

A FISCAL JOB? AN ANALYSIS OF FISCAL POLICY AND THE LABOR MARKET

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This paper examines the impact of fiscal policy on labor market outcomes, including at times of recessions and recoveries. Using a panel of 34 OECD countries over the last three decades (1975-2012), we find that unemployment gaps widen during recessions, while they do not change significantly at times of recoveries, suggesting that recoveries may be on aggregate neither jobless nor jobful. Fiscal policy can help close unemployment gaps, through discretionary current spending, especially spending on goods and services and on public sector wages. We also find that lower statutory tax rates reduce unemployment in the short term, and that the impact on employment of social contributions is higher than that one of consumption taxes (VAT). Consistently with the relevant literature, unemployment benefits and early retirement benefits have a positive impact on unemployment (also when a one-year lag is considered), while evidence on active labor market policies is mixed. Finally, we find that the impact of fiscal variables on the labor market does not change substantially during recessions and recoveries.

1 Introduction

The global financial crisis has exacerbated conditions in the labor market of many advanced economies, most of which were already marked by high structural unemployment at the onset of the crisis. According to recent statistics, unemployment currently amounts to 7.6 per cent in the OECD, corresponding to about 46 million unemployed, 11 millions more than in July 2008 (OECD, January 2014). The years of the crisis have been crucial in terms of policy making, as they triggered a series of old and new policy responses aimed at containing job losses, through incentives to the labor demand and supply (IMF, 2012).

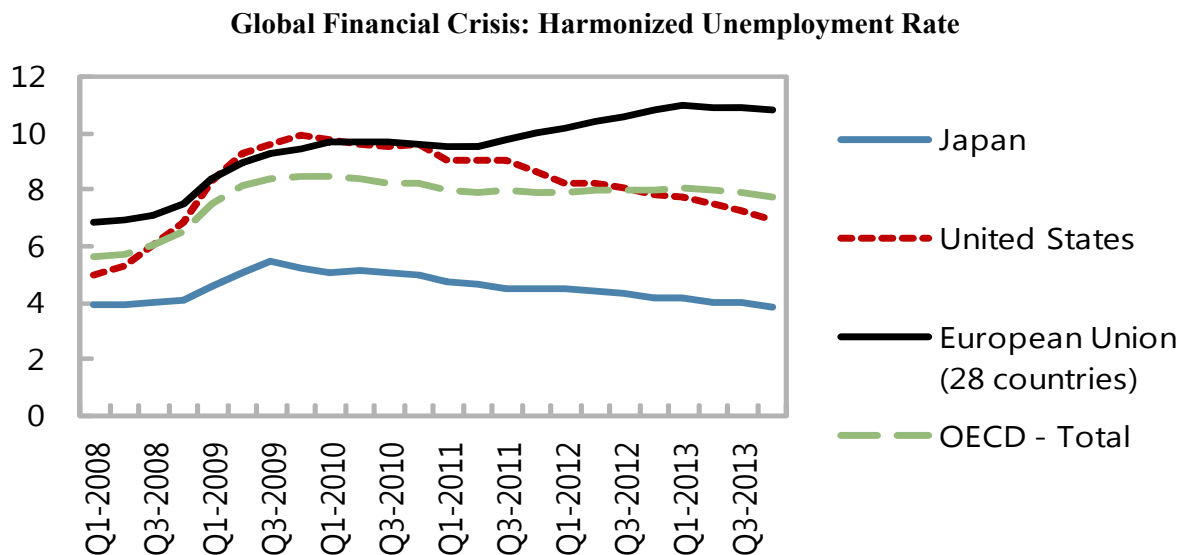
While the literature provides a comprehensive review of fiscal policy's role for growth during the global financial crisis, studies on how specific tax or expenditure measures sustain jobs in this context are limited. This paper provides an analysis of the channels through which fiscal policy can impact the short-term dynamics of the labor market by addressing three main questions. First, we empirically investigate how specific fiscal instruments can prop up jobs in the short term, looking at changes in the unemployment and employment gaps. Second, we analyze whether the impact of these instruments is different along output deviations from its long-term trend. Third, we check the effectiveness of these instruments at times of recessions and recoveries.

We examine the effectiveness of fiscal instruments using a panel of 34 OECD countries for the period 1975-2012. To address these questions, we consider the short-run dimension of the labor market, where movements in both labor demand and supply are affected by deviations of output from its long-run trend, as predicated by the so-called Okun's law (Okun, 1962). Hence, the focus of the paper is to assess how fiscal policy impacts on (un)employment gaps through labor demand and labor supply, where (un)employment gaps are defined as (un)employment's deviations from its long run trend. By looking at both unemployment and employment gaps, we also capture differences in the labor force participation.

We find a stable relationship between (un)employment gaps and output gaps across different specifications, providing further evidence of the validity of the Okun's law, as largely documented in the literature. Recessions cause a widening of unemployment gaps during a time horizon of up to

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Figure 1



Source: OECD.

two years, while the impact of recoveries is not stable. Fiscal policy can help close unemployment gaps, through discretionary current spending, especially spending on goods and services and on public sector wages. We also find that cutting statutory tax rates reduces unemployment gaps in the short term. In particular, the positive impact of cutting social contributions on employment is higher than the one of consumption taxes (VAT), suggesting that fiscal devaluations, conducted through a reduction in social contributions and an increase in consumption taxes, can have a positive impact on employment. Consistent with the relevant literature, unemployment benefits and early retirement benefits worsen unemployment, while evidence on active labor market policies is mixed. Finally, we find that the impact of discretionary spending on the labor market does not change during recessions and recoveries, while the impact of the personal income and consumption tax rates during recessions is different from that one at normal times.

