they have changed slowly over time in any given country, as shall be discussed later in this paper. Put simply, the rapid divergence of youth unemployment rates in the aftermath of the crisis has not

¹⁰ OECD (2006), Scarpetta (1996), and Scarpetta, Sonnet, and Manfred (2010) have also highlighted the large share of temporary contracts held by youth and the high concentration of youth employment in cyclically sensitive industries such as construction as factors behind high youth unemployment.

been accompanied by dramatic changes in labor market features in a given country. Thus, it stands to reason that the sharp increase in youth unemployment during the crisis was not associated with changes in labor market factors.

- *...but also not the full story.* As discussed earlier, the unemployment problem has both a stock and flow element to it. A limited role in explaining the flow problem does not imply that labor market factors have no impact on the stock, as will be seen in the next section. Moreover, the lack of a robust relationship between labor market factors and changes in the unemployment rate could simply reflect empirical and specification challenges. In particular, the analysis relied on measures that were available for most countries in the data set, but these may be inadequate for capturing country-specific institutional details that are relevant for measuring the impact of labor market factors in a particular country. Moreover, labor market reforms since the crisis are not fully captured in the dataset that extends until 2012.¹¹

B. What Explains the High Unemployment Levels (“Stock” Problem)?

Business Cycle and Labor Markets

Impact of cyclical and labor market factors. The business cycle (measured by the output gap for each country) and labor market factors together explain 90–96 percent of the *levels* of the unemployment rate across countries. High youth and adult unemployment levels are associated with a number of labor market factors. In particular, lower labor costs and higher spending per unemployed person via ALMPs, especially on training, seem to be connected with lower youth unemployment. Higher opportunity costs of working, lower skill levels and greater labor market duality tend to go hand in hand with higher unemployment, whereas collective bargaining and product market reforms have mixed or inconclusive effects.¹²

Cross-country variations. In principle, each labor market factor could have a different impact across countries. Given severe data constraints, however, it was not feasible to assess the impact of a set of factors in each and every country in a manner that could yield robust results. A number of different methods were used to partially work around this constraint.¹³ The results reported below are based on a methodology that looks at the impact of several labor market factors and the business cycle simultaneously, allowing the impact of the business cycle to vary across countries but restricting the sensitivity of unemployment to labor market factors to be the same across countries.

¹¹ For instance, Spain introduced major labor market reforms in 2012 (Ley 3/2012 de medidas urgentes para la reforma del mercado laboral) that included reforms to collective bargaining, opt-outs and firm-level internal flexibility regarding working conditions (wages, hours), and dismissals (conditions, costs).

¹² Some of the labor market characteristics considered in the literature as having an impact on youth unemployment include unionization (Bertola, Blau, and Kahn, 2007; IMF, 2014b), hiring and firing regulations, minimum wages and hiring costs (Bernal-Verdugo, Furceri, and Guillaume, 2012), and labor market flexibility (OECD, 2006; Choudhry, Marelli, and Signorelli, 2012).

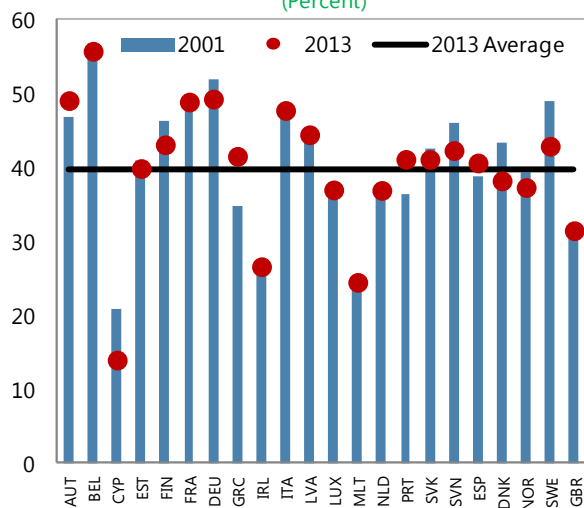
¹³ IMF (2014a) and Banerji, Lin, and Saksonovs (2014) provide detailed discussions of data gaps and methodology.

Higher Labor Costs, Higher Unemployment

Economic intuition. Labor costs—measured by the tax wedge¹⁴ and statutory minimum wage rates—affect unemployment by influencing both the supply of and demand for labor. Several studies find that a higher labor tax wedge raises unemployment,¹⁵ and the impact of the tax wedge is strengthened when combined with the impact of the minimum wage and the strength of collective bargaining. High payroll taxes and employers’ social security contributions are even more likely to raise labor costs in the presence of wage floors generated by statutory minimum wages.¹⁶ If, on the other hand, employers succeed in shifting the tax burden to the employees in the form of lower wages, this could reduce labor supply, especially for low-wage earners.

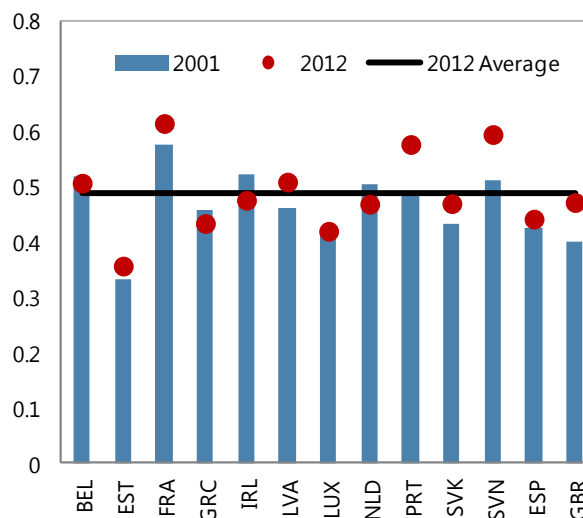
State of play. Tax wedges have remained large over the past decade, with the exception of the Scandinavian countries and Germany. In other European countries, the tax wedge has either remained unchanged or increased (in particular, Greece and Spain).¹⁷ The ratio of minimum to median wages has also remained unchanged for the vast majority of advanced European countries while increasing in France, Greece, Portugal, and Spain (Figure 12).¹⁸

Figure 11. Tax Wedges (Percent)



Note: Latest available data for Cyprus is for 2007.
Source: European Commission.

Figure 12. Ratio of Minimum to Median Wage



Source: Organization for Economic Cooperation and Development.

¹⁴ The tax wedge is defined as the proportional difference between the costs of a worker to his or her employer (wage and social security contributions, i.e. the total labor cost) and the amount of net earnings that the worker receives (wages minus personal income tax and social security contributions, plus any available family benefits). The tax wedge measures incentives to work (labor supply) as well as to hire persons (labor demand).

¹⁵ For example, Espinoza and Pérez Ruiz (2014) find that a lower labor tax wedge lowers unemployment.

¹⁶ Wage floors negotiated by social partners can have effects that are quite similar to legislated minimum wages (IMF, 2014b).

¹⁷ That said, unit labor costs and wages have declined significantly in several euro area countries (more than 20 percent since 2009 in Greece). Unit labor costs also declined in Spain by 7 percent during 2009–2013 but this mainly reflects dismissals.

¹⁸ The minimum wage was frozen in Portugal in the second half of 2011 and cut in Greece in the second half of 2012 under the financial assistance programs.

