How to deal with the job crisis?

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HOW TO DEAL WITH THE JOB CRISIS?
HOW TO DEAL WITH THE JOB CRISIS?
Answers from a macroeconomic-modelling approach

INTERNATIONAL LABOUR ORGANIZATION
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Abstract

This paper is part of a series of discussion papers that have been prepared by the International Institute for Labour Studies (IILS) within the framework of the joint project “Addressing European labour market and social challenges for a sustainable globalization”, which has been carried out by the European Commission (EC) and the International Labour Organization (ILO). The discussion paper series provides background information and in-depth analysis for two concluding synthesis reports that summarize the main findings of the project. This paper relates to first part of the project “Addressing the short- and medium-term labour market and social challenges of the current economic and financial crisis” and the concluding synthesis report “Building a sustainable job-rich recovery”.

The aim of this note is to present an overview of the current understanding of the role of fiscal policy in promoting an employment recovery, taking into account different labour market characteristics such as segmentation and different wage bargaining institutions. Specifically, the note discusses the resilience of economies with segmented labour market. Regarding fiscal policy, it demonstrates that wage bargaining institutions that also include hours worked in their bargaining process typically leads to improved employment outcomes, despite the fact that output and real wages are reacting in a similar fashion. Finally, the note discusses the importance of targeted active labour market policies in promoting employment creation: When such policies specifically increase search effort of the unemployed, their effectiveness is multiplied in comparison to a general spending increase that gets diluted in the economic system.
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Main findings

- Adverse shocks to the economy – such as the current global financial crisis – lead to a serious deterioration of the quality of work and an increase in non-standard employment. At the same time, countries with large segments of non-standard, informal labour markets are much less resilient against these shocks and suffer a more severe crisis as a consequence. This implies that policies targeting a reduction in the informal economy, for instance through incentives for formal sector job creation, can improve a country’s resilience to shocks.

- Fiscal instruments are effective tools for countries to counter-act the impact of a crisis: Both general public spending and labour market policies help mitigate the adverse shock. Existing evidence demonstrates such interventions can be highly efficient in times of crisis and help limit employment losses and steer the economy out of recession. In particular, an overview of the literature and original research in this paper shows that:

  - Public consumption is an efficient form of public intervention through its positive impact on aggregate demand. The multiplier is large and close to one in the short term. Both employment and hours increase following an increase in public consumption.
To further increase the size of the employment multiplier, policy makers should strengthen incentives to increase jobs rather than hours. The case where hours worked result from a bargaining between workers and firms yields a superior outcome than the case where firms set hours unilaterally.

Labour market spending aiming at easing the matching between unemployed and vacancies are also associated with a positive employment multiplier. More efficient labour markets improve firms’ production and the state of the economy.

There is an optimal level of labour market spending for which the fiscal multiplier is maximum: both, private consumption and employment react positively to public intervention, increasing social welfare.

Introduction: one sided recovery and fiscal stimulus

The economic crisis has turned into a job depression. Despite the timid recovery of GDP, employment is likely to recover with a long delay and at a much slower pace, an asymmetric reaction that might be labelled a one-sided recovery. Consequently, a key aspect of the way out of the crisis is the ability of public authorities to stimulate job creation. Unemployment bears large economic and social costs and can be a long term impediment to economic recovery: unemployed workers become discouraged and leave the labour market. Even if they eventually return to work, they are less productive having lost most of their skills after prolonged spells of unemployment. Finally, there will be a growing sentiment of unfairness in the face of impoverishment.

Public authorities have implemented large fiscal stimulus packages aiming at stabilizing the financial system as well as steering the economy out of recession. These fiscal packages are heterogeneous across countries and are made of a disparate number of initiatives ranging from support to the financial sector to infrastructure investment, tax cuts, social protection and labour market policies. The effectiveness of the different measures is widely debated by policy makers, which has also triggered renewed interest for this issue within academic circles. In particular, the relative merits of fiscal versus monetary stimulus are being debated. In addition, several authors have stressed the particular circumstances of the current crisis which may justify a more interventionist approach by policy makers. In particular the liquidity trap on financial markets that has frozen up credit supply is said to be addressed most appropriately by fiscal policies.

