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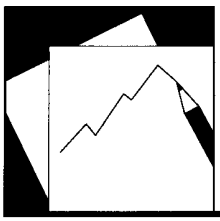

IMF Working Paper

A Fiscal Job?

An Analysis of Fiscal Policy and the Labor Market

Elva Bova, Christina Kolerus, and Sampawende J.-A. Tapsoba

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A Fiscal Job? An Analysis of Fiscal Policy and the Labor Market

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Abstract

This paper examines the impact of fiscal policy on employment through the lenses of Okun's Law. Looking at the panel of OECD countries over the past three decades, we find that fiscal policy can affect employment beyond the impact it is traditionally assumed to exert through the output multiplier. In particular, this impact is found to be effective for most items of current discretionary expenditure and for corporate income taxes and social security contributions. Okun's Law is found to be stable under almost all model specifications, but higher spending on subsidies and lower social security contributions can amplify the impact of the output gap on employment gaps.

JEL Classification Numbers: E24, E32

Keywords: fiscal policy, labor market, employment gaps

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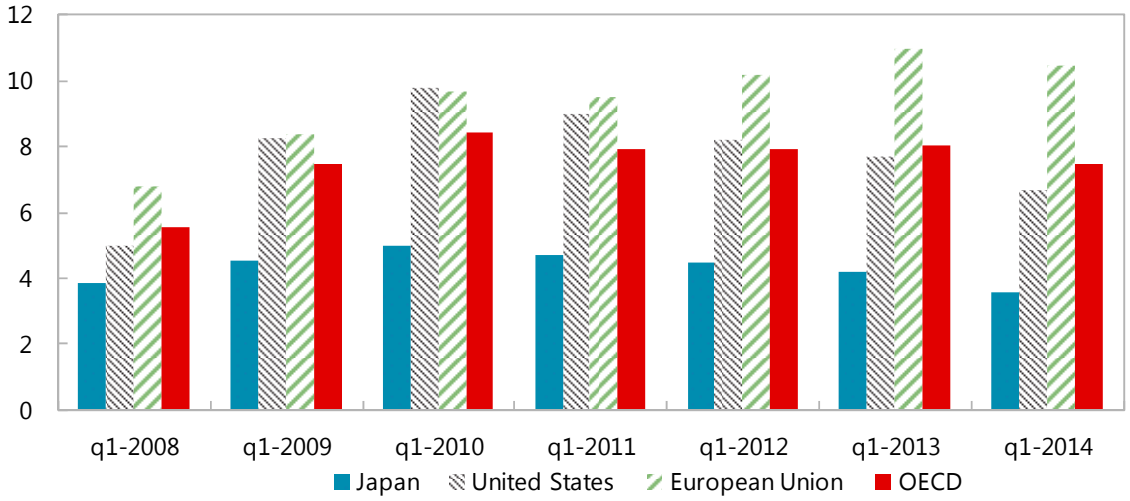
Contents Page

I. INTRODUCTION

The global financial crisis has left its marks on labor market conditions in many advanced economies. Unemployment increased significantly in the OECD, reaching almost 7½ percent in March 2014; corresponding to about 46 million of unemployed, 11 million more than in July 2008 (Figure 1). Improvements in employment levels over the last six years have been uneven (Figure 2). 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 labor demand and supply (IMF 2012). Accordingly, fiscal policy has tilted toward supporting jobs by stimulating aggregate demand. At the same time the research agenda has moved towards studies on how fiscal policy can sustain output and, through this, employment.[1] Yet, fiscal policy can shape labor market outcomes through more direct channels than the output channel, by impacting both on labor demand and labor supply.

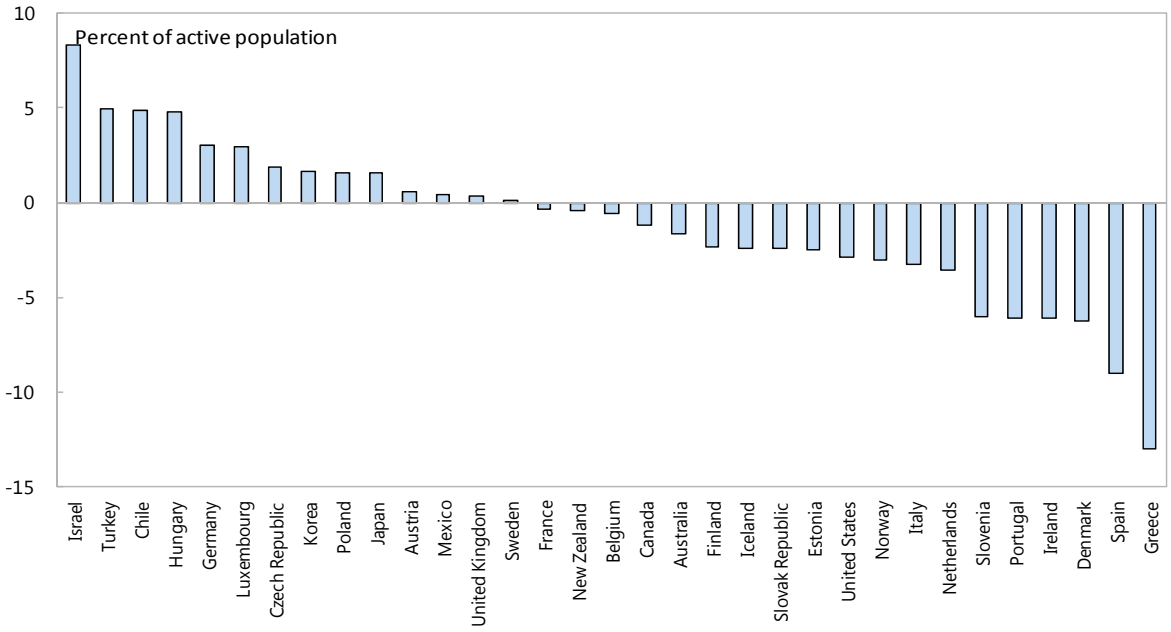
Figure 1. Unemployment Rates in OECD Countries (2008–14)
(Percent of labor force)