Higher labor costs, higher unemployment. Our analysis confirms that higher labor costs—that is, a larger tax wedge and/or minimum wages relative to the median wage—are associated with higher youth and adult unemployment rates. A one percentage point increase in the tax wedge comes with higher youth unemployment rates by 0.3–1.3 percentage points, while the effect on adult unemployment is smaller (around 0.5 percentage points). Higher minimum wages relative to median wages comes with higher youth unemployment by 0.4–1.2 percentage points (while the effect on adult unemployment is insignificant). This is probably because many young people are hired at minimum wage jobs, leaving them particularly vulnerable to increases in labor costs. OECD (2012) shows that since 2007 young people have, on average, been at a disadvantage in countries where the minimum wage is relatively high as a percentage of median pay.

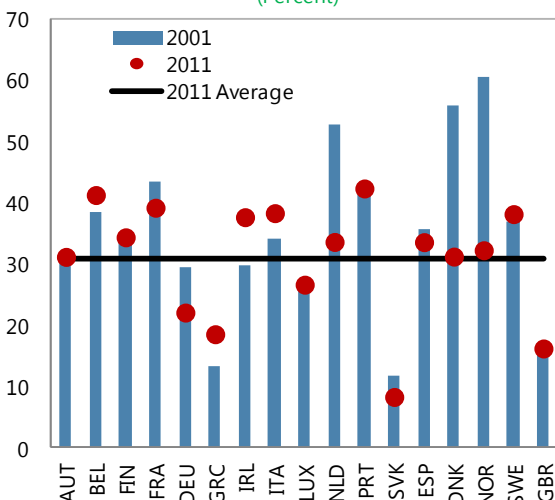
Higher Opportunity Cost of Working, Higher Unemployment

Economic intuition. High unemployment benefits can raise unemployment by reducing the willingness to search intensively for jobs and/or to accept job offers, and by increasing the reservation wage, i.e., the salary at which the unemployed would be willing to work instead of receiving unemployment benefits (both of which lower labor supply). Moreover, tax and benefit systems can interact to create an unemployment or inactivity trap that arises when individuals who qualify for social protection benefits have little financial incentive to work or even look for work because the combined effects of increased tax payments and withdrawn income-tested benefits offset the potential gain in disposable incomes from increased earnings.

State of play. Again, the picture remains largely unchanged over 2001–12 for most countries, regardless of which indicators are used to capture the incentives of the unemployed to seek work (the gross benefit replacement rate or the inactivity trap) (Figure 13). There are a few exceptions, for example, Germany and some Scandinavian countries have reduced benefit replacement rates. On the other hand, gross benefit replacement rates in Portugal and Spain remained virtually unchanged and increased somewhat in Italy and Ireland. The inactivity trap remained remarkably stable during 2001–12 (Figure 14).

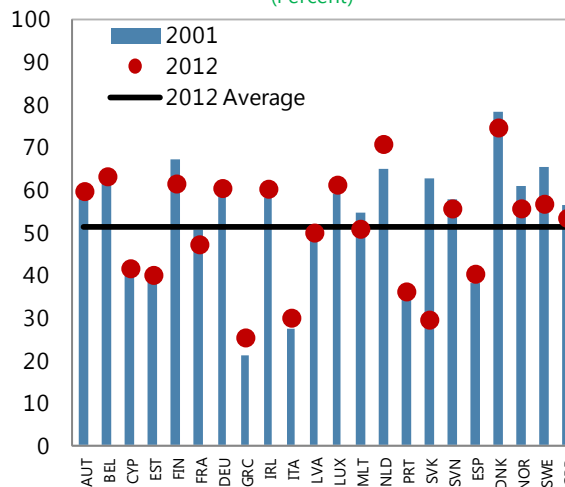
Higher opportunity costs, higher unemployment. According to our analysis, higher gross replacement rates are associated with higher youth unemployment by about 0.5 percentage points (for a 1 percentage point increase) and higher adult unemployment rates by 0.1–0.2 percentage points. Other measures of opportunity cost—the net replacement rate and the inactivity trap—do not uniformly yield strong results, perhaps due to data limitations. It is worth noting in this context that an aggregate indicator may mask country-specific differences in eligibility for unemployment benefits, e.g., in some countries, people who never had a job may not be eligible for unemployment benefits.

Figure 13. Gross Benefit Replacement Rate (Percent)



Sources: Organization for Economic Cooperation and Development and European Commission Tax and Benefits Indicators Database.

Figure 14. Inactivity Trap (Percent)



Source: Organization for Economic Cooperation and Development.

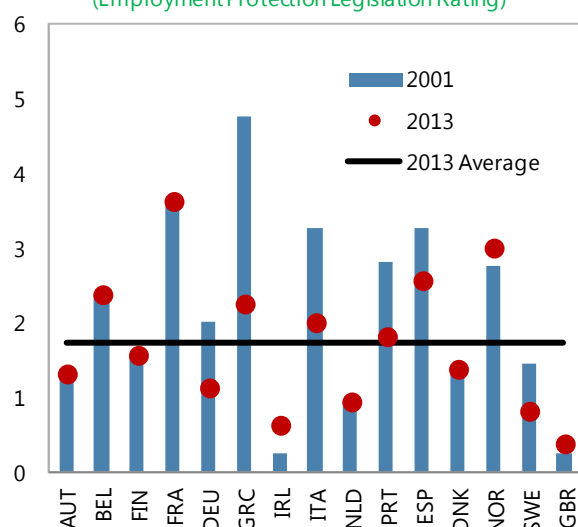
Stronger Duality of Labor Markets, Higher Unemployment

Economic intuition. Dual labor markets are characterized by a high share of temporary employment contracts with lower employment protection for workers who are on temporary contracts than for those on regular contracts. In general, the impact on labor market outcomes of employment protection legislation—laws governing the hiring and firing of employees—is found to be small and ambiguous, as it potentially lowers both the separation rate (by increasing the cost of firing), and also the employment rate (by increasing reluctance to hire workers in the first place). However, labor market duality has been associated with lower youth employment rates in a sample of 17 OECD countries over 1960–96 (Bertola, Blau, and Kahn, 2007). Blanchard, Jaumotte, and Loungani (2013) note that the unequal distribution of unemployment and its unusual concentration among youth in some countries in part reflects dysfunctional labor market institutions, namely the dual employment protection systems. This is why the IMF has recommended the reduction of duality in a number of countries, particularly Italy, Portugal, and Spain. Also, duality could be more harmful for employment if combined with wage rigidity—when hit by a negative shock, firms are unable to adjust wages and instead end up dismissing workers, particularly those on temporary contracts (i.e., mainly youth). For instance, labor market adjustments in Spain have mainly focused on shedding workers on temporary contracts.

State of play. As indicated earlier, young workers are more likely to be employed on temporary contracts than adult workers. The disparity between the adults and youth in this regard is particularly large in Spain, Italy and Portugal, which have had some of the largest increases in youth unemployment. However, the regulatory protection offered to temporary contracts has declined in recent years especially in vulnerable euro area countries.