The remainder of the paper is structured as follows. Section 2 provides a review of the theoretical and empirical literature; Section 3 presents the empirical analysis, with a focus on the model, data and the results of the estimation; Section 4 concludes.

2 A review of the literature

In the classical labor market model, the labor demand identifies the number of workers (or working hours) firms are willing to hire at any given rate of the real wage. The hiring decision depends on a firm's profit maximization function and is, thus, determined by the level of real wages and the marginal productivity of labor *vis-à-vis* the capital stock and the level of technology. The labor supply identifies, instead, the number of workers willing to supply labor at each level of the real wage by maximizing workers' utility derived from leisure activities and the consumption of goods and services.

Overall changes in output directly affect labor demand, thereby lowering unemployment. In assessing the impact of fiscal policy on the labor market most studies do, in fact, focus on the

growth channel, and examine how fiscal policy affects aggregate demand and through this the labor market.¹ Yet, fiscal policy can shape the efficiency of labor markets through more direct channels with an impact both in the short and medium terms. In the short term, these policies could stimulate job creation by boosting labor demand, improving the matching of workers with existing job vacancies, and create incentives to work.

On the expenditure side, **spending on goods and services and capital spending** directly affects aggregate demand and through this labor demand. The impact of **the wage bill** is instead more direct, as the public sector is usually the largest single employer in the country. Studies for the United States (Fatás and Mihov, 2001; Burnside *et al.*, 2004; Galí *et al.*, 2007; Cavallo, 2005) find positive effects on employment following a government spending shock. In particular, Monacelli *et al.* (2010) provide an empirical estimate of the unemployment multipliers of government spending in US data, focusing in more detail on the transmission of fiscal policy to the labor market. They show that an increase in government spending boosts total hours, employment and the job finding probability. In a real business cycle model with competitive labor markets and lump-sum taxation, Finn (1998) suggests that an increase in government employment can lead to lower private sector employment (if the wealth effect is small) and higher real wages, as well as lower private sector hours, output and investment. However, Lane and Perotti (2003) and Alesina *et al.* (2002) find evidence of the opposite impact. They show that an increase in government purchases and the wage bill leads to higher wages in the private sector, lower firm profits and ultimately lower employment and business investment in current and future periods. As a result, output, income and private consumption expenditure contract.²

It is usually acknowledged that **social benefits** weaken the link between labor supply and incomes. In general, as they make labor more costly, they tend to reduce the labor demand. Social assistance can reduce work incentives, especially if benefits are withdrawn as earnings rise.³ **Pension benefits** (usually the largest share of social benefits) tend to affect pension decisions and when they increase they would reduce the labor force, and employment. There is a consensus on the fact that **unemployment benefits** have a significant positive impact on unemployment (Duval and Bassanini, 2006; Scarpetta, 1996; Nickell, 1998; Nunziata, 2002). Duval and Bassanini estimate that a 10 per cent increase in unemployment benefits would increase unemployment by 1.2 percentage points. Krueger and Meyer (2002) conclude that a 10 per cent increase in unemployment benefits raises the average duration of unemployment by around 5 per cent – although this impact is likely to be much higher in countries with relatively weak eligibility conditions. Empirical evidence also suggests that strengthening the link between contributions and benefits improves labor market outcomes (Disney, 2004).

On the revenue side, the literature agrees that **labor taxes** (personal income tax and social security contributions) negatively affect employment by impacting both on the labor supply and demand. Higher taxes reduce after-tax wages for workers which supply less work as the incentive to opt for leisure as opposed to work is now higher (if the substitution effect prevails). Higher taxes on labor reduce labor demand as they can drive up labor costs. Whether the burden of the tax is borne more by the workers or the firms depends ultimately on the elasticities of labor supply and

¹ The empirical literature shows that different combinations of spending measures and taxes can have positive and negative effects on economic growth and, through this, on employment (Dao and Loungani, 2010; Vitek 2010; OECD, 2009; IMF, 2010; Darius *et al.*, 2010; Chen *et al.*, 2011).

² See also Pappa (2009), Cavallo (2005) and Ardagna (2007).

³ The mode of financing of social benefits also matters. Depending on workers' perceptions, financing social benefits through payroll contributions rather than taxes could help employment. From a worker's perspective, mandatory payroll deductions that have no or only weak links to the benefits they finance are likely to have the same adverse effect on labor supply as a tax on wages. However, where workers perceive a strong relationship between the amount and number of years of contributions to the pension system and pension benefits, the adverse impact on labor supply will be mitigated (IMF, 2012).

labor demand. Cahuc and Zylberberg (2004) find that the price elasticity of labor demand is close to about -1 , implying that a reduction of personal tax rates by three per cent would increase labor demand by about 2.5 per cent. On the other hand, the elasticity of labor supply to real wages is found to be between 0.2 and 0.5 per cent (IMF, 2012).

Given the negative elasticity of labor demand, adjustments in the rate of labor income taxes have a significant impact on the labor market. Similarly, the higher **the tax wedge**, *i.e.*, the difference between the cost of a worker to the firm and take home pay, the lower labor demand and labor supply, hence the higher unemployment. Bassanini and Duval (2006) focusing on OECD countries find that higher labor taxes (whether including consumption taxes or not) raise unemployment; in particular they estimated that a 10 percentage points higher labor tax wedge would raise structural unemployment by 2.8 percentage points. Likewise, **taxes on final consumption** (VAT, excises) have the impact of increasing the costs for consumption goods therefore they reduce real wages which, if the substitution effect prevails over the wealth effect, would lower the labor supply.