Source: OECD

[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 and others, 2010; Chen and others, 2011; Monacelli and others, 2010; Bruckner and Pappa, 2012; Ramey, 2012; Kato and Miyamoto, 2013; Tagkalakis, 2013; and Dell'Erba and others, 2014).

Figure 2. Differences in Employment Rates Between March 2014 and September 2008
(Percent of active population)



Source: OECD

In classical labor market models, labor demand identifies the number of workers (or working hours) firms are willing to hire at any given rate of the real wage. Hiring decisions depend on a firm's profit maximization function and are thus determined by the level of real wages, 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. Within these dynamics, fiscal policy can indeed affect firms and workers' decisions, thereby boosting labor demand and supply, or the structure of the labor market, removing frictions and promoting skills. This can be done through higher spending, lower taxes, or alternatively through ad hoc measures that improve the matching of workers with existing job vacancies, and create incentives to work (Bassanini and Duval, 2006; Estevão, 2007; Card and others, 2010; IMF, 2012; and Orlandi, 2012).

Traditionally the literature has addressed the role of fiscal policy for employment either as a derivate of the output multiplier literature or through studies on the impact of specific fiscal policy instruments, such as labor taxation and unemployment benefits. Against this literature, we provide an innovative angle to the analysis, by examining the interplay of fiscal policy, employment and output through the lenses of Okun's Law. In his study of U.S. unemployment dynamics for the period 1947–60, Okun (1962) found that a 1 percent increase in Gross National Product (GNP) corresponded to a 0.3 percentage point decrease in the unemployment rate. This co-movement between output and unemployment results from

the fact that variations in output make firms hire and fire workers, causing changes in employment and unemployment (Ball and others, 2013). Okun's coefficient reflects the degree of adjustment of employment to changes in output, which in turn can depend on labor market rigidities and institutions, technological and training costs or costs created by employment protection laws. However, some countries might exhibit different, but stable, coefficients relate to their own specificities. For instance, Ball and others (2013) found an Okun's coefficient as high as 0.8 for Spain, probably reflecting the large number of temporary workers, and a coefficient of 0.15 for Japan, possibly resulting from the large use of permanent contracts.

Although more an empirical regularity than a theoretical construct, Okun's Law has featured well as a forecasting instrument for employment dynamics in advanced economies (Ball and others, 2014). Yet, labor market developments prevailing during the global financial crisis have put the validity of Okun's Law under question (Gordon, 2010; Daly and Hobijn, 2010; Cazes and others, 2011; Daly and others, 2013). This debate emerged, in particular, from the observation that increases in U.S. unemployment were found to be larger than those expected under the Law, a fact in most cases associated with changes in productivity (Gordon, 2010; Daly and Hobijn, 2010). Overall, the stability of Okun's coefficient remains still an open question.

Even with a stable Okun's Law, there are reasons to consider that the employment multiplier may not be a simple product of the output multiplier and Okun's coefficient. This is because fiscal policy could be directed to capital-intensive and highly productive sectors with small labor content. In this case, employment would expand less than output. Another possible reason for a discrepancy between employment and growth multipliers could be a time mismatch, whereby a policy that sustains employment would provide an expansion of output in the medium-term; or vice-versa. Hence, this study intends to capture direct employment multipliers, which could be found by netting out the impact of Okun's Law. To this end, we calculate Okun's coefficient, the direct impact of fiscal policy and the conditional impact via the interaction between the output gap and fiscal policy. If this interaction term is not significant, Okun's Law is proved to be stable under different fiscal policies. If this interaction term is significant, then the impact that growth has on employment could be higher or lower given the change in a specific fiscal policy measure. Therefore, this policy could affect the long-run relationship between the two or cause protracted deviations from Okun's Law.

Using a panel of the 34 OECD countries over the period 1975–2012, we calculate employment gaps and see how these are affected by changes in output gaps and in selected fiscal policy instruments. We estimate the interaction of each fiscal policy instrument with the output gap, to check for stability in Okun's coefficient and verify whether some fiscal policy instruments can amplify or reduce the extent at which changes in output affect changes in employment. Finally, as a robustness check, we apply the baseline analysis on

unemployment gaps, to verify whether movements in jobseekers are driven by similar (but opposite) dynamics to those of the employed population.

Key findings are as follows. On the expenditure side, discretionary current expenditure is found to robustly affect employment gaps while capital spending has no significant impact, suggesting that capital spending has no short-run impact on employment gaps beyond the one resulting from aggregate demand. Discretionary spending on goods and services has the largest effect, followed by the wage bill, social benefits, and subsidies. On the revenue side, we find that cutting corporate income tax (CIT) and social security contributions (SSC) rates can improve employment outcomes. Moreover, we find that Okun's coefficient is stable against most policy changes, but that subsidies and social security contributions can affect Okun's relationship at times of positive output gaps. In addition, some components of fiscal policy through spending have some direct, albeit small, impact. This suggests that fiscal interventions to reduce employment gaps would play a minor role than policies aimed at stimulating aggregate demand.