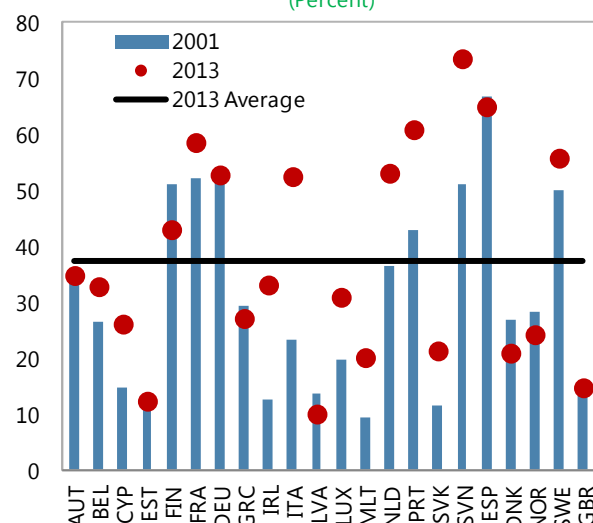
Stronger duality of labor markets, higher unemployment. Our analysis finds stronger labor market duality to be linked with a detrimental effect on youth employment. Higher protection for temporary contracts—i.e., less duality—is related to lower unemployment rates for youth and adults, but the results are stronger for youth given that a higher share of youth employment is based on temporary contracts. A one-unit increase in the employment protection legislation rating for temporary contracts¹⁹ is associated with lower youth unemployment rates by 2.5–5 percentage points and lower adult unemployment by 1.5–2 percentage points. A higher share of youth on temporary contracts relative to all employed youth—i.e., more duality—corresponds to higher youth unemployment by 0.3–0.4 percentage points, but a similarly defined increase for adult workers has no significant correlation with adult unemployment rates.

Figure 15. Protection of Temporary Workers
(Employment Protection Legislation Rating)



Note: Data for Estonia is from 2003.
Source: Eurostat

Figure 16. Share of Temporary Workers Ages 15-24
(Percent)



Note: 1 = least protection; 6 = highest protection.
Source: Organization for Economic Cooperation and Development.

More Spending on Active Labor Market Policies, Lower Unemployment

Economic intuition. Most macro-econometric studies have found significant positive effects on aggregate unemployment of spending on ALMPs, especially on training (OECD, 2006, Chapter 6 and 7). However, micro-econometric evaluations of ALMPs find that the effectiveness of programs varies, and that programs that seem similar at first glance can yield very different outcomes.

Micro-econometric studies also show that ALMPs that specifically target young people are not very effective regardless of the type of the program, i.e., they have a lower probability of yielding positive results (see Box 1).

¹⁹ The rating is on a scale from 1 (least protection) to 6 (highest protection).

Box 1. Active Labor Market Policies: How Successful? A Brief Literature Review

Active labor market policies are programs that intervene in the market to address unemployment.

International experience indicates that there is no “one size fits all” model of successful ALMPs. Design, targeting, and close interactions with passive labor market policies are key (OECD, 2010a). Overall, ALMPs focused on training, private sector incentives, “services and sanctions” (i.e., programs to improve the efficiency of labor market search and matching) and self-employment tend to produce better results than direct employment programs:

- Kluge (2010) finds that private-sector hiring subsidies are the most effective, but they must be short-term, targeted and closely monitored because they suffer increasingly from dead-weight and substitution effects when expanded.
- “Services and sanctions” programs are the most cost-effective (Martin, 2000; Martin and Grubb, 2001), and produce better outcomes than training programs (Kluge, 2010). Counseling and job-search are particularly cost-effective when associated with increased monitoring of job seekers and enforcement of work tests. Self-employment programs are helpful, but only for a limited proportion of the unemployed.
- Lutz and Mahringer (2007) conclude that training programs should be small in scale and well-targeted, given their costs and mixed results.
- Direct employment programs produce the weakest post-program employment outcomes, especially when geared toward public sector jobs. These results are supported by the broader meta-analysis by Card, Kluge, and Weber (2010) which considers 199 estimates from 97 studies conducted from 1996–2010 on programs in 26 different countries. The study also finds that a longer-term perspective provides more positive evidence.

In terms of implementation, the literature suggests that positive outcomes depend on appropriate design and a proper cost-benefit analysis. Regular impact assessments help in shifting resources to more effective schemes. Interactions between active and passive policies are important (Kluge, 2010; OECD, 2010a; European Commission, 2012b). Referrals by the public employment service (PES) to labor market programs can increase effectiveness. Good management and efficient operation of the PES is also important.

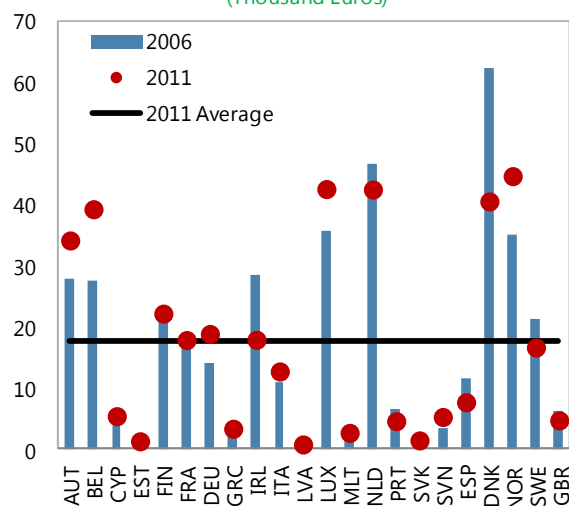
Despite the vulnerability of youth to unemployment (Eurofound, 2011), youth are under-represented in the vast majority of ALMPs (ILO, 2012). A number of guidelines have emerged in the literature on best practices for developing ALMPs for young workers, summarized by the European Commission (2012b):

- Prioritization and tailoring, especially focused on the most vulnerable, are a key precondition. A good example is the MYPLACE program in the United Kingdom with youth facilities dedicated to the disadvantaged (Eurofound, 2012).
- Mutual obligation—i.e., the linking of passive benefits to activation—is important for youth-specific measures (Calmfors, 1994), and requires appropriate benefit provision and addressing the stigma associated with reporting to unemployment agencies.
- Avoiding cycles of inactivity is important for reducing demotivation and destruction of human capital. In Sweden, the young unemployed are given incentives and support to actively seek jobs, followed by three months of active job matching combined with apprenticeship or further education (European Commission, 2012b).
- Early intervention, notably with targeted outreach, helps prevent the scarring effects of unemployment. A good example would be the Austrian “training guarantee” targeted at youth under the age of 18 who cannot find a company-based apprenticeship.
- Close links to the labor market are achieved through a mix of education, occupational skills and on-the-job training, and access to support services (Grubb, 1999), as illustrated by the successful youth guarantee scheme in Finland that combines education and employment (European Commission, 2012b).
- Youth guarantee schemes are increasingly favored as a policy response to the specific challenges of young with commitments to place them in an education, training or work program. With substantial experience in such schemes, Finland and Sweden were able them to intervene successfully during the crisis (Eurofound, 2012).

State of Play. Spending on ALMPs varies widely across countries, and several countries have increased spending in this area after the crisis. Given dramatic increases in unemployment during the crisis, ALMP funds have had to be distributed across greater numbers of the unemployed.

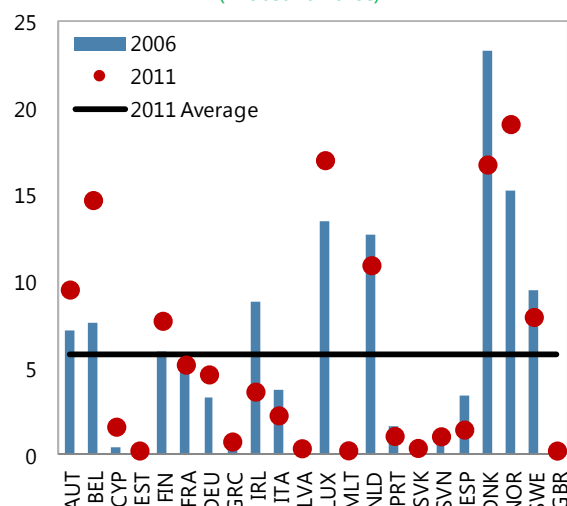
Higher spending in ALMPs, lower unemployment. Higher spending on ALMPs, especially training, is associated with significant reductions in youth unemployment rates. An additional 1000 euro per unemployed increase in ALMP spending is linked to lower youth (adult) unemployment by around 0.3 (around 0.1) percentage points (Figures 17 and 18).