What has not being much discussed in the current debate is the nature and characteristics of labour markets in different countries and the different forms of government policies when transmitting macroeconomic stimulus into higher employment. Indeed, large cross-country differences exist as regards the extent to which labour market segmentation prevents a proper and timely adjustment of employment to exogenous shocks. In
addition, wage bargaining institutions and patterns differ significantly across countries and need to be taken into account in order to understand the transmission of government policies. On the policy side, most models assume a simple increase in general government consumption, financed by an increase in the net present value of taxation to balance the budget. In reality, however, government spending can take many different forms, including active labour market policies that target directly the process by which job vacancies and unemployed workers are generating increases in employment.

The aim of this note is to present an overview of the current understanding of the role of fiscal policy in promoting an employment recovery, taking into account different labour market characteristics such as segmentation and different wage bargaining institutions. Specifically, the note discusses the resilience of economies with segmented labour market. Regarding fiscal policy, it demonstrates that wage bargaining institutions that also include hours worked in their bargaining process typically leads to improved employment outcomes, despite the fact that output and real wages are reacting in a similar fashion. Finally, the note discusses the importance of targeted active labour market policies in promoting employment creation: When such policies specifically increase search effort of the unemployed, their effectiveness is multiplied in comparison to a general spending increase that gets diluted in the economic system.

The rest of the note is organized as follow. Section A discusses the employment effects of exogenous shocks when labour market segmentation is present. Section B looks specifically into the effectiveness of fiscal policies in raising employment. After a brief overview of the literature, model results are presented from a set-up with different wage bargaining institutions and different forms of government spending. A final section concludes. All technical considerations are grouped together in three working papers in order to guarantee readability:

- Bridji S. and Charpe M., (2010) ”Dual labour markets with search costs”, mimeo INST
- Bridji S. and Charpe M., (2010) ”Active labour market policies, search costs and positive fiscal multiplier”, mimeo INST
- Bridji S. and Charpe M., (2010) ”Fiscal policy and the labour market”, mimeo INST

A. The employment challenge and labour market segmentation

This section briefly reviews different approaches at modelling the labour market in macro models and then presents a new approach based on segmented labour markets as well as first results. The objective is to go beyond existing models of the labour market and to address a silent feature of modern economies: the segmentations of labour
markets. In particular, this section looks at the job quality dynamics over business cycle fluctuations and the consequences of labour market segmentation for a country’s resilience.

1. Literature review

Until recently, labour markets have not played a central role in macroeconomic models. Real business cycle models – the main workhorse of rational expectation macroeconomics since the 1970s – assume Walrasian labour markets with market-clearing wages that rule out involuntary unemployment or even employment adjustment dynamics. These models had been ill-suited to account for the continuous rise in structural unemployment rates in Europe during the 1970s and 1980s and for the observed sluggish employment adjustment following shocks. Their wage flexibility assumptions implied overly smooth employment behaviour over the business cycle and too low output and inflation persistence.

Partly in reaction to these difficulties of RBC models to allow for accurate dynamic behaviour, partly in a desire to make macroeconomic models more realistic, search and matching models have been integrated into the macroeconomic modelling framework. The main contribution of search theories of the labour market is to model job and worker flows: the transition of workers in and out of unemployment and the process of job destruction and creation. In these models, jobs arise as a result of a trading process between unemployed workers and firms that open job vacancies. Workers and employers need to spend resources to find productive jobs as workers and jobs are not identical and as there is imperfect information. As a consequence, employment adjustment takes time as new hires can only be brought in through the matching process. The number of unemployed finding a job and employers filling a vacant position depends on the level of unemployment and the number of vacancies. Such a search process highlights the fact that trade in labour market is a decentralized economic activity which is uncoordinated, time consuming and costly for both firms and workers.