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

II. LITERATURE REVIEW

The literature has addressed employment effects of fiscal policy from different dimensions. On the one hand, the fiscal multiplier literature has examined the *macroeconomic* impact of government spending (usually spending on goods and services) on employment as a derivate of the impact on output. On the other hand, *microeconomic* studies have investigated the effect of specific tax changes and government benefits on labor demand and supply dynamics.

A. Expenditure Side

In general, the literature documents a positive effect of public spending on labor market outcomes. This effect operates mainly through aggregate demand: spending on goods and services and capital spending directly affect 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 employer in the country.

For the United States, studies find positive effects on employment following a government spending shock (Fatas and Mihov, 2001; Burnside and others, 2004; Cavallo, 2005; Gali and others, 2007). In particular, Monacelli and others (2010) provide an empirical estimate of the unemployment multipliers of government spending, focusing in more detail on the transmission of fiscal policy to the labor market. They show that an increase in government expenditure 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 could 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 and others (2002) find evidence of the opposite impact. They find 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]

Still within spending, it is usually acknowledged that social benefits weaken the link between labor supply and incomes (Scarpetta, 1996; Nickell, 1998; Nunziata, 2002; Duval and Bassanini, 2006; IMF, 2012). 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. Duval and Bassanini estimate that a 10 percent increase in unemployment benefits would increase unemployment by 1.2 percentage points. Krueger and Meyer (2002) conclude that a 10 percent increase in unemployment benefits raises the average duration of unemployment by around 5 percent—although this impact is likely to be much higher in countries with relatively weak eligibility conditions. In the same vein, 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. Empirical evidence also suggests that strengthening the link between contributions and benefits improves labor market outcomes (Disney 2004).

B. Revenue Side

On the revenue side, the literature agrees that labor taxes, including personal income tax and social security contributions, negatively affect employment by impacting both on the labor supply and demand. In principle, if the substitution effect prevails, 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. Higher taxes on labor can also reduce labor demand as they can drive up labor costs (Bassanini and Duval, 2006). Whether the burden of the tax is borne more by the workers or the firms depends ultimately on the price-elasticities of labor supply and labor demand. For instance, on one hand, 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 3 percent would increase labor demand by about a similar proportion. On the other hand, the elasticity of labor supply to real wages is found to be between 0.2 and 0.5 percent (IMF, 2012). Hence, adjustments in the rate of labor income taxes have a significant impact on the labor market.

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

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

lower wages. For instance, business tax relief can ease financing constraints for firms relying on retained earnings and boost investment (IMF, 2012). These effects are consistent with the finding that reductions in the cost of capital reduce unemployment (Phelps, 1994; Blanchard, 1997).

Likewise, taxes on final consumption (VAT, excises) increase the costs for consumption goods thereby reducing real wages which, if the substitution effect prevails over the wealth effect, would lower the labor supply (IMF, 2012). Additionally, 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 (De Mooij and Keen, 2012). 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 over time. 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.

III. Empirical Strategy

A. Methodology

To assess the effectiveness of fiscal policy on employment, we base our analysis on the short-term relationship between employment gaps and output gaps, used as one of the two main specifications for Okun's Law:[3]

$$e_{it} = \alpha_0 + \alpha_1 y_{it} + \theta_i + \eta_{it} \quad (1)$$

where e_{it} denotes the employment gap of country *i* at time *t*, calculated as the deviation of current employment from its trend; y_{it} is the output gap, obtained as the deviation of actual output from potential output. The employment trend (or long-term level) and potential output were calculated using Hodrick-Prescott filtering. We use 6.25 as a smoothing parameter; however, other parameters were considered and the results do not change significantly. In addition, α_0 is a constant, α_1 is Okun's coefficient, θ_i is country fixed effects and η_{it} is the error term.

[3] The alternative specification includes the rate of change in output and changes in the unemployment rate.

We estimate both the direct and conditional impacts of fiscal policy by using Okun's law framework in the following equation:

$$e_{it} = \beta_0 + \beta_1 y_{it} + \beta_2 \mathcal{T}_{it} + \beta_3 y_{it} \mathcal{T}_{it} + \theta_i + \eta_{it} \quad (2)$$

where $\mathcal{T}_{it}$ represents a vector of exogenous, to the extent possible, fiscal policy variables. To that effect, we compute the discretionary fiscal variables including spending categories (total public expenditure, current primary expenditure, capital expenditure, spending on wages and salaries, on goods and services, on social benefits, and other spending, of which spending on subsidies is a major component) and tax rates (including corporate and personal income taxes, value added tax and social security contributions).[4] The approach for estimating $\mathcal{T}_{it}$ is decribed below. θ_i denotes country fixed effect; η_{it} is the error term.

The coefficient β_1 is Okun's coefficient indicating how much of the change in employment gaps is caused by changes in the output gap. The coefficient β_2 captures the direct impact of specific fiscal policy instruments on employment gaps. Controlling for the output gap allows us to assess the extent to which selected fiscal policies are able to influence labor market outcomes in the short-term beyond the cycle. Possible channels for this direct influence include policies that affect matching or training and that could avoid hysteresis by enabling companies to quickly react to output fluctuations without firing workers but adjusting working hours (e.g., government support covering social security contributions or wage losses at firms which introduce shorter shifts for workers, such as the Kurzarbeitergeld in Germany during the crisis). An additional channel could be supporting (public) employment in labor intensive sectors but with potentially low output multiplier. Finally, the coefficient β_2 can capture labor market improvements that have been induced by fiscal policy which have yet to be translated into higher output.