Figure 17. Total ALMP Spending per Unemployed Person
(Thousand Euros)



Note: Total active labor market policy (ALMP) spending combines spending on training, support, and services.
Source: Eurostat.

Figure 18. Spending on ALMP Measures per Unemployed Person
(Thousand Euros)



Note: Active labor market policy (ALMP) measures include training as one of the main components.
Source: Eurostat.

More Vocational Training, Lower Unemployment

Economic intuition. Educational attainment may have a large impact on employability (OECD, 2013). The share of workers in the population with low education has been declining steadily across all countries in Europe. But the level of formal education may not provide a complete picture of the skills of the young unemployed. Vocational training and apprenticeships are important forms of teaching skills, but difficult to measure. Box 2 briefly discusses the main features of Germany’s dual vocational training system. Such systems also exist in a number of other European countries, such as Austria and Switzerland. OECD, 2014, provides an in-depth review and comparative analysis of these programs.

**Box 2. Germany’s Dual Vocational Training System:
Summary of Core Elements and Conditions for Success**

The dual vocational training system in Germany integrates school and work-based learning to prepare apprentices for full-time employment. After completing the compulsory lower secondary education, young workers can start such training by signing a training contract with a private company, with no additional prerequisites for admission. The dual vocational training lasts for 2–3 years (depending on occupation); apprentices usually spend 3–4 days at the workplace and 1–2 in vocational school. The theoretical and practical aspects of school and work-based learning are mutually reinforcing. In addition, successful transition to full-time employment is facilitated by the soft skills acquired at the workplace (e.g., conflict resolution, initiative taking), while academic skills obtained in the classroom enhance prospects for long-term labor market success (OECD, 2010b).

The effectiveness of the German system is highly influenced by its social, cultural, and economic conditions, as well as by prevailing institutional structures (Euler, 2013). The government and business community share costs and work together to constantly improve the system. An intricate web of checks and balances at the national, state, municipal, and company levels ensures that the short-term needs of employers do not distort broader educational and economic goals. Germany also has a well-developed and institutionalized research capacity, including the Federal Institute for Vocational Education and Training (*BIBB*), which supports continuous innovation and improvement of the system, making it more flexible, and responsive to the emergence of new fields and occupations (OECD, 2010b).

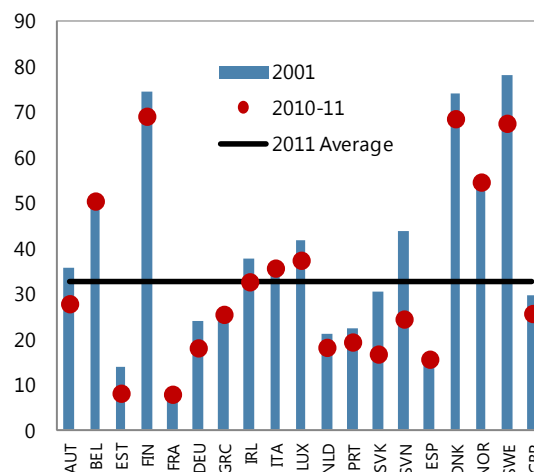
The German system is not without limitations. Notably, the evaluation of dual system trainees is seen as limiting their ability to attain tertiary education afterwards. Tertiary attainment rates for 25–34 year olds in Germany are below the levels in most other OECD countries, even though tertiary attainment rates are about average for the working-age population as a whole (OECD, 2009, 2011). Moreover, the vocational education system may need to be adapted to the demands of a globalized world, as its advantages may be diminishing in the context of rapid technological change and globalization (OECD, 2010c).

More vocational training, lower unemployment. Our analysis shows that access to vocational training—measured by the share of temporary workers in probationary periods or vocational training—corresponds to lower youth unemployment by around 0.3 percentage points, but is not relevant for adult unemployment. A higher share of individuals with low education generally has no significant association with youth unemployment or employment rates, but has a strong and negative association with adult unemployment and employment rates. Low education may be less of an obstacle for youth employment, perhaps because young workers are more amenable to training.

Other Labor Market Factors

Unclear effects of collective bargaining. According to the literature, the impact of collective bargaining on total employment could be mixed, depending on the level at which the bargaining occurs. Firm-level bargaining tends to limit wage increases beyond productivity levels, thereby having less of a negative impact on overall employment and unemployment. The overall impact of this type of bargaining on the labor force can potentially be explicitly incorporated in the bargaining process, thereby minimizing the

**Figure 19. Union Density
(Percent)**

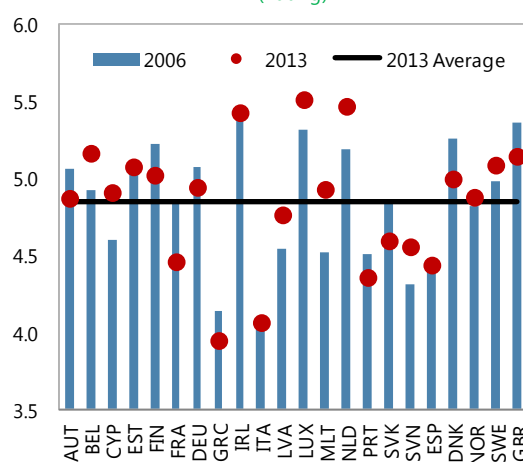


Source: Organization for Economic Cooperation and Development

effect on unemployment. Thus, the relationship between the strength of collective bargaining and unemployment could be seen as hump-shaped, having the worst effects on unemployment when collective bargaining systems are neither fully centralized nor decentralized (Calmfors and Driffell, 1988). However, other papers find more qualified support for the hump-shaped hypothesis (e.g., Traxler, 2003), suggesting that the impact of collective bargaining on unemployment is unclear. The OECD's indicator on union density (Figure 19) measures the incidence of unionization among the unemployed, but does not measure the degree of centralization or the coverage of unions.²⁰

Insufficient data on product market reform. It has been suggested that the lack of progress in product market liberalization could pose an obstacle to youth employment (Nicoletti and Scarpetta, 2001). However, it is difficult to establish a clear link between product market reform indicators and youth unemployment. This is, in part, due to the difficulty of finding appropriate measures of these reforms, and the fairly limited scope of the available data.²¹ The analysis was based on the "Market Efficiency: Competition" sub-indicator compiled from the Global Competitiveness Report (Figure 20) and the cost of starting a business from the World Bank Doing Business Indicators. These tentative results should therefore not be construed as evidence against the importance of product market reforms but rather a reflection of poor cross-country data availability and the need for more careful country-by-country research. IMF research has shown that product market reforms, in combination with other measures, can increase growth rates in the euro area, and thereby indirectly affect unemployment rates (IMF, 2014c).

Figure 20. Market Efficiency Competition of Goods (Rating)



Source: World Economic Forum, *Global Competitiveness Report*.

Labor Market Factors and the Business Cycle

Interactions with the business cycle. Overall, the analysis suggests that labor market factors affect the sensitivity of youth unemployment levels to the business cycle in Greece, Ireland, Italy and Spain. For example, an increase in the tax wedge is associated with an increase in the degree to which youth unemployment rates in Greece and Spain respond to cyclical changes. Similarly, higher spending on ALMPs seems to relate to a lower sensitivity of youth unemployment in Ireland, Italy and Spain to cyclical changes.