Labour market segmentation is another pervasive phenomenon in real-world economies. Certain categories of workers are confined to jobs characterised by bad working conditions and low pay without having the opportunity to move to alternative occupations. Often, these jobs come with substantial job insecurity or even without a formal work contract, making them particularly precarious. To account for such labour market duality, several models have extended the search methodology (e.g. Davidson et al. (2008) and Hosios (1990)). These models typically incorporate two labour markets, one frictionless segment with (almost) no unemployment, the other characterised by search costs. There is unemployment in the primary labour market, while workers

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1. See for instance (C. Pissarides 2000) or (Shimer 2007) for a presentation of the search and matching functions.
willing to find a standard job have to queue. Rent sharing and wage bargaining lead firms to pay higher wages in the primary labour market. An interesting extension is Acemoglu (2001). Minimum wages and unemployment benefits shift the composition of employment towards high-wage jobs. With higher unemployment benefits, waiting for high-wage jobs is less costly and workers can refuse low wage jobs.

So far, however, these considerations have been limited to a partial equilibrium framework (e.g. Saint-Paul (1996), Zenou (2008)). Only recently researchers have started to apply search and matching functions to segmented labour markets in general equilibrium and macroeconomic models, applying them to countries with large informal labour markets (e.g. Batini and al. (2009)). Batini and al. (2009) discuss the costs and benefits of informality with a focus on tax restriction, wage flexibility and monetary policy. Others link labour market segmentation to the heterogeneity of production sectors to understand the employment dynamics over the business cycle in an open economy context (Fiess et al. 2002).

2. Main features of the model

In line with existing approaches, our model is structured around monopolistically competitive firms that use three inputs (capital, standard and non-standard labour) in order to produce a homogenous consumption good. This modelling strategy reflects the fact that non-standard work increasingly takes place within the same production units alongside standard work. The firm hires the two types of workers on two different labour markets that are subject to different adjustment mechanisms:

- The standard labour market is modelled following the search and matching approach as discussed above. Search and matching functions enable to apprehend employment from a flow perspective. The number of new vacancies depends on the hiring incentives of firms as well as on the wage that is negotiated between employers and workers at the firm level. This allows a detailed description of flows in and out of unemployment.

- The non-standard labour market is modelled as a competitive labour market, to account for the relative lower degree of regulation of these markets. The parameters characterizing each labour market are chosen such that there is a wage gap and a productivity gap between the two labour markets, with standard jobs being associated with higher income and higher productivity.

Workers can switch between the two labour markets but at a cost. The transition is costly in terms of time and resources. The relative size of the two segments is driven by two mechanisms. First, the relative wage affects labour demand by firms. Second, workers compare utilities associated with standard jobs, unemployment and non-standard jobs. In equilibrium, the value of being unemployed in the primary labour
market is equal to non-standard wages plus switching costs. To reflect learning-by-doing effects, the model also includes capital adjustment costs.

3. Overview of the results

The model is calibrated such that the steady states are economically meaningful. The value of the main parameters is consistent with the existing empirical literature\(^2\). The unemployment rate is set at around 10%, while standard and non-standard employment account for 30% and 60% respectively, roughly in line with labour market characteristics in the average developing country. The consumption-to-output ratio is close to 75%, which is consistent with empirical evidences. Lastly, the wage share is set at 64%, in line with the average wage share in OCED countries.

The first set of results discusses the long-term behaviour of the steady states for different values of switching costs. Switching costs affect the ability of workers to shift between the different segments of the labour markets. In the long-run, non-standard wages equal the utility of being unemployed minus switching costs. Increasing the switching costs, therefore, reduces non-standard wages and generates an increase in non-standard labour demand of firms. Lifting the barrier between the two segments of the labour market raises the relative size of non-standard employment. Consequently, output is lower due to the existence of the wage gap between the two labour markets (see figure 1.1).

The second set of comparative static analyzes the impact of higher search costs on the steady state values of the main macroeconomic variables. Similarly to the standard search model, higher search costs reduce (standard) employment and increase unemployment. Their effects on non-standard employment are limited, as it increases at first and then decreases slightly. The main transmission channel from the standard sector to the non-standard sector goes through the equilibrium condition for the transition between the two labour markets. Lower non-standard wages have limited effects on non-standard employment as a result of the higher transition costs. In sum, higher search costs increases unemployment, and the relative size of non-standard employment. Higher unemployment reduces the wage share, consumption and output (see figure 1.2).

\(^2\) See Bridji S. and Charpe M., “Dual labour markets with search costs” section 3.1 for a discussion of the main parameters values.
Figure 1.1: The impact of switching costs on steady states

Note: The figure displays steady state values for main macroeconomic aggregates depending on the importance of switching costs between standard and non-standard labour market segments.