The interaction term β_3 reflects the influence of fiscal policy on Okun's relationship. If the coefficient is not significant then fiscal policy would not alter the way employment changes with output. Conversely, a significant interaction coefficient indicates that fiscal policy may affect the way the cycle impacts on employment, for instance by tilting production towards employment intensive sectors, away from capital intensive ones. In this perspective, the marginal impact of a change in employment gaps over a change in the output gap could be expressed in the following way:

$$\partial e_{it} / \partial y_{it} = \beta_1 + \beta_3 \mathcal{T}_{it} \quad (3)$$

[4] In the IMF *World Economic Outlook* other expenditure corresponds to the *Expense not elsewhere classified* which comprises the consumption of fixed capital, subsidies, grants, and other expenses.

where β_1 captures Okun's Law impact and β_3 captures the impact conditional on fiscal spending (the interaction coefficient). If the interaction coefficient β_3 is positive, then fiscal expansions positively affect the way employment fluctuates around the cycle—and fiscal contractions negatively impact on Okun's Law.

Another angle to examine the interaction coefficient is to consider whether fiscal policy would be more effective under positive or negative output gaps. A positive coefficient would indicate that expansionary fiscal policy would be more effective in creating employment at times of a positive output gap rather than at times of negative output gap. This can occur in the case fiscal policy is directed to create employment through measures like hiring subsidies schemes or lowering labor taxation. By the same token, policies helping to avoid lay-offs would then be less successful than policies which support employment creation once the economy is back on track. The marginal impact of a change in employment given a change in fiscal policy can then be expressed as:

$$\partial e_{it}/\partial \mathcal{T}_{it} = \mu_0 + \mu_1 y_{it} \tag{4}$$

where μ_0 captures the direct impact and μ_1 captures the impact conditional on the output gap.

The estimation also controls for changes in the stance of monetary policy, by including the central bank policy rate and, when unavailable, the money market rate or the long-term bond yield. The impact of changes in the interest rate on employment is ambiguous. On the one hand, a lower interest rate would stimulate growth, and, through Okun's coefficient, employment. On the other hand, a lower interest rate might cause a substitution effect by shifting production away from labor intensive techniques or sectors towards more capital intensive ones. As additional control variable, we include an index of strictness in labor market regulations but find it to be not significant in almost all specifications. We also 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 is 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.

We use the within fixed effect estimator. In so doing we control for idiosyncratic factors and mitigate the omitted variable bias. We do not neutralize common shocks as we are also interested in the reaction of fiscal policy to common growth slump such as the recent Great Recession. Moreover, we account for the fact that some discretionary fiscal variables are calculated before the estimated and can be prone to measurement error. We use the bootstrap technique with 1,000 replications to estimate equation (2). Finally, to produce robust results,

autocorrelation and heteroskecasiticty are corrected for. An intercept is included in all regressions.

B. Discretionary Fiscal Policy

There is, however, a major challenge in correctly identifying the role of fiscal policy on employment. Fiscal policy instruments and employment gaps can be endogenous, as low employment can trigger immediate fiscal policy responses. To solve for the endogeneity in government expenditures, we follow the relevant literature including Fatas and Mihov (2003, 2006), Afonso and others (2010), and Agnello and others (2013).[5] Discretionary fiscal policy is calculated by extracting the automatic stabilizer component of public spending. To this end, we estimate a linear "fiscal rule" for each country where the fiscal balance (F_{it}) is expressed as function of its lagged value (F_{it-1}), inflation (π_{it}), output gap (y_{it}), debt ($Debt_{it}$), and a time trend (Tt):

$$F_{it} = \gamma_0 + \gamma_1 F_{it-1} + \gamma_2 \pi_{it} + \gamma_3 y_{it} + \gamma_4 Debt_{it} + \gamma_5 T_t + \mathcal{T}_{it} \quad (5)$$

The residual $\mathcal{T}_{it}$ is then taken as the proxy for discretionary policy. The underlying idea is that after accounting by country and for each variable that captures the conditions of the business cycles, the remaining portion is a good proxy of fiscal activism. Further, we include lags to solve for endogeneity in non-spending variables and use panel fixed effects to control for the simultaneous bias. Moreover, estimated as a residual, $\mathcal{T}_{it}$ is trend stationary. In particular, the estimation for the tax rates controls for changes in expenditure to isolate any possible implication resulting from higher or lower spending implemented in conjunction with or in response to changes in taxes.

C. Data

For the purpose of the analysis, we collect data for a panel of 34 OECD countries for the period 1975–2012. Data on employment come from the OECD database, while data on real GDP and public spending items are from the IMF *World Economic Outlook* (WEO) database. Tax rates are from Iltzeski's (2011) database, which has observations for 15 countries for the period 1981–2008.[6] Data on the central bank policy rate, money market rate and long-term bond yield are from the IMF-International Finance Statistics (IFS) database. The index of strictness in the labor market regulations and its components (minimum wage, union

[5] An alternative option could have been to use the policy-based approach à la Devries and others (2011) and Romer and Romer (2010) which relies on descriptive historical information about policy-determined changes in fiscal variables. However, for the purpose of this analysis, we believe that the Fatas and Mihov procedure can be more easily applied to specific categories of expenditure while a policy-based analysis of changes in specific categories of expenditure would have posed problems of comparability between countries.