²⁰ Our analysis finds that a one percentage point increase in union density is associated with lower youth unemployment rates by 0.2–0.6 percentage points, but these results are not robust and tend to dissipate when other factors are taken into account. Our analysis also does not test for the non-linear relationship to collective bargaining because of data limitations.

²¹ For example, the OECD's Product Market Reform indicator is only available at five year intervals.

WHAT IS THE SOLUTION TO YOUTH UNEMPLOYMENT IN EUROPE?

Where does this leave us? This analysis has attempted to determine the factors driving high youth unemployment in advanced European countries. It looked at both the “flow” problem (large increases in unemployment during the crisis) and the “stock” problem (persistently high youth unemployment levels). The paper finds that economic activity plays an important role in explaining *both* the high levels of youth unemployment as well as the sharp increases in these rates since the beginning of the crisis. The role of growth is particularly significant for vulnerable euro area countries, and is much larger for youth than adults. Labor market factors seem to play an important role in explaining the high *levels* of youth unemployment across countries, but do not appear to be as relevant in driving the changes in unemployment. For the most part, measures that alleviate youth unemployment also reduce adult unemployment, although to different degrees.

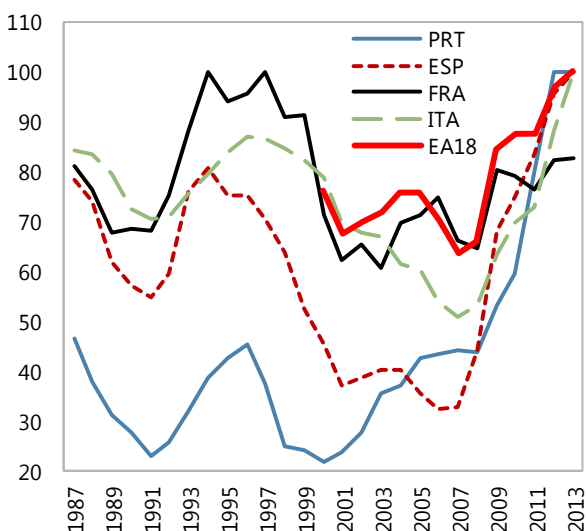
No silver bullet. The youth unemployment problem in the euro area is multi-faceted and varies across countries. Substantial cross-country differences in the composition and dynamics of youth unemployment suggest that no single policy at the EU or national level is likely to solve the problem. The solution would need to target the country-specific factors affecting youth unemployment. Experience from other countries indicates that there is no one-size-fits-all approach to tackling youth unemployment (ILO, 2013).²²

Strong sustainable growth is critical. A comprehensive strategy to tackle youth unemployment in the euro area must focus on creating conditions for sustainable growth, given the high sensitivity of youth unemployment (and, for that matter, adult unemployment) to output changes. Public policies should focus on supporting domestic demand until the threat of persistently low inflation has subsided and a strong recovery has taken hold. Policies to support aggregate demand and restore credit flows would be particularly important.

Past is prologue. The role of strong growth in mitigating high youth unemployment levels is not unprecedented in the euro area. Some euro area countries have experienced extremely high youth unemployment rates in the past. In fact, the 2013 youth unemployment rates are close to, and even *below* historical peaks for France, Italy and Spain (Figure 21). Historically, euro area countries have reduced youth unemployment rates significantly by growing much more strongly than they are expected to grow in the future. Therefore, the small output growth rates currently projected will not be enough to sustainably lower the youth unemployment rate. For instance, for Italy, a total reduction of unemployment rate by 7 percentage points during 1996–2001 was accompanied by average growth of almost 2 percent, but Italy is projected to grow by only 0.9 during 2014–19 (Figure 22). In some cases, growth rates would have to be double or even triple the current forecasts (see Spain and Portugal in Figure 22).

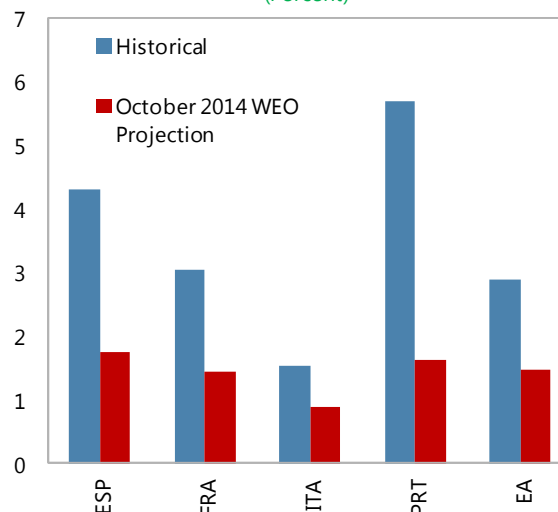
²² Schindler and others (2014) provides a broader discussion of how to boost growth and create jobs in Europe, noting that sustained growth requires not only macro support, but also further steps to deal with high debt levels and implement structural reforms.

Figure 21. Youth Unemployment Rate
(Peak = 100)



Sources: Eurostat; IMF, World Economic Outlook; and IMF staff estimates.

Figure 22. Average Growth during Unemployment Reduction and Current Projections
(Percent)



Sources: Eurostat; IMF, October 2014 World Economic Outlook; and IMF staff estimates.

Labor market reforms can pay dividends. Growth alone cannot solve the youth unemployment problem. As the economic recovery solidifies and unemployment rates return closer to their historical averages, labor market institutions may play an increasingly large role in labor market dynamics. Reforms could include: lowering labor costs by reducing the tax wedge and reconsidering minimum wage policies (which largely affect youth) to increase labor demand; reforming unemployment benefits to better incentivize the transition from inactivity to work; improving skill levels and work-related training; decreasing labor market duality; and, implementing effective ALMPs.²³ Hypothetically, reducing the tax wedge in France and Italy to average European levels could be associated with lower youth unemployment rates in these countries by some 4-9 percentage points. Similarly, reducing gross benefit replacement rates to the European average in France, Italy, Portugal, and Spain could potentially be correlated with lower youth unemployment rates by another 1-6 percentage points, depending on the country.

Cut minimum wages? While some countries with relatively high youth unemployment rates also have above-average ratios of minimum to median wages, a specific policy prescription would require a careful analysis of country-specific circumstances. This is because labor costs are just one of many labor market features that affect incentives, and therefore labor market outcomes. That said, minimum wages relative to the median wage affect the relative cost of hiring those who are paid the minimum wage, a group that typically include a large number of young workers. Thus, the focus should not be on cutting minimum wages or targeting a specific minimum wage, but on

²³ Some studies suggest that, as far as good labor market outcomes are concerned, the common denominator between successful countries is trust, and that trusting partners in reform can make widely different combinations of institutions work well (Blanchard, Jaumotte, and Loungani, 2013; Blanchard and Philippon, 2006; Algan and Cahuc, 2009). These results could conceivably also apply to youth unemployment, even though the studies do not specifically address this issue.

ensuring that minimum wages are well aligned with median wages so that labor costs for low-skilled employees are not excessive relative to other workers in the labor force. If labor costs in the wider economy are adjusted significantly downward, keeping minimum wages unchanged would make it relatively expensive to hire young workers who are paid these wages. The burden of adjustment then falls disproportionately on youth. In countries where minimum wage policies reflect a strong consensus among social partners, there may be other avenues for labor market reform, such as reducing the tax wedge and improving training.