Figure 1.2: The impact of switching costs on steady states

Note: The figure displays steady state values for main macroeconomic aggregates depending on the importance of switching costs between standard and non-standard labour market segments.
Figure 1.3 illustrates the key dynamics at work in our model. It displays impulse response functions to a productivity shock of one percent of steady state output. Responses are expressed as a percentage deviation from the steady state value of the respective variables. In line with the result of a search model with a single labour market, the main macroeconomic variables (consumption, investment and output) are pro-cyclical. The positive shock on productivity increases the marginal productivity of labour and capital and their respective prices too (see also correlations in table 1.1).

The first result is that non-standard employment is counter-cyclical, in line with the view of non-standard employment as a buffer. This follows from the fact that the interest rate and standard wages are adjusting less rapidly than the corresponding marginal productivities of capital and labour due to capital adjustment and search costs, which fosters an increase in the demand for both inputs. Non-standard wages increase faster than standard wages in the absence of search costs in the non-standard sector. Firms therefore substitute non-standard with standard workers. Standard labour increases at the expense of non-standard labour. Non-standard labour plays the role of a buffer and decrease in the upturn. In the long-run, standard employment returns to its steady state, as standard wages adjust downward slower than non-standard wages. This first result is central, as it points to the deterioration of job quality in a downturn. The substitution of well paid jobs for low paid, un-protected jobs calls for policies to protect these workers during economic crisis and this not only from an equity but also from an efficiency standpoint.

**Figure 1.3: Non-standard work is counter-cyclical**

Note: The graph displays the dynamic reaction of main macroeconomic aggregates with respect to a productivity shock over a period of 50 quarters.
Table 1.1 displays statistics summarizing the characteristics of the business cycle for four different nested models. The performances of two variants of our segmented labour market model are assessed against those of a Real Business Cycle (RBC) model and a search model without labour market segmentation. The aim is to compare the macroeconomic characteristics of an economy with a homogenous labour market with that of an economy with segmented labour markets. Put differently, the issue is to explore whether the existence of a non-regulated labour market alongside a well-protected labour market increases the ability of an economy to absorb shocks. There are two competing mechanisms at play. On the one hand, the existence of a flexible labour market has positive effects at the micro level as firms are able to adjust the composition of labour and to restore profitability. On the other hand, this re-composition induces worker flows between labour market segments, which increase economic volatility.

Table 1.1: Cycle properties: search costs with different level of non-standard employment

<table>
<thead>
<tr>
<th></th>
<th>RBC</th>
<th>Search model</th>
<th>Non standard employment-witching costs</th>
<th>Non standard employment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \sigma(y)=0.5 )</td>
<td>( \sigma(y)=0.41 )</td>
<td>( \sigma(y)=0.21 )</td>
<td>( \sigma(y)=2.59 )</td>
</tr>
<tr>
<td>( \sigma(x) )</td>
<td>0.32</td>
<td>0.21</td>
<td>0.35</td>
<td>0.35</td>
</tr>
<tr>
<td>( \sigma(x)/\sigma(y) )</td>
<td>0.63</td>
<td>0.43</td>
<td>0.70</td>
<td>0.70</td>
</tr>
<tr>
<td>Corr(x,y)</td>
<td>0.96</td>
<td>0.91</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>( \sigma(x) )</td>
<td>0.22</td>
<td>0.16</td>
<td>0.22</td>
<td>0.22</td>
</tr>
<tr>
<td>( \sigma(x)/\sigma(y) )</td>
<td>0.55</td>
<td>0.38</td>
<td>0.54</td>
<td>0.54</td>
</tr>
<tr>
<td>Corr(x,y)</td>
<td>0.96</td>
<td>0.92</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>Consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment</td>
<td>0.03</td>
<td>0.06</td>
<td>0.03</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Standard employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment</td>
<td>–</td>
<td>–</td>
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<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td>Non-standard</td>
<td>–</td>
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<td>–</td>
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</tr>
<tr>
<td>employment</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Standard wages</td>
<td>0.35</td>
<td>0.70</td>
<td>0.35</td>
<td>0.35</td>
</tr>
<tr>
<td>Non-standard</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>wages</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In table 1.1, column 1 is a measure of volatility and displays the standard deviation for different macroeconomic variables. Column 2 is an alternative measure of volatility and displays the standard deviation of a given variable normalized by the standard deviation of output. Column 3 provides a measure of co-movement of each variable with output. It is also worth pointing out that our two benchmark models, the RBC and the search models have conventional properties. In particular, RBC models are unable to account for the observed persistence in employment (normalized standard deviation is close to zero) as the macroeconomic adjustment fall completely on wages. The innovation of
search and matching function is that search costs reduces the volatility of wages and increase that of employment \((\sigma(x)/\sigma(y) = 0.13)\).