[6] Available at http://personal.lse.ac.uk/ilzetzki/index.htm/Data.htm.

concentration and membership) come from the World Economic Freedom dataset (WEF); data on employment protection legislation is from the OECD.

IV. RESULTS

A. Baseline

By regressing employment gaps on output gaps we find a strongly significant Okun's Law. A 1 percent widening of the output gap would lead to a 0.24 percentage point increase in the employment gap (Table 1). This coefficient is slightly lower than the 0.5 found by Ball and others (2013) for the United States and by IMF (2012) for advanced economies. Also, we find that Okun's coefficient is stable in most specifications and with similar magnitude.

Table 1. Okun's Law: Output and Employment Gaps

	Employment Gap
Output Gap	0.240***
	(0.0232)
Observations	538
R2	0.464
Countries	34

Estimation includes country fixed effects and intercept
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Adding fiscal policy: expenditure

When including fiscal policy instruments, we find that total discretionary expenditure has a small, positive effect on employment gaps. A 1 percent of GDP increase in expenditure would contribute to expand employment gaps by 0.05 percentage points (Table 2). This result corroborates Monacelli and others' (2010) findings for U.S. data, who find positive employment multipliers of an increase in government spending for the United States, although of a magnitude larger than the one found in this study. We also display the R2 when excluding fiscal variable on an identical sample. In so doing, we explore whether the addition of the fiscal instruments to Okun's Law brings any economic significance of the results beyond the statistical significance. The estimates indicate that fiscal policies account for a limited fraction of variation in employment gaps, between 2–3 percent.

The impact for total spending found in our regression comes essentially from current primary expenditure, which has a significant coefficient of around 0.07 (0.08 when including capital spending at the same time). Capital spending is instead not significant. The monetary policy variable when significant has a positive sign suggesting that the substitution effect from labor

to capital prevails over the negative impact that an increase in interest rates has on output and through this on employment.[7]

The interaction coefficient for primary current spending is significant and positive, revealing an influence on Okun's relationship from discretionary current spending. This implies that a change in output would have a larger effect on employment when spending is expansionary and that the employment multiplier of fiscal policy is larger at times of boom, contrary to the output multiplier. Overall, changes in Okun's coefficient are relatively small when taking into account the interaction term. For one percent of GDP more discretionary primary current spending, Okun's coefficient would increase temporarily from 0.22 to 0.25 (and to 0.35 when considering a 5 percent of GDP stimulus). For the spending multiplier, at average positive output gaps the primary current spending multiplier on employment gaps increases to 0.10 and 0.12 (based on results shown in Table 2).

Table 2. Employment Gaps and Discretionary Expenditure

	Employment Gap				
Output Gap	0.242***	0.236***	0.222***	0.220***	0.219***
	(0.0244)	(0.0263)	(0.0262)	(0.0301)	(0.0279)
Monetary Policy Rate (-1)	0.0135*	0.0165*	0.0184	0.0201	0.0180
	(0.00708)	(0.00865)	(0.0136)	(0.0138)	(0.0133)
Disc.Expenditure		0.0515**			
		(0.0230)			
Disc.Expenditure*Output Gap		1.378			
		(1.689)			
Disc. Primary Current Expenditure			0.0693***		0.0793***
			(0.0210)		(0.0211)
Disc. Primary Current Expenditure*Output Gap			2.668**		2.915**
			(1.270)		(1.255)
Disc. Capital Expenditure				0.00426	0.0528
				(0.0777)	(0.0548)
Disc. Capital Expenditure*Output Gap				1.747	1.503
				(4.701)	(4.377)
Observations	519	496	400	400	400
R2	0.472	0.480	0.430	0.406	0.435
Non-Fiscal R2	…	0.470	0.404	0.404	0.404
Countries	34	34	29	29	29

Estimation includes country fixed effects and intercept
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Considering the main components of current spending, the employment multiplier is considerably higher than for total spending. Spending on goods and services displays the

[7] Changes in discretionary spending might be compensated by changes in revenues. We do not control for revenues due to endogeneity problems and using discretionary revenues might not capture the full compensation.

largest employment multiplier, with a coefficient of 0.28, a result largely in line with the literature on multipliers (for instance Dell'Erba and others, 2014). This is followed by spending on the wage bill which is found to increase employment gaps by 0.26 percentage points. Spending on social benefits and subsidies seem to have a smaller but still significant influence on employment, at 0.20 and 0.14, respectively.

The finding that social benefits improve employment outcomes is somewhat at odds with what the literature finds regarding *unemployment* benefits (Bassanini and Duval, 2006), which is a component of the variable social benefits used in our study. A reason for this divergence comes from the fact that unemployment benefits are not the main component of social benefits. The latter are by about one-third composed by pension benefits—and changes in the pension packages are more likely to affect long-term decisions for entering or leaving the labor market. In addition, social benefits in this estimation reflect the non-discretionary component of social benefits. In this case the main impact of social benefits on employment is more likely to come from assistance schemes, social services and ad-hoc support programs.[8]

For all components, but subsidies, the interaction term with the output gap is insignificant, proving stability of Okun's Law. For subsidies, the interaction term is significant and positive, indicating that spending on subsidies could cause temporary deviations from Okun's Law. Okun's coefficient increases from 0.22 to 0.27 when the government is spending one percent of GDP on discretionary subsidies. In turn, at average positive output gaps, the spending multiplier of subsidies on employment reaches 0.21, comparable to the impact of social benefits.