Reducing duality. Lower levels of labor market duality—achieved by reducing the gap between the protection of temporary workers and that of regular workers—could help address high youth unemployment rates. Illustratively, reducing the share of youth on temporary contracts in Spain, Portugal and Italy to the European average could be associated with lower youth unemployment by 3–11 percentage points, all else being held constant. Considering that the large-scale destruction of jobs has already taken place, the IMF has recommended easing employment protection on existing and new regular contracts at this point. This could help stimulate hiring on more stable contracts as the recovery takes hold (Blanchard, Jaumotte, and Loungani, 2013).

Vocational training. More access to effective vocational training could help. Germany's dual vocational training system is a successful example of integrating school and work-based learning to facilitate a smooth transition from school to full-time employment (Box 2). However, it may be difficult to replicate the German system in other countries, given that the success of the system has been influenced by social, cultural and economic conditions and institutional structures in Germany (Euler, 2013).

ALMPs are not a panacea by themselves. Higher ALMP spending is associated with lower youth unemployment rates. For example, hypothetically speaking, increasing ALMP spending per unemployed person in Italy, Portugal and Spain to average European levels may be associated with lower youth unemployment rates by 1–5 percentage points, all else being held constant. However, it is crucial that ALMP programs be well targeted and appropriately monitored (Box 1). Moreover, given the estimated effects on youth unemployment, the amounts of ALMP spending required to make a sizeable dent in historically high youth unemployment rates would be too large to be feasible. Thus, ALMP spending will need to be complemented with growth and other labor market reforms to yield the maximum effect. ALMPs may be more effective if they are part of a broader strategy to address structural impediments to greater youth employment. For example, higher tax wedges reduce the effectiveness of ALMP spending in Austria and Germany.

Supra-national policies. Policies at the EU level can also help (Annex 1). For example, effective ALMPs, especially for training, can also be financed at the regional level, provided the regionally funded programs are properly designed and monitored with due regard to country-specific impediments, and, ideally, complemented by other measures at the national level. Measures that foster labor mobility, including European Employment Services (EURES) and the implementation of the 2006 Services Directive, could alleviate the detrimental effects of persistent unemployment on the regions' economic potential by reducing the length of unemployment spells and, thereby, halting the attrition of skills. In addition, regional governance frameworks, such as country-specific structural policy recommendations under the European Semester, can also help if they incentivize countries to adopt labor market reforms.

Annex 1. European Union Measures for Dealing with Youth Unemployment

The European Union's Youth Guarantee Scheme includes a number of active labor market policies. Policies that can be supported by the EU include, for example, those that provide opportunities for low-skilled young people to train, address skill mismatches via work-based learning and apprenticeships or training vouchers, provide wage and recruitment subsidies to encourage employers to give young people an apprenticeship or job placement, and support for small and medium enterprises (SMEs) and start-ups.

Over 60 billion euros (approximately 0.6 percent of euro area GDP) is to be spent over the next budget period. The Youth Guarantee Scheme is supported by the European Social Fund. The Fund is scheduled to provide more than €10 billion every year during 2014–20 to address youth unemployment. In addition, a dedicated Youth Employment Initiative (YEI) concentrates on regions experiencing youth unemployment rates above 25 percent and on young people not in employment, education or training (NEETs). These funds are front-loaded to be available over 2014–15. France, Italy, Poland, Portugal, and the United Kingdom are the major recipients of YEI funding (European Commission, 2014).

The EU's policy efforts have also focused on improving traineeships and apprenticeships. The European Commission has launched two specific initiatives: the Quality Framework for Traineeships which enables beneficiaries to acquire high-quality work experience under safe and fair conditions; and the European Alliance for Apprenticeships, which brings together public authorities, businesses, social partners, vocational education and training providers, youth representatives, and other key actors in order to improve the quality and supply of apprenticeships across the European Union.

The EU has also intensified efforts to improve labor mobility. For example, the European Employment Services (EURES)—the pan-European job search network that provides access to nearly 2 million job vacancies—is being modernized. A pilot project is underway to test the effectiveness of tailor-made services combined with financial support to help young people aged 18–30 find a job in other Member States (minimum six months contract in accordance with national labor law). The scheme provides information, a job search function, recruitment and job placement support. In addition, it finances training needs and travel expenses for young job applicants (for job interviews and job settlement in other EU countries) and provides additional incentives in the case of recruitment by an SME. Since 2013, the scheme has been extended to traineeship and apprenticeship placements.

Annex 2. Estimation Techniques¹

A. The Okun's Coefficient

The Okun's coefficient, b_i , was estimated using the following specifications:

$$\Delta u_{i,t} = \beta_0 + \sum_{i=2}^{22} \beta_{1,i} c_i + \sum_{i=1}^{22} \beta_{2,i} c_i \Delta y_{i,t} + \varepsilon_{it}, \quad (1)$$

$$u_{i,t} - u_{i,t}^* = \beta_0 + \sum_{i=2}^{22} \beta_{1,i} c_i + \sum_{i=1}^{22} \beta_{2,i} c_i (y_{i,t} - y_{i,t}^*) + \varepsilon_{it}, \quad (1a)$$

where $\Delta u_{i,t}$ is the change in youth or adult unemployment rates in country i , year t , c_i is the dummy variable for country i (note the omission of the dummy variable for country 1 to avoid perfect collinearity), $\Delta y_{i,t}$ is output growth and ε_{it} is the error term with standard assumptions. In the alternative specification, we use the output gap ($y_{i,t} - y_{i,t}^*$) and deviation from natural rates of unemployment $u_{i,t} - u_{i,t}^*$, respectively, as independent and dependent variables. Results are shown in Table A1.

B. Impact of Labor Market Institutions

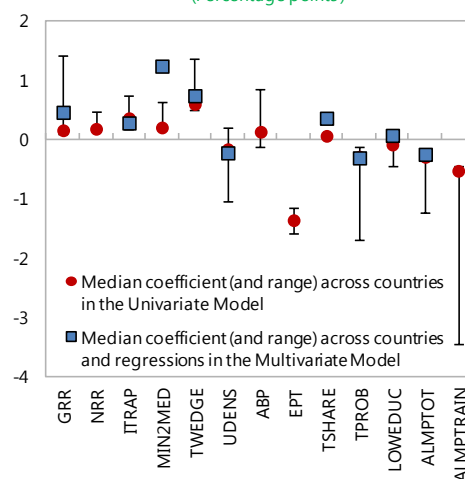
The estimates referred to in the text (blue dots in Figure A1; see also Table A2) are based on a specification that includes *several* labor market features at a time ("multivariate model") and assumes that the impact of labor market factors, if any, is common across all countries. It allows the impact of the business cycle (output gap) to vary across countries.

$$u_{i,t} = \beta_0 + \beta_{1,i} c_i + \sum_j \gamma_j x_{i,j,t} + \sum_{i=1}^{22} \beta_{2,i} c_i (y_{i,t} - y_{i,t}^*) + \varepsilon_{it}, \quad (2)$$

where $u_{i,t}$ is the youth or adult unemployment rate in country i at time t , c_i is the dummy variable equal to 1 if the dependent variable is from country i ; ($y_{i,t} - y_{i,t}^*$) is the output gap, and $x_{i,j,t}$ represents labor market institution j , in country i , year t . A variety of additional specifications were considered, e.g., with levels of total unemployment rates as well as unemployment ratios, and employment rates for different age groups as dependent variables.

In addition, the analysis included a "univariate model" with interaction terms (red dots in Figure A1) between the business cycle and *one* labor market factor in each regression. This model assumes that (i) the effects of the business cycle may depend on labor market features, (ii) this dependence may be different across countries and (iii) the effect of the labor market factor itself does not depend on the country, except indirectly via the business cycle.