Corporate taxes can affect employment by reducing investment and production, and by reducing labor supply to the extent that firms pass on these taxes to employees in the form of lower wages.⁴ For instance, business tax relief can ease financing constraints for firms relying on retained earnings and boost investment. These effects are consistent with the finding that reductions in the cost of capital reduce unemployment (Phelps, 1994, Blanchard, 1997).

In addition, **compositional shift of taxes** from labor to consumption taxes could boost labor demand. For instance, reductions in employer social security contributions financed by higher consumption taxes (as in a fiscal devaluation case) can raise labor demand by lowering (non-wage) labor costs. The long-term employment effects of tax shifts depend on the extent to which the tax burden is shifted away from labor income and onto other incomes. Compared to the long-run equilibrium under full wage flexibility, the impact of a tax shift on employment is thus expected to gradually disappear across time.⁵

Active labor market policies (ALMP) consist of job placement services and labour market programs such as job-search, vocational training or hiring subsidies. These are supposed to have a positive impact on employment as they improve the matching of labor demand and supply and hence reduce labor demand frictions. The largest components of ALMPs are usually training and job searching/matching services. Empirical evidence has not found a robust impact of ALMPs on the labor market (IMF, 2012). However, when proper account is made for the long-term impact, intensive employment services, individual case management and mixed strategies with selective referrals to long-term programs are found to have a large impact negative impact on unemployment. A study by Card and others (2010) examines how participation in active labor market program (ALMP) affects labor market outcomes. Consistent with earlier summaries, their analysis suggests that subsidized public sector employment programs are relatively ineffective, whereas job search assistance and related programs have generally favorable impacts, especially in the short run. Classroom and on the job training programs are not particularly effective in the short run but have more positive impacts after two years. Orlandi (2012) finds that ALMPs have a negative and significant impact on unemployment. Estevão (2007) finds that ALMPs do increase

⁴ Reductions in the effective tax rate on corporate income have two opposing effects: substitution from labor to capital reduces labor demand higher investment raises output – including over the longer term – and therefore labor demand.

⁵ The adjustment, however, can take quite some time (De Mooij and Keen, 2012). Moreover, there may be more subtle effects that render the long-term effects of a tax shift positive on growth and employment. This is confirmed by model simulations (Auerbach and Kotlikoff, 1987) as well as empirical studies (Daveri and Tabellini, 2000; Arnold, 2008). For instance, consumption taxes have a broader base than social contributions, bearing on all incomes that support consumption, including income from economic rents and social transfers.

employment, especially in the form of direct subsidies for job creation; whereas expenditure in training programs seems to have been largely ineffective.⁶

There is no consensus in the literature on the concept of **jobless recoveries**. While there is clear evidence on the existence of lags between labor market recovery and economic recovery in the shorter term (IMF, 2010; Groshen and Potter, 2003; Aaronson *et al.*, 2004), a sustained deviation of the Okun's law in the longer term is not documented. Galí *et al.* (2012), for instance, argue that there are no jobless recoveries but simply delays in the response of unemployment in recovery periods. Most studies, however, acknowledge that the rebound employment following recessions has become less forceful in recent years. Jaimovich and Siu (2012) explain this phenomenon by job polarization (disappearance of occupations in the middle of the skill distribution) due to progress in technology which substitutes for labor in routine tasks. Also, as a consequence of recent reforms in various countries which rendered labor market institutions more flexible, the responsiveness of unemployment to output has increased during recessions and crises (IMF, 2010; Cazes *et al.*, 2013), generating higher unemployment or employment losses which need more time to recover.

3 Empirical analysis

3.1 The model

To assess the effectiveness of fiscal policy on the labor market, we rely on the short term relationship between (un)employment gaps and output gaps, better defined as the Okun's law:

$$U_t - U_t^* = \beta_o + \beta_1(Y_t - Y_t^*) \quad (1)$$

$$E_t - E_t^* = \alpha_o + \alpha_1(Y_t - Y_t^*) \quad (2)$$

The main prediction of the Okun's law is that short-term shifts in aggregate demand cause output to fluctuate around its long term trend. Output movements affect firms' decisions to hire and fire workers, causing employment to deviate from its long term trajectory and the unemployment rate to move in the opposite direction (Okun, 1962; Ball *et al.*, 2013).

Within the Okun's law we assess whether fiscal variables impact (un)employment gaps either directly or through their interaction with the output gap:

$$U_t - U_t^* = \beta_o + \beta_1(Y_t - Y_t^*) + \beta_2(X_t) + \beta_3(Y_t - Y_t^*)(X_t); \quad (3)$$

$$E_t - E_t^* = \alpha_o + \alpha_1(Y_t - Y_t^*) + \alpha_2(X_t) + \alpha_3(Y_t - Y_t^*)(X_t); \quad (4)$$

where:

- $Y_t - Y_t^*$ represents the output gap obtained from the current real output level minus its long term level; $U_t - U_t^*$ and $E_t - E_t^*$ are unemployment and employment gaps obtained as a deviation of their current levels from their long-term values. Y_t^* , U_t^* and E_t^* are all calculated using Hodrick-Prescott filtering.⁷
- X_t represents a vector of fiscal variables: i) total public expenditure, current primary expenditure, capital expenditure, spending on wages and salaries, on goods and services, on social benefits; ii) statutory tax rates of corporate and personal incomes taxes, value added tax and social security contributions; iii) the tax wedge; and, iv) active and passive labor market policies, including public employment services, training, job rotation and job sharing;

⁶ See also Tagkalakis (2013) for the impact of ALMPs on Greece.

⁷ In both cases we used 6.25 as a smoothing parameter; however, other parameters were considered and the results do not change significantly.

employment incentives; supported employment and rehabilitation; direct job creation and startup incentives, as well as unemployment benefits and early retirement.