When including all spending items of Table 3 in one regression, our sample shrinks considerably while collinearity problems occur for some expenditure groups. As a result, the significant effect on employment gaps vanishes. However, when including selected spending items with sufficiently large observations, in particular capital spending, in addition to the respective current expenditure item, we find that for all categories of current spending (tested individually) the direct impact on employment remains significant. In addition, for goods and services and wages the impact is magnified, with a coefficient of 0.39 in the case of goods and services.[9]

[8] See Government Finance Statistics Manual (2001) for the detailed composition of social benefits.

[9] Results not reported but can be provided upon request.

Table 3. Employment Gaps and Primary Current Discretionary Expenditure

	Employment Gap			
Output Gap	0.218***	0.219***	0.218***	0.221***
	(0.0357)	(0.0356)	(0.0297)	(0.0352)
Monetary Policy Rate (-1)	0.0191	0.0193	0.0211*	0.0174
	(0.0137)	(0.0141)	(0.0118)	(0.0154)
Disc. Wage & Salaries	0.261**			
	(0.130)			
Disc. Wage & Salaries*Output Gap	8.004			
	(6.391)			
Disc. Goods & Services		0.280*		
		(0.158)		
Disc. Goods & Services*Output Gap		11.54		
		(9.396)		
Disc. Social Benefits			0.203**	
			(0.0804)	
Disc. Social Benefits*Output Gap			3.369	
			(3.417)	
Disc. Subsidies				0.141**
				(0.0713)
Disc. Subsidies*Output Gap				5.367*
				(2.883)
Observations	309	295	387	280
R2	0.396	0.391	0.408	0.401
Non-Fiscal R2	0.377	0.378	0.391	0.380
Countries	23	22	26	21

Estimation includes country fixed effects and intercept
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Adding fiscal policy: tax rates

The estimates of the impact of tax rates show a significant negative impact of the corporate income tax (CIT) and social security contribution (SSC) rates on employment, while personal income tax (PIT) and value added tax (VAT) rates are not significant (Table 4). A one percent increase in the SSC and CIT rates is found to lower employment gaps by about 0.04 and 0.03 percentage points, respectively. For SSC, this effect is slightly higher the larger output gaps are, for instance 0.045 at average positive output gap.

Overall, while the direct impact of changes in tax rates on employment outcomes is very small, the level of tax rates considerably influences Okun's coefficient. The interaction coefficient suggests that Okun's Law coefficient is lower if the rates of the VAT and social security contributions are increased. At average social security rates, Okun's coefficient is similar to the baseline in Table 1, namely 0.24. At the 75th percentile of the sample's social security rates, however, Okun's coefficient is much smaller, at 0.18. In other words, countries with higher social security contributions tend to have smaller Okun's coefficients. This result is consistent with the evidence that employment is less flexible in countries with stronger employment protection, which tend to coincide with countries with higher social

security contributions. In addition, the higher the social security contributions, the lower the real wage of the employee, hence the lower the labor supply elasticity, which in turn reduce the flexibility (or sensitivity) of employment to changes in output. The same holds for VAT where Okun's coefficients is as low as 0.19 at the 75th percentile of sample VAT rates. On the other end, Okun's coefficient reaches 0.34 when using the 10th percentile of VAT sample rates.

Table 4. Employment Gaps and Tax Rates

	Employment Gap			
Output Gap	0.213**	0.434***	0.151*	0.374***
	(0.0741)	(0.0466)	(0.0786)	(0.0758)
Monetary Policy Rate (-1)	0.0197*	0.0207*	0.0430*	0.0174*
	(0.0107)	(0.0105)	(0.0224)	(0.00947)
Expenditure (-1)	0.00256	0.00232	0.00950	0.0179
	(0.0222)	(0.0217)	(0.0226)	(0.0216)
PIT (-1)	-0.00785			
	(0.00505)			
PIT(-1)*Output Gap	0.111			
	(0.335)			
VAT(-1)		-0.00544		
		(0.00642)		
VAT (-1)*Output Gap		-1.150***		
		(0.296)		
CIT(-1)			-0.0305**	
			(0.0126)	
CIT(-1)*Output Gap			0.349	
			(0.304)	
SSC(-1)				-0.0404**
				(0.0143)
SSC(-1)*Output Gap				-0.395*
				(0.199)
Observations	158	158	158	131
R2	0.583	0.609	0.608	0.640
Non-Fiscal R2	0.577	0.577	0.577	0.614
Countries	14	14	14	13

Estimation includes country fixed effects and intercept
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

B. Positive and Negative Output Gaps

A significant interaction between fiscal policy and the output gap could entail that a fiscal expansion has a larger impact on employment during positive output gaps or that a fiscal contraction has a larger impact during negative output gaps, for instance. The tables below report the regression results of the baseline model expanded to include a dummy taking one at times of negative output gaps.

The results show that spending items which only featured a direct effect before display no statistically significant difference between positive and negative output gaps either. However, for wages and goods and services the coefficients of the overall effects are considerably larger than without controlling for the state of the cycle. Further, the positive effect of subsidies on employment is almost entirely associated with positive output gaps, since the coefficient associated with downturns is negative and of a similar magnitude (−0.280) of the one for expansions (0.263) (Table 5). This suggests that during recessions, subsidies have no impact on employment beyond the one deriving from Okun's Law (via aggregate demand). Similarly, we find that the increases in social security contributions are more harmful to employment at times of expansions than at times of negative output gaps (Table 6).