Figure A1. Marginal Effects of Labor Market Factors on Youth Unemployment Rates (Percentage points)



Note: Abbreviations: GRR, NRR (gross and net replacement rates), ITRAP (inactivity trap), MIN2MED (minimum to median wage ratio), TWEDGE (tax wedge), UDENSITY (union density), ABP (adjusted bargaining coverage), TSHARE (share of temporary workers), TPROB (share of temporary workers in probationary period), LOWEDUC (share of individuals with low education), ALMPTOT (total ALMP expenditure per unemployed), ALMPTRAIN (ALMP spending on training, per unemployed). Results of EPT (employment protection of temporary workers) excluded for presentational clarity. Sources: Eurostat; and IMF staff estimates.

¹ See Banerji, Lin, and Saksonovs (2014) for more details.

Table A1. Okun's Law Estimates

	Specification with Output Growth		Specification with Output Gap	
	Youth	Adult	Youth	Adult
	Okun's Coefficients ($\beta_{2,i}$)		Okun's Coefficients ($\beta_{2,i}$)	
Austria	-0.21 (0.26)	-0.09* (0.05)	-0.23*** (0.07)	-0.09** (0.04)
Belgium	-0.90*** (0.27)	-0.25*** (0.07)	-0.93*** (0.21)	-0.27*** (0.09)
Cyprus	-0.93*** (0.27)	-0.45*** (0.12)	-1.12*** (0.37)	-0.42** (0.20)
Estonia	-0.78*** (0.09)	-0.33*** (0.07)	-0.92*** (0.12)	-0.42*** (0.06)
Finland	-0.67*** (0.12)	-0.16*** (0.03)	-0.96*** (0.18)	-0.17*** (0.03)
France	-0.91*** (0.27)	-0.21*** (0.06)	-0.92*** (0.18)	-0.22*** (0.06)
Germany	-0.30 (0.20)	-0.17** (0.08)	-0.15 (0.10)	-0.13** (0.05)
Greece	-0.81*** (0.12)	-0.36*** (0.09)	-0.79*** (0.14)	-0.35*** (0.07)
Ireland	-0.64*** (0.10)	-0.30*** (0.06)	-0.94*** (0.08)	-0.40*** (0.04)
Italy	-0.55*** (0.20)	-0.12* (0.06)	-0.56* (0.31)	-0.13 (0.09)
Latvia	-0.76*** (0.08)	-0.33*** (0.04)	-1.06*** (0.07)	-0.48*** (0.05)
Luxembourg	-0.19 (0.12)	-0.05** (0.02)	-0.11 (0.07)	-0.03 (0.02)
Malta	-0.85*** (0.32)	0.01 (0.09)	-0.88*** (0.15)	-0.00 (0.05)
Netherlands	-0.46** (0.22)	-0.22*** (0.04)	-0.41*** (0.11)	-0.19*** (0.07)
Portugal	-0.82*** (0.14)	-0.28*** (0.04)	-0.85*** (0.13)	-0.32*** (0.05)
Slovakia Republic	-1.05*** (0.15)	-0.36*** (0.09)	-1.77*** (0.66)	-0.52** (0.25)
Slovenia	-0.58*** (0.15)	-0.14*** (0.02)	-0.40*** (0.11)	-0.19*** (0.05)
Spain	-1.89*** (0.18)	-0.78*** (0.08)	-2.17*** (0.19)	-0.92*** (0.12)
Denmark	-0.74*** (0.19)	-0.36*** (0.06)	-0.78*** (0.09)	-0.44*** (0.06)
Norway	-0.32 (0.23)	-0.14*** (0.04)	-0.86*** (0.11)	-0.32*** (0.05)
Sweden	-0.87*** (0.18)	-0.18** (0.07)	-0.88*** (0.24)	-0.08 (0.07)
United Kingdom	-0.53*** (0.18)	-0.21*** (0.04)	-0.70*** (0.13)	-0.30*** (0.05)
Total observations	554	493	565	509
Adjusted R-squared	0.51	0.58	0.53	0.57

Sources: Eurostat; and IMF staff estimates.

Table A2. Multivariate Model Estimates

	Youth Unemployment Rate (Level)					
Gross replacement rate	0.48*** (0.12)	0.46*** (0.09)			0.39*** (0.09)	
Inactivity Trap			0.31 (0.20)	-0.24 (0.20)		0.28 (0.23)
Minimum wage / Median wage			1.24*** (0.25)	0.40 (0.28)		1.34*** (0.28)
Tax wedge	1.27*** (0.29)	0.71** (0.28)	0.33 (0.39)	0.77* (0.39)	1.04*** (0.24)	0.06 (0.36)
Union density	-0.62*** (0.16)	-0.41*** (0.11)	-0.15 (0.14)	-0.21 (0.13)	-0.24* (0.13)	-0.20 (0.15)
Protection of temporary workers	-2.50* (1.31)		-3.49*** (1.22)		-5.20*** (1.17)	
Share of temporary workers		0.36*** (0.07)		0.44*** (0.09)		0.17* (0.10)
Weekly hours per worker (full-time)	1.22** (0.47)	1.18** (0.48)	0.97 (0.60)	0.70 (0.54)	1.13** (0.45)	0.81 (0.58)
Share of temporary workers due to probationary period			-0.31** (0.14)		-0.41*** (0.09)	-0.25* (0.14)
Share of low-educated workers	0.01 (0.10)	0.08 (0.08)		0.07 (0.08)		
ALMP total spending per unemployed	-0.36*** (0.06)	-0.32*** (0.04)	-0.21*** (0.07)	-0.23*** (0.07)	-0.27*** (0.06)	-0.21*** (0.07)
Country-specific output gap coefficient	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	144	151	104	160	99	106
Adjusted R-squared	0.93	0.94	0.96	0.93	0.96	0.96

Sources: European Commission; Eurostat; OECD; and IMF staff estimates.

References

- Algan, Y., and P. Cahuc. 2009. "Civic Virtue and Labor Market Institutions." *American Economic Journal: Macroeconomics* 1 (1): 111–45.
- Ball, L., D. Leigh, and P. Loungani. 2013. "Okun's Law: Fit at Fifty?" NBER Working Paper 18668. Cambridge, Massachusetts: National Bureau of Economic Research.
- Banerji, A., H. Lin, and S. Saksonovs. 2014. "Youth Unemployment in Europe: Okun's Law and Beyond." IMF Working Paper, Washington DC.
- Bernal-Verdugo, L. E., D. Furceri, and D. Guillaume. 2012. "Labor Market Flexibility and Unemployment: New Empirical Evidence of Static and Dynamic Effects." *Comparative Economic Studies* 54: 251–73.
- Bertola, G., F.D. Blau, and L. M. Kahn. 2007. "Labor Market Institutions and Demographic Employment Patterns." *Journal of Population Economics*, 20 (4): 833–67.
- Blanchard, O., and T. Philippon. 2006. "The Quality of Labor Relations and Unemployment." Stern School of Business, NYU Working Paper No. FIN-06-038. New York: New York University. <http://ssrn.com/abstract=1293660>.
- _____, M. Griffiths, M., and B. Gruss. 2013a. "Boom, Bust, Recovery: Forensics of the Latvia Crisis." *Brookings Papers on Economic Activity* (Fall).
- _____, F. Jaumotte, and P. Loungani. 2013b. "Labor Market Policies and IMF Advice in Advanced Economies During the Great Recession." *IMF Staff Discussion Note, 13/02*. International Monetary Fund, Washington DC.
- Calmfors, L. 1994. "Active Labour Market Policies and Unemployment: A Framework for the Analysis of Crucial Design Features." *OECD Economic Studies* 22. Paris: Organization for Economic Cooperation and Development.
- _____, and J. Driffill. 1988. "Bargaining Structure, Corporatism and Macroeconomic Performance." *Economic Policy* 3 (6): 13–61.
- Card, D., J. Kluve, and A. Weber. 2010. "Active Labor Market Policy Evaluations: A Meta-Analysis." *The Economic Journal* 120 (548):F452–F477.
- Choudhry, M., E. Marelli, and M. Signorelli. 2012. "Youth and Total Unemployment Rate: The Impact of Policies and Institutions." Available at http://www.eco.unibs.it/~emarelli/CMS_unemp_instit.pdf.
- Espinoza, R., and E. Pérez Ruiz. 2014. "Labor Tax Cuts and Employment: A General Equilibrium Approach for France." Working Paper 14/114, International Monetary Fund, Washington DC.