- the coefficients β_3 and α_3 express the impact of fiscal policy on unemployment and employment gaps, respectively, conditional to changes in the output gap.

As high unemployment (or low employment) can trigger immediate fiscal policy responses, for instance via unemployment benefits and other automatic stabilizers, the model is sensitive to endogeneity. To solve for endogeneity in government expenditures, we follow Fatás and Mihov (2003, 2006), Afonso *et al.* (2010), and Agnello *et al.* (2013). Discretionary fiscal policy is calculated by extracting the automatic stabilizer component of public spending. To this end, we estimate a “fiscal rule” accounting for inflation, GDP, debt, and a time trend. The residual is then taken as the proxy of discretionary policy. Further, we include lags to solve for endogeneity in non-spending variables and use panel fixed effects to control for the simultaneous bias.

We control for differences in the flexibility of the labor market (employment protection legislation) and other institutional variables (minimum wage, union concentration and membership) but find that these estimates are not robust while the loss of observation was sizeable. This is consistent with some of the literature which finds estimates of the effects of labor institutions on employment to be not very conclusive (IMF, 2012). As follows, our baseline only controls for differences in the output gap, assuming that other country-specific differences would be accounted for by panel fixed effects.

Several studies show that the impact on output of fiscal variables can be different along the business cycle and at time of recessions or negative output gaps (Auerbach and Gorodnichenko, 2012; Baum *et al.*, 2012). Hence we examine how fiscal policy impacts unemployment and employment in periods of recessions and recoveries:

$$U_t - U_t^* = \beta_0 + \beta_1(Rec) + \beta_2(X_t) + \beta_3(X_t)(Rec) + \beta_4(X_t)(Recov) \quad (5)$$

$$E_t - E_t^* = \alpha_0 + \alpha_1(Rec) + \alpha_2(X_t) + \alpha_3 f(X_t)(Rec) + \alpha_4(X_t)(Recov) \quad (6)$$

- where *Rec* identifies a recession dummy which takes value one when real output growth is negative. In the sample of 34 OECD countries for 1975 to 2012 we find 173 recession years. *Recov* is a recovery dummy for the time span following a recession until real GDP is equal to or higher than real GDP of the year before the recession. Using this filter, we identify 132 recovery years, and most recoveries take place in only one year after the recession.

3.2 Data

The analysis is based on a panel of 34 OECD countries for the period 1975-2012. Data on unemployment and employment come from the OECD database. Data on real GDP and public spending items are from the IMF-WEO database. The tax wedge comes from the OECD and corresponds to the average tax wedge of one-earner married couple at 100 per cent of average earnings with 2 children. Spending on labor market policies are also from the OECD database. Statutory tax rates are from Iltzeski's (2011) database, which has observations for 15 countries for the period 1981-2008.⁸ We also introduce as control variable an index of strictness in the labor market regulations which comes from the World Economic Freedom dataset (WEF) but find it to be not significant in almost all specifications.

⁸ Available at <http://personal.lse.ac.uk/ilzetzki/index.htm/Data.htm>

Table 1

Testing the Okun's Law

	HP $\lambda=6.25$		HP $\lambda=100$	
	u-gap	e-gap	u-gap	e-gap
yokun	-0.339*** (0.0256)	0.235*** (0.0234)	-0.357*** (0.0317)	0.247*** (0.0219)
Observations	763	512	763	512
R^2	0.534	0.449	0.572	0.491
Number of countries	34	34	34	34

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Note: the regression has been done with country-fixed effect; an intercept has been included.

3.3 Estimation results

We find that the Okun's law is strongly and statistically significant throughout the different specifications of the model with a magnitude of around 0.3, similar to what has been found by the literature (Table 1). This can imply that a deviation from long term output of one per cent would lead to a deviation of unemployment from its natural rate (or long term trend) of about 0.3 per cent. The coefficient is slightly lower for employment gaps (with opposite sign) suggesting that short term changes in output do also affect labor force participation.

Compared to normal times, the contemporaneous unemployment gap widens by about 0.4 per cent during a recession, with a widening of almost 1.4 per cent on a cumulative basis for about three years; and the impact disappears after the third year.⁹ During recoveries, the contemporaneous unemployment gap widens by about 0.6 per cent, but this effect is not robust when including the outer years. Overall, unemployment losses occurred during recessions seem to not be made up during recoveries (Table 2). The impact on employment gaps is less clear, as recessions and recoveries cause a reduction in the gap during the first year but the impact on the outer years is not stable.

Discretionary spending has a strong negative (positive) effect on unemployment (employment) gaps with the impact being significant for current primary spending and insignificant for capital spending (Table 3). An increase of one per cent of GDP in discretionary current primary spending would reduce unemployment gap by 10 per cent. The impact comes mostly from wages and spending on goods and services which reduce the unemployment gap by 20 and 34 per cent, respectively. Social benefits seem to negatively affect the unemployment gap by 16 per cent. In advanced economies about two-thirds of social benefits consist of pension spending. In theory, the higher pension benefits, the higher the incentive for retirement, with no anticipated effect on unemployment (given the withdrawal from the labor force) but a reduction in employment. Here we find the opposite dynamics, suggesting that higher pension benefits reduce unemployment. This

⁹ Following the Akaike information criterion, our analysis uses specifications (2) and (4).

Table 2

What Is the Impact of Recessions and Recoveries on U- and E-gaps?