Table 5. Employment Gaps, Positive and Negative Output Gaps, and Expenditure

	Employment Gap						
Output Gap	0.241***	0.227***	0.226***	0.220***	0.220***	0.221***	0.215***
	(0.0257)	(0.0305)	(0.0318)	(0.0371)	(0.0387)	(0.0292)	(0.0375)
Negative Gap	0.000140	0.000139	0.000183	0.00003	-0.00007	0.00006	-0.000340
	(0.000678)	(0.000757)	(0.000752)	(0.000909)	(0.000917)	(0.000753)	(0.000968)
Monetary Policy Rate (-1)	0.0169**	0.0191*	0.0202**	0.0192*	0.0191*	0.0213**	0.0174
	(0.00793)	(0.00955)	(0.00945)	(0.0105)	(0.0111)	(0.00903)	(0.0115)
Disc.Expenditure	0.0967***						
	(0.0265)						
Disc.Expenditure*Neg.Gap	-0.0864**						
	(0.0418)						
Disc. Primary Current Expenditure		0.0988**					
		(0.0362)					
Disc. Prim.Cur.Expenditure*Neg.Gap		-0.0770					
		(0.0530)					
Disc. Capital Expenditure			0.0252				
			(0.0326)				
Disc. Capital Expenditure*Neg.Gap			-0.0349				
			(0.0502)				
Disc. Wage & Salaries				0.377***			
				(0.122)			
Disc. Wage & Salaries*Neg.Gap				-0.219			
				(0.200)			
Disc. Goods & Services					0.447**		
					(0.211)		
Disc. Goods & Services*Neg.Gap					-0.305		
					(0.250)		
Disc. Social Benefits						0.251**	
						(0.102)	
Disc. Social Benefits*Neg.Gap						-0.0930	
						(0.144)	
Disc. Subsidies							0.263**
							(0.0928)
Disc. Subsidies*Neg.Gap							-0.280***
							(0.0897)
Observations	496	400	400	309	295	387	280
R2	0.484	0.424	0.405	0.395	0.391	0.408	0.399
Countries	34	29	29	23	22	26	21

Estimation includes country fixed effects and intercept
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Employment Gaps, Positive and Negative Output Gaps, and Tax Rates

	Employment Gap			
Output Gap	0.218***	0.221***	0.221***	0.221***
	(0.0262)	(0.0264)	(0.0266)	(0.0239)
Negative Gap	-0.00124	-0.00393***	0.000274	-0.00423**
	(0.00249)	(0.00128)	(0.00325)	(0.00143)
Monetary Policy Rate (-1)	0.0205*	0.0183	0.0433*	0.0149
	(0.0111)	(0.0115)	(0.0215)	(0.0109)
Expenditure (-1)	0.00347	-0.00110	0.00955	0.0154
	(0.0217)	(0.0227)	(0.0232)	(0.0223)
PIT (-1)	-0.00879			
	(0.00727)			
PIT(-1)*Negative Gap	0.000169			
	(0.00689)			
VAT(-1)		-0.00631		
		(0.00764)		
VAT (-1)*Negative Gap		0.0190*		
		(0.00918)		
CIT(-1)			-0.0298**	
			(0.0121)	
CIT(-1)*Negative Gap			-0.00495	
			(0.0104)	
SSC(-1)				-0.0425**
				(0.0161)
SSC(-1)*Negative Gap				0.00960**
				(0.00430)
Observations	158	158	158	131
R2	0.587	0.592	0.607	0.639
Countries	14	14	14	13

Estimation includes country fixed effects and intercept
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

C. Unemployment Gaps

The focus on employment gaps posits this study closer to the literature on output multipliers and business cycles which examine employment dynamics rather than unemployment dynamics. However, as indicated, Okun initially analyzed the relationship between GNP and unemployment. In this section, we report econometric results of the relationship between fiscal policy and unemployment gaps, with the intent to complete and complement our analysis on the employment gaps. Overall, we find that the results on Okun's Law and on expenditure policy are largely in line with those obtained from the employment gap analysis. The impact of tax policy on unemployment gaps seems to capture more labor supply dynamics rather than labor demand, and therefore it is different from the impact on employment gaps.

We find that Okun's Law holds for unemployment gaps, with a coefficient largely in line with what found by the literature (Daly and Hobijn, 2010; Daly and others, 2013; Ball and others, 2013). The coefficient is slightly higher than that one for employment gaps, suggesting that deviations from potential output might also affect labor force participation (Table 7).

Table 7. Okun's Law: Output and Unemployment Gaps

	Unemployment Gap
Output Gap	-0.335***
	(0.0256)
Observations	833
R2	0.524
Countries	34

Estimation includes country fixed effects and intercept
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

When fiscal policy measures are included in the analysis, we find that the spending multiplier is lower for unemployment than employment as also found by Dell'Erba and others (2014). Further, the impact of primary current discretionary expenditure on unemployment is very similar to that one on employment, with the exception that the impact of spending on wages and salaries is insignificant (Table 8). Goods and services is, again, the expenditure item with the strongest impact on unemployment with a multiplier of 0.34.