- Euler, D. 2013. "Germany's Dual Vocational: A Model for Other Countries?" Bertelsmann Stiftung Foundation.
- Eurofound. 2011. "Young People and NEETs in Europe: First Findings."
- _____. 2012. "Youth Guarantee: Experiences from Finland and Sweden."
- European Commission. 2012a. "Moving Youth into Employment." Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 727.
- _____. 2012b, Commission Staff Working Document Accompanying the Document Proposal for a Council Recommendation on Establishing a Youth Guarantee, SWD(2012) 409.
- _____. 2013a. "Working Together for Europe's Young People: A Call to Action on Youth Unemployment." Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 447.
- _____. 2013b. "Labor Market Developments in Europe 2013." *European Economy* 6/2013.
- _____. 2014. "EU Measures to Tackle Youth Unemployment." Memo 14/466.
- Giuliano, P., and A. Spilimbergo. 2009. "Growing up in A Recession: Beliefs and the Macroeconomy." NBER Working Paper 15321. Cambridge, Massachusetts: National Bureau of Economic Research.
- Grubb, W.N. 1999. "Lessons from Education and Training for Youth: Five Precepts in Preparing youth for the 21st Century: The Transition from Education to the Labor Market. Paris: Organization for Economic Cooperation and Development.
- Hazans, M. 2011. "The Changing Face of Latvian Emigration." In *Latvia—Human Development Report 2010/2011: National Identity, Mobility and Capability*, ed. by Brigita Zepa and Evija Kllja. Riga: Advanced Social and Political Research Institute of the University of Latvia.
- International Labor Organization (ILO). 2010. "Global Employment Trends for Youth." Available at: http://www.ilo.org/empelm/pubs/WCMS_143349/lang--en/index.htm.
- _____. 2012. "Eurozone Jobs Crisis: Trends and Policy Responses." Geneva, Switzerland.
- _____. 2013. "Global Employment Trends for Youth: A Generation at Risk." Available: http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_212423.pdf.
- International Monetary Fund (IMF). 2014a. "Youth Unemployment in Europe: Okun's Law and Beyond." IMF Country Report No. 14/199. International Monetary Fund, Washington DC.

- _____. 2014b. "The Swedish Labor Market—Responding to Global Challenges." IMF Country Report No. 14/262. International Monetary Fund, Washington DC.
- _____. 2014c. "External Rebalancing in the Euro Area: Developments and Policies." IMF Country Report No. 14/199. International Monetary Fund, Washington DC.
- Kluge, J. 2010. "The Effectiveness of European Active Labor Market Programs." *Labour Economics*, 17(6): 904–18, December.
- Lutz, H., and H. Mahringer. 2007. "Does Labour Market Promotion Work in Austria? Main Evaluation Findings on Active Labour Market Policy Programmes in Austria." WIFO Monatsberichte 80B (3): 99-218.
- Martin, J. 2000. "What Works Among Active Labour Market Policies: Evidence from OECD Countries' Experiences." In *Policies Towards Full Employment*: 191–219. Paris: Organization for Economic Cooperation and Development.
- _____, and D. Grubb. 2001. "What Works and for Whom: A Review of OECD Countries' Experiences with Active Labour Market Policies." *Swedish Economic Policy Review* 8: 9–56.
- Nickel, S., and R. Layard. 1999. "Labor Market Institutions and Economic Performance." *Handbook of Labor Economics* Vol. 3C, ed. by O. Ashenfelter and D. Card. Amsterdam: Elsevier.
- Nicoletti, G., and S. Scarpetta. 2001. "Interactions Between Product and Labour Market Regulations: Do They Affect Employment? Evidence from OECD Countries." Banco de Portugal Conference on "Labour Market Institutions and Economic Outcomes." Available at: <https://www.bportugal.pt/en-US/EstudosEconomicos/Conferencias/Documents/2001LabourMarket/Stefano.pdf>.
- Organization for Economic Cooperation and Development (OECD). 2006. "Boosting Jobs and Growth." *OECD Employment Outlook*. Paris: Organization for Economic Cooperation and Development.
- _____. 2009. "Education at a Glance." Paris: Organization for Economic Cooperation and Development.
- _____. 2010a. "Off to a Good Start? Jobs for Youth." Paris: Organization for Economic Cooperation and Development.
- _____. 2010b. "Learning for Jobs: OECD Reviews of Vocational Education and Training—Germany." Paris: Organization for Economic Cooperation and Development.
- _____. 2010c. "Economic Surveys: Germany." Paris: Organization for Economic Cooperation and Development.
- _____. 2011. "Economic Surveys: Germany." Paris: Organization for Economic Cooperation and Development.

- _____. 2012. "Under Shock: How to Spread Macroeconomic Risks More Fairly." *Going for Growth*. Paris: Organization for Economic Cooperation and Development.
- _____. 2013. "Education at a Glance 2013." Paris: Organization for Economic Cooperation and Development. Available at <http://dx.doi.org/10.1787/eag-2013-en>.
- _____. 2014. "Skills Beyond School." Paris: Organization for Economic Cooperation and Development. Available at <http://www.oecd.org/edu/skills-beyond-school/oecdpolicyreviewsofvocationaleducationandtrainingvet.htm>
- Reisenbichler, A., and K. J. Morgan. 2012. "From Sick Man to Miracle: Explaining the Robustness of the German Labor Market During and After the Financial Crisis 2008–09." *Politics & Society* 40: 549. Available at <http://DOI: 10.1177/0032329212461616>.
- Scarpetta S. 1996. "Assessing the Role of Labour Market Policies and Institutional Settings on Unemployment: A Cross-Country Study." *OECD Economic Studies* No. 26. Paris: Organization for Economic Cooperation and Development.
- _____, A. Sonnet, and T. Manfredi. 2010. "Rising Youth Unemployment During The Crisis: How to Prevent Negative Long-term Consequences on a Generation?" OECD Social, Employment and Migration Working Paper No. 106. Paris: Organization for Economic Cooperation and Development. Available at <http://doi:10.1787/5kmh79zb2mmv-en>.
- Schindler, M., H. Berger, B. Bakker, and A. Spilimbergo. 2014. "Jobs and Growth: Supporting the European Recovery." International Monetary Fund, Washington DC. Available at <http://www.imf.org/external/np/seminars/eng/2014/EURbook/#1>.
- Traxler F. 2003. "Bargaining (De) centralization, Macroeconomic Performance and Control over the Employment Relationship." *British Journal of Industrial Relations* 41 (1): 1–27.