	1	2	3	3	4	5
	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap
recess	0.00447*** (0.00108)	0.00249* (0.00142)	0.00271* (0.00142)	-0.00232** (0.000973)	-0.000557 (0.00124)	-0.000703 (0.00121)
L.recess		0.00796*** (0.00247)	0.00689*** (0.00213)		-0.00641*** (0.00224)	-0.00575*** (0.00194)
L2.recess			0.00378** (0.00184)			-0.00256 (0.00159)
L3.recess						
recov	0.00595*** (0.000908)	-0.000678 (0.00187)	-0.000580 (0.00192)	-0.00379*** (0.000680)	0.00142 (0.00163)	0.00160 (0.00172)
L.recov		0.00230*** (0.000590)	-0.000971 (0.00149)		-0.00215*** (0.000648)	-6.82e-05 (0.00138)
L2.recov			0.00104* (0.000584)			-0.000464 (0.000385)
Observations	833	828	823	538	536	534
R ²	0.079	0.122	0.131	0.044	0.094	0.102
Number of countries	34	34	34	34	34	34

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects and an intercept has been included.

could be explained by the fact that large spending on pension is associated with a higher share of long term contracts as opposed to short term contracts, which are usually more affected by job cuts. For employment gaps, the coefficients are positive and significant for wages, goods and services and social benefits, with the magnitude for social benefits higher than for unemployment gaps, suggesting an impact on the labor force participation. Interactions with the output gap are insignificant implying that the impact of expenditure items on the labor market does not change at different levels of the output gap.¹⁰

The impact of total and current spending on (un)employment gaps is slightly higher than the Okun's law specification when using the alternative baseline with recessions and recoveries, although wages and salaries are now insignificant. The interaction terms suggest that the impact of fiscal policy on the labor market considering times of recessions and recoveries is not different from normal times (Table 4).

¹⁰ The size of the expenditures coefficients with and without interaction term is very similar, supporting the assumption that discretionary spending has been correctly identified and there is no remaining collinearity between spending and the output gap.

Table 3

What is the Impact of Expenditure on Unemployment and Employment Gaps?

	1	2	3	4	5	6	7	8	9	10	11	12
	u-gap	u-gap	u-gap	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap	e-gap	e-gap	e-gap
yokun	-0.345*** (0.0269)	-0.348*** (0.0372)	-0.319*** (0.0274)	-0.338*** (0.0329)	-0.345*** (0.0351)	-0.347*** (0.0319)	0.232*** (0.0250)	0.214*** (0.0340)	0.213*** (0.0274)	0.210*** (0.0313)	0.212*** (0.0332)	0.212*** (0.0261)
disexpy	-0.0604*** (0.0206)						0.0544*** (0.0206)					
yokundisexpy	-0.332 (1.528)						1.503 (1.720)					
discurexp		-0.0975*** (0.0349)						0.0901** (0.0407)				
yokundiscurexp		-1.628 (2.372)						2.674 (1.899)				
discapexp			0.0647 (0.0493)						0.00496 (0.0596)			
yokundiscapexp			-2.452 (2.310)						2.036 (4.567)			
dis_W&S				-0.204** (0.102)						0.260** (0.122)		
yokundis_W&S				-11.26 (8.258)						8.471 (6.545)		
dis_G&S					-0.343*** (0.120)						0.279* (0.164)	
yokundis_G&S					-1.840 (9.167)						10.67 (10.58)	
dis_SocBen						-0.158** (0.0788)						0.213*** (0.0819)
yokundis_SocBen						4.010 (5.973)						3.657 (3.620)
Observations	639	367	527	402	389	498	508	293	426	321	307	399
R ²	0.557	0.529	0.502	0.512	0.520	0.512	0.466	0.383	0.386	0.376	0.371	0.386
Number of countries	34	21	30	23	22	26	34	21	30	23	22	26

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects and bootstrapping; an intercept has been included.

Table 4

What is the Impact of Discretionary Spending on U-gaps and E-gaps During Recessions and Recoveries?

	1	2	3	4	5	6	7	8	9	10	11	12
	u-gap	u-gap	u-gap	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap	e-gap	e-gap	e-gap
recess	0.00216 (0.00173)	0.00370 (0.00247)	0.00228 (0.00161)	0.00324* (0.00189)	0.00332 (0.00231)	0.00365** (0.00184)	-0.000282 (0.00136)	-0.00186 (0.00179)	-0.000680 (0.00130)	-0.00172 (0.00138)	-0.00162 (0.00169)	-0.00134 (0.00151)
L.recess	0.00887*** (0.00243)	0.00676*** (0.00228)	0.00619*** (0.00180)	0.00565*** (0.00212)	0.00672*** (0.00229)	0.00655*** (0.00186)	-0.00654*** (0.00218)	-0.00457* (0.00250)	-0.00471** (0.00203)	-0.00440* (0.00241)	-0.00460* (0.00242)	-0.00442** (0.00208)
recov	-0.00171 (0.00184)	-0.000933 (0.00223)	-0.000486 (0.00167)	2.37e-05 (0.00219)	-0.000399 (0.00225)	0.000606 (0.00177)	0.00180 (0.00164)	0.000763 (0.00206)	0.000824 (0.00162)	0.000601 (0.00208)	0.000504 (0.00201)	0.000399 (0.00172)
L.recov	0.00230*** (0.000695)	0.00245*** (0.000934)	0.00164** (0.000701)	0.00239*** (0.000924)	0.00243*** (0.000894)	0.00223*** (0.000806)	-0.00201*** (0.000682)	-0.00192** (0.000939)	-0.00160** (0.000694)	-0.00194** (0.000946)	-0.00202** (0.000895)	-0.00212** (0.000835)
disexpy	-0.101*** (0.0346)						0.0961*** (0.0237)					
recovdisexpy	-0.179 (0.132)						0.0886 (0.112)					
recessdisexpy	0.110 (0.107)						-0.117 (0.0920)					
discurexp		-0.118** (0.0496)						0.0656 (0.0510)				
recovdiscurexp		-0.197 (0.236)						0.0726 (0.163)				
recessdiscurexp		-0.0817 (0.116)						0.125 (0.119)				
discapexp			-0.00699 (0.0542)						0.0465 (0.134)			
recovdiscapexp			0.0879 (0.164)						0.0243 (0.194)			
recessdiscapexp			0.354* (0.212)						-0.139 (0.239)			
dis_W&S				-0.193 (0.150)						0.168 (0.146)		
recovdis_W&S				-0.341 (0.521)						-0.137 (0.675)		
recessdis_W&S				-0.365 (0.595)						0.539 (0.422)		
dis_G&S					-0.341** (0.171)						0.155 (0.200)	
recovdis_G&S					-0.745 (0.840)						0.497 (0.667)	
recessdis_G&S					-0.664 (0.555)						0.927 (0.602)	
dis_SocBen						-0.185 (0.141)						0.200** (0.0945)
recovdis_SocBen						0.0848 (0.276)						0.0589 (0.235)
recessdis_SocBen						-0.325 (0.276)						0.132 (0.273)
Observations	639	367	527	402	389	498	508	293	426	321	307	399
R-squared	0.161	0.118	0.129	0.098	0.114	0.142	0.120	0.093	0.075	0.090	0.092	0.090
Number of code	34	21	30	23	22	26	34	21	30	23	22	26