The impact of the non-standard sector on the persistence of employment and wages is assessed by comparing the characteristics of the RBC and search models against the model with dual labour markets. The model with dual labour markets is analyzed for two different sets of parameters. The first set of parameters corresponds to the parameters discussed in the calibration section. The steady state level of informal employment is calibrated by adjusting the switching costs between the two labour markets. Switching costs are set to 10, while the parameter for the elasticity of capital in the production function is equal to 0.26. The non-standard sector accounts for 57% of the active population, while the unemployment rate is 13%. The consumption to output ratio also increases to 73%. The corresponding properties of the business cycle following a positive productivity shock are displayed in column 3 of table 1.1.

Output volatility drops to 0.21 in the presence of high switching costs, which is twice as low as that of either the RBC or the search model. This result is consistent with Conesa et al. (2002), who show that the volatility of economies with non-standard labour is related to the transition of population between the two labour markets. In our model, large transition costs reduce the population switching effect. The presence of both search and switching costs also greatly increase the normalized volatility of employment to 0.24 from 0.13 in the search model with single labour market. The absolute volatility of wages (0.13 and 0.09) is similar to the volatility of the search model with single labour market. The normalized volatility of wages is however much larger in the model with dual labour markets. This result stands in contrast with the conclusion of Batini et al. (2009), who argue that the non-standard labour market increases the overall flexibility of the economy.

In a second calibration, capital elasticity is increased whereas the transition costs are reduced close to zero. The non-standard sector now accounts for 50% of the active population, while unemployment is smaller at 5%. With this calibration, output volatility \((\sigma(y) = 2.59)\) is more than five times larger than that generated by the RBC and search models (see column 4 of table 3.1). This result is consistent with the previous simulations, which show that the transition of the population between the two sectors of the economy amplifies the business cycle fluctuations. Moreover, the combination of a large non-standard sector with small transition costs reduces the impact of search costs on the persistence of employment. An economy with free transition of households between the two labour markets is similar to an economy with a single competitive labour market. Most of the adjustment falls on wages \((\sigma(x)/\sigma(y) = 0.43\) and 0.45 for standard and non-standard wages respectively), while employment persistence falls to zero. These results are in line with the conclusions of Batini et al. (2009), which argue that the non-standard sector increases the overall flexibility of both labour markets.
Figure 1.4 performs sensitivity analysis and displays the standard deviation of output, wages and employment for different values of switching costs ranging from 5 to 15. The sensitivity analysis confirms the results found previously regarding the impact of switching costs on the volatility of output, employment and wages. Results are in line with the above discussion. Increasing switching costs reduce output volatility, as volatility is here generated by households moving between the standard and non-standard labour markets. Similarly, increasing the switching costs greatly increases the volatility of employment, while the volatility of wages decreases in the non-standard sector or stays mainly constant in the standard sector. Summing up, this second set of results show that in the absence of transition costs, the existence of an unregulated labour market has some positive microeconomic effects at the firm level, but perverse effects at the macroeconomic level. The large increase in volatility can be interpreted as a sign that economies with segmented labour market are fragile and less resilient to shocks.

B. Fiscal Policy and the fiscal multiplier

This section discusses what macroeconomic models can tell us about the capacity of policy makers to soften the impact of a shock. In particular, three main questions addressed in this section.
First, is fiscal policy efficient in steering the economy out of recession? Recent fiscal consolidation worldwide highlights that policy makers are dubious about the positive impact of fiscal policy.

Second, how efficient are fiscal policies? There