The only tax policy instrument that affects unemployment is changes in personal income tax, usually a crucial factor for labor supply decisions (Table 9). Finally, contrary to the case of employment gaps, Okun's relationship between unemployment and output gaps is not sensitive to any fiscal policy change; the interaction term is indeed insignificant for all instruments, indicating that spending or taxation does not matter for the employers and employee's decisions. The different temporal dimension for employment and unemployment can be an additional factor underlining differences between unemployment and employment gap estimates. This is because of the lag for the formal registration of an *out of work* person as *unemployed.*

1

Table 8. Unemployment Gaps and Discretionary Expenditure

	Unemployment Gap						
Output Gap	-0.345***	-0.327***	-0.322***	-0.338***	-0.344***	-0.346***	-0.347***
	(0.0304)	(0.0264)	(0.0273)	(0.0343)	(0.0335)	(0.0335)	(0.0371)
Monetary Policy Rate (-1)	3.43e-05	-0.00181	-0.00434	-0.00687	-0.00373	-0.000928	-0.00427
	(0.00542)	(0.00775)	(0.00791)	(0.00705)	(0.00690)	(0.00745)	(0.00817)
Disc.Expenditure	-0.0580***						
	(0.0205)						
Disc.Expenditure*Output Gap	-0.258						
	(1.766)						
Disc. Primary Current Expenditure		-0.0707***					
		(0.0179)					
Disc. Primary Current Expenditure*Output Gap		-0.362					
		(1.758)					
Disc. Capital Expenditure			0.0659				
			(0.0490)				
Disc. Capital Expenditure*Output Gap			-2.389				
			(2.165)				
Disc. Wage & Salaries				-0.179			
				(0.120)			
Disc. Wage & Salaries*Output Gap				-10.76			
				(8.171)			
Disc. Goods & Services					-0.343***		
					(0.121)		
Disc. Goods & Services					-1.417		
					(10.78)		
Disc. Social Benefits						-0.155*	
						(0.0877)	
Disc. Social Benefits*Output Gap						4.161	
						(5.644)	
Disc. Subsidies							-0.117*
							(0.0613)
Disc. Subsidies*Output Gap							-3.799
							(4.509)
Observations	625	496	496	388	375	484	347
R2	0.555	0.509	0.502	0.507	0.516	0.508	0.515
Countries	34	29	29	23	22	26	21

Estimation includes country fixed effects and intercept
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9. Unemployment Gaps and Tax Rates

	Unemployment Gap			
Output Gap	-0.320***	-0.406***	-0.290***	-0.362***
	(0.0700)	(0.0935)	(0.0589)	(0.0769)
Monetary Policy Rate (-1)	-0.00291	-0.00429	-0.00373	-0.00208
	(0.00537)	(0.00603)	(0.00665)	(0.00788)
Expenditure (-1)	0.0399**	0.0295**	0.0277*	0.0250*
	(0.0162)	(0.0128)	(0.0131)	(0.0131)
PIT (-1)	0.0107**			
	(0.00430)			
PIT(-1)*Output Gap	-0.0723			
	(0.313)			
VAT(-1)		-0.00353		
		(0.0104)		
VAT (-1)*Output Gap		0.436		
		(0.548)		
CIT(-1)			-0.000248	
			(0.00563)	
CIT(-1)*Output Gap			-0.173	
			(0.217)	
SSC(-1)				0.00678
				(0.0102)
SSC(-1)*Output Gap				0.0616
				(0.237)
Observations	249	249	249	210
R2	0.576	0.570	0.568	0.579
Countries	14	14	14	13

Estimation includes country fixed effects and intercept
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

V. CONCLUSION

Labor market conditions across most OECD countries continue to be significantly worse than desired by society. Although policy makers and even central bankers pay close attention to movements in employment and unemployment, the understanding of how to influence these movements is still limited. In order to design supportive fiscal policy to help the economy overcome mass unemployment, in particular for the young, it is crucial to understand which policy instruments could be useful.

This study investigates the impact of fiscal policy instruments on labor market outcomes in the short-run, looking at deviations of employment from its long-run trend. The theory postulates that such deviations in employment are tightly linked to output deviations from its long-term trend. We find strong evidence of this relationship and thus place our analysis in the context of Okun's Law.

Okun's law has proven to be relatively stable throughout various specifications. However, we could observe deviations in several cases: a two percent of GDP increase in discretionary spending—a number which roughly corresponds to fiscal stimuli in some countries during the global financial crises would shift Okun's coefficient from around 0.2 towards 0.3. The good news is hat this influence only happens in expansions. In other words, some instruments of fiscal policy help to support job creation when the output gap is expanding, but they do not lead to more layoffs during bad times.

Considering different fiscal policy instruments, we find that fiscal policy can impact the labor market through current discretionary spending, and cuts in corporate taxation and social security contributions. We also find that spending on subsidies and changes in social security contributions can magnify the impact that fiscal policy has on employment during positive output gaps. While the employment multiplier for total discretionary spending is relatively small, some expenditure items feature a stronger influence on employment outcomes. For instance, spending one percent of GDP on goods and services can lead to an increase in employment rates by up to 0.4 percentage points.

Finally, while the direct effect of specific tax rates is significant but relatively contained, for VAT and social security contributions, the level of the average tax rate in the country has a strong influence on the strength of Okun's Law. Countries with higher rates tend to have smaller Okun's coefficients.

Which policy implications can we draw from these results? First, the optimal size of Okun's coefficient is a political choice for each country. This paper shows that fiscal policy can exert some influence on the sensitivity of employment to output, in particular through the tax system. Second, when considering fiscal support for job creation, fiscal space and possibly distortionary impact of certain fiscal policies are important to take into account, in particular given the relatively small size of the impact. Overall, this paper only looks at short term effects, and some of the transmission channels for fiscal policy might take longer to materialize. Further research in this area is warranted, in particular to shed light on the different channels through which fiscal policy can influence labor market outcomes.

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