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects and bootstrapping; an intercept has been included.

The impact of **statutory taxes** is significant mostly for employment gaps, but the personal income tax seems to worsen unemployment as well. A one per cent increase in each of these tax rates is equivalent to a reduction in employment gaps of about 0.9 per cent for personal income tax and VAT, one per cent for corporate income tax and 1.8 per cent for social contributions. The fact that the impact of social contributions is greater than that one of VAT may imply that a fiscal devaluation could have a positive impact on employment. In this case as well, the interaction term is insignificant indicating that the impact of statutory tax rates does not change at different positions of output *vis-à-vis* its long term trend (Table 5).

Considering the alternative baseline specification with normal, recession and recovery times, personal income tax rates have a stronger positive impact on unemployment gaps during recessions and a stronger negative impact on employment. On the contrary, the VAT rate has a less negative impact on employment gaps during recessions (Table 6).

The tax wedge has no significant impact on (un)employment gaps in the baseline specification, including when it interacts with the output gap (Table 7). It has a weakly significant and positive impact on unemployment gaps and stronger negative impact on employment at normal times, in the alternative specification when controlling for recessions and recoveries (Table 6).

Labour market policies have an impact on unemployment (employment) gaps (Table 8). As consistent with the literature, passive labor market policies, namely unemployment and early retirement benefits, have a negative and significant impact on employment of a magnitude of about 0.4, implying that a one per cent increase would lead to a 40 per cent reduction of employment gaps. For retirement benefits no impact is discernible on unemployment, suggesting that changes in these benefits affect the labor force together with the unemployed; while unemployment benefits have a positive impact on unemployment gaps with a magnitude of about 0.18; but when they are associated with changes in the output gap the impact is slightly higher.¹¹ For active labor market policies, we find only job rotation to substantially reduce the unemployment gap while training seems to increase employment gaps.

Considering the alternative specification with recessions and recoveries dummies, the coefficients for labor market policies are higher at normal times than in the baseline specification. Also, we find that during recoveries employment services (PES), incentives, and rehabilitation services might work to reduce unemployment gaps (Table 9).

4 Conclusion

This study investigates the impact of fiscal policy instruments on unemployment. In the short run, the theory postulates that unemployment and employment deviations from their long-term trend are tightly linked to output deviation from its long term trend. We find a strong evidence of this relationship. While there is a consensus on the negative impact of recessions on employment, various conjectures exist on (un)employment dynamics during recoveries. We find that recessions exacerbate unemployment over a two-year time period, while the impact of recoveries on unemployment and employment is not significant or worsen labor market outcomes. This may suggest that the job losses of a recession are not reversed during a recovery, defined as the catch-up phase of GDP until its pre-crisis level.

We find that fiscal policy can help close unemployment gaps, through discretionary current spending, especially through spending on goods and services and on public sector wages. We also

¹¹ This is because the average value of the output gap is negative and very small (-.0004).

Table 5

What Is the Impact of Statutory Tax Rates on Unemployment and Employment Gaps?

	1	2	3	4	5	6	7	8
	u-gap	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap	e-gap
yokun	-0.307*** (0.0661)	-0.383*** (0.0809)	-0.297*** (0.0531)	-0.355*** (0.0689)	0.188*** (0.0479)	0.344*** (0.0671)	0.142*** (0.0455)	0.288*** (0.0741)
L.PITr	0.00627** (0.00210)				-0.00924** (0.00401)			
yokunlpitr	-0.166 (0.292)				0.189 (0.249)			
L.VATr		0.00458 (0.00290)				-0.00847*** (0.00254)		
yokunlvatr		0.276 (0.480)				-0.705* (0.391)		
L.CITr			0.00424 (0.00338)				-0.0110** (0.00417)	
yokunlcitr			-0.169 (0.177)				0.334* (0.188)	
L.SCr				0.00757 (0.00495)				-0.0188*** (0.00448)
yokunlsstr				0.0254 (0.211)				-0.185 (0.204)
Observations	281	281	281	232	182	182	182	148
R-squared	0.568	0.564	0.565	0.575	0.551	0.559	0.559	0.591
Number of code	14	14	14	13	14	14	14	13

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: a constant has been included in the regression.

Table 6

What Is the Impact of Statutory Tax Rates on U- and E-gaps during Recessions and Recoveries?

	1	2	3	4	5	6	7	8
	u-gap	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap	e-gap
recess	0.00455*	0.00447*	0.00442*	0.00360	-0.00268	-0.00241	-0.00243	-0.000806
	(0.00226)	(0.00233)	(0.00229)	(0.00265)	(0.00216)	(0.00225)	(0.00212)	(0.00266)
L.recess	0.00612	0.0117**	0.0134	0.0122*	-0.00544	-0.0157***	-0.00553	-0.0136**
	(0.00556)	(0.00394)	(0.0118)	(0.00627)	(0.00418)	(0.00339)	(0.00976)	(0.00493)
recov	-0.00166	0.000323	-0.000131	-0.00136	0.00500	0.00432	0.00411	0.00692
	(0.00450)	(0.00406)	(0.00450)	(0.00526)	(0.00395)	(0.00382)	(0.00403)	(0.00527)
L.recov	0.00393*	0.00645***	0.00626	0.00717**	-0.00432***	-0.00811***	-0.00404	-0.00542**
	(0.00213)	(0.00125)	(0.00495)	(0.00239)	(0.000973)	(0.000763)	(0.00289)	(0.00210)
L.pitr	0.00454				-0.00954			
	(0.00463)				(0.00765)			
L.recovpitr	0.00358				-0.00404			
	(0.00930)				(0.00608)			
L.recesspitr	0.0224***				-0.0241***			
	(0.00713)				(0.00612)			
L.vatr		0.000919				-0.00913		
		(0.00819)				(0.00581)		
L.recowatr		-0.0137				0.0211**		
		(0.0140)				(0.00734)		
L.recessvatr		-0.0183				0.0489***		
		(0.0250)				(0.0131)		
L.citr			0.00399				-0.0114**	
			(0.00495)				(0.00501)	
L.recovcitr			-0.00560				-0.00234	
			(0.0109)				(0.00707)	
L.recesscitr			-0.0114				-0.0110	
			(0.0215)				(0.0182)	
L.sstr				0.000727				-0.0192
				(0.0108)				(0.0174)
L.recovsstr				-0.00619				0.00182
				(0.00825)				(0.00836)
L.recesssstr				-0.00478				0.00742
				(0.0149)				(0.0193)
Observations	281	281	281	232	182	182	182	148
R-squared	0.154	0.143	0.143	0.129	0.164	0.162	0.147	0.140
Number of countries	14	14	14	13	14	14	14	13

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects; an intercept has been included.

Table 7

**What is the Impact of the Tax Wedge on U and E-gaps,
Including During Recessions and Recoveries?**

	1	2	3	4
	u-gap	u-gap	e-gap	e-gap
yokun	-0.347*** (0.0622)		0.293*** (0.0841)	
L.taxwed	0.00799 (0.00656)		-0.00964 (0.00649)	
yokunltaxwed	0.0563 (0.237)		-0.205 (0.270)	
recess		0.00100 (0.00171)		-6.82e-05 (0.00132)
L.recess		0.0130*** (0.00411)		-0.0108** (0.00459)
recov		-0.00312 (0.00189)		0.00166 (0.00160)
L.recov1		0.00172 (0.00138)		-0.00172 (0.00166)
L.taxwed		0.0313* (0.0164)		-0.0277** (0.0134)
recov1ltaxwed		0.000460 (0.00527)		-0.000169 (0.00519)
recess1ltaxwed		-0.0115 (0.0106)		0.0135 (0.0116)
Observations	393	393	388	388
R ²	0.558	0.126	0.477	0.113
Number of countries	34	34	34	34

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects; an intercept has been included.

Table 8

What Is the Multiplicative Impact of Labor Market Policies on Unemployment and Employment Gaps?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	u-gap	u-gap	u-gap	u-gap	u-gap	u-gap	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap	e-gap	e-gap	e-gap	e-gap	e-gap	e-gap
yokun	-0.355*** (0.0542)	-0.326*** (0.0457)	-0.358*** (0.0330)	-0.350*** (0.0344)	-0.352*** (0.0371)	-0.340*** (0.0420)	-0.308*** (0.0363)	-0.269*** (0.0443)	-0.356*** (0.0356)	0.260*** (0.0368)	0.228*** (0.0323)	0.241*** (0.0285)	0.258*** (0.0274)	0.243*** (0.0306)	0.243*** (0.0278)	0.233*** (0.0327)	0.195*** (0.0289)	0.245*** (0.0294)
L.pes	0.742** (0.363)									-1.119* (0.564)								
yokunpes	1.130 (22.39)									-18.60 (14.50)								
L.training		0.0337 (0.167)																
yokuntraining		-16.22 (10.43)																
L.jobrot			-3.255*** (1.031)															
yokunjobrot			141.7 (134.2)															
L.incentives				0.398 (0.337)														
yokunincentives				-5.416 (20.07)														
L.rehab					0.373* (0.187)													
yokunrehab					-2.497 (10.91)													
L.jobcreat						0.170 (0.221)												
yokunjobcreat						-17.56 (14.52)												
L.startup							1.379 (0.852)											
yokunstartup							-287.4** (122.8)											
L.benefit								0.182*** (0.0508)										
yokunbenefit								-9.144*** (3.036)										
L.ealryret									0.131 (0.103)									
yokunlealryret									2.574 (10.40)									
Observations	608	636	649	645	643	641	648	647	649	409	430	443	439	437	439	442	441	443
R-squared	0.537	0.531	0.532	0.531	0.530	0.534	0.552	0.572	0.529	0.464	0.464	0.452	0.460	0.453	0.454	0.454	0.507	0.454
Number of code	31	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: a constant has been included in the regression

What Is the Impact of LMPs on Unemployment and Employment Gaps at Times of Recessions and Recoveries?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	uokun	uokun	uokun	uokun	uokun	uokun	uokun	uokun	uokun	eokun	eokun	eokun	eokun	eokun	eokun	eokun	eokun	eokun
recess	0.00152 (0.00135)	0.000856 (0.00134)	0.000824 (0.00137)	0.000884 (0.00141)	0.000925 (0.00138)	0.000879 (0.00137)	0.000905 (0.00135)	0.00126 (0.00129)	0.00103 (0.00137)	-1.85e-05 (0.00122)	0.000295 (0.00116)	0.000530 (0.00120)	0.000542 (0.00122)	0.000490 (0.00120)	0.000376 (0.00120)	0.000507 (0.00119)	0.000180 (0.00111)	0.000309 (0.00121)
L.recess	0.0120** (0.00482)	0.00757* (0.00373)	0.00840*** (0.00275)	0.00921** (0.00354)	0.00859** (0.00333)	0.00710** (0.00333)	0.00841*** (0.00280)	0.00703* (0.00280)	0.00839*** (0.00302)	-0.00841* (0.00429)	-0.00552 (0.00340)	-0.00624** (0.00268)	-0.00833** (0.00340)	-0.00600* (0.00307)	-0.00624** (0.00293)	-0.00670** (0.00285)	-0.00551 (0.00334)	-0.00658** (0.00287)
recov	-0.00199 (0.00182)	-0.00104 (0.00187)	-0.00112 (0.00178)	-0.00108 (0.00201)	-0.000967 (0.00194)	-0.000874 (0.00190)	-0.000916 (0.00182)	-0.00147 (0.00186)	-0.00111 (0.00175)	0.00170 (0.00182)	0.000920 (0.00177)	0.000944 (0.00169)	0.000829 (0.00182)	0.000839 (0.00182)	0.000678 (0.00184)	0.000790 (0.00171)	0.00109 (0.00188)	0.000753 (0.00170)
L.recov	0.00451*** (0.00104)	0.00264** (0.00112)	0.00266*** (0.000818)	0.00396*** (0.000941)	0.00331*** (0.000875)	0.00285*** (0.000942)	0.00204** (0.000859)	0.00307** (0.00118)	0.00306*** (0.000835)	-0.00331** (0.00121)	-0.00194 (0.00115)	-0.00243*** (0.000775)	-0.00251** (0.00104)	-0.00219** (0.000850)	-0.00213** (0.000832)	-0.00203** (0.000901)	-0.00134 (0.00138)	-0.00241** (0.000886)
L.pes	1.435* (0.760)									-1.401* (0.729)								
L.recovpes	-1.007** (0.464)									0.557 (0.473)								
L.recesspes	-1.295 (1.511)									0.562 (1.207)								
L.training		0.0307 (0.271)									-0.749** (0.290)							
L.recovtraining		0.0433 (0.337)									-0.227 (0.366)							
L.recesstraining		0.421 (0.627)									-0.487 (0.844)							
L.jobrot			-3.767** (1.461)									1.821 (2.023)						
L.recovjobrot			1.252 (4.275)									2.611 (2.050)						
L.recessjobrot			3.952 (2.900)									-3.493 (3.851)						
L.incentives				0.506 (0.534)									-0.405 (0.597)					
L.recovincentives				-0.932*** (0.321)									0.155 (0.378)					
L.recessincentives				-0.567 (0.769)									2.059 (1.270)					
L.rehab					0.404 (0.350)									0.0526 (0.828)				
L.recovrehab					-0.583** (0.256)									-0.304 (0.236)				
L.recessrehab					-0.146 (0.698)									-0.365 (0.524)				
L.jobcreat						0.162 (0.306)									-0.545 (0.371)			
L.recovjobcreat						-0.118 (0.514)									-0.433 (0.570)			
L.recessjobcreat						1.305 (0.987)									0.175 (1.931)			
L.startup							-0.857 (1.891)										-0.707 (2.303)	
L.recovstartup							3.464 (2.134)										-1.684 (1.890)	
L.recessstartup							0.314 (3.626)										2.804 (3.286)	
L.benefit								0.345*** (0.0659)										-0.536*** (0.130)
L.recovbenefit								-0.0953 (0.0735)										-0.0161 (0.133)
L.recessbenefit								0.0593 (0.138)										0.0369 (0.177)
L.ealryret									0.542** (0.217)									-0.822** (0.354)
L.recovealryret									-0.105 (0.230)									-0.175 (0.347)
L.recessealryret									0.203 (0.528)									0.409 (0.562)
Observations	608	636	649	645	643	641	648	647	649	409	430	443	439	437	439	442	441	443
R-squared	0.143	0.113	0.115	0.116	0.114	0.120	0.114	0.164	0.116	0.126	0.107	0.097	0.112	0.098	0.098	0.099	0.162	0.105
Number of countries	31	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note:the regression has been done with country fixed effects; an intercept has been included in the regression.

find that cutting statutory tax rates reduces unemployment in the short term, and that the positive impact of cutting social contributions on employment is higher than the one of consumption taxes (VAT), suggesting that fiscal devaluations (conducted through a reduction in social contributions and an increase in consumption taxes) can have a positive impact on employment. Consistent with the relevant literature, unemployment benefits and early retirement benefits worsen unemployment, and evidence on active labor market policies is mixed. Finally, we find that the impact of discretionary spending on the labor market does not change at different output's levels relative to its long term trend. Also, discretionary spending, social contributions and corporate income taxes have no different impact on the labor market at times of recessions and recoveries. On the contrary, personal income and value added tax rates, and some specific active labor market policies affect labor market outcomes differently at times of recessions or recoveries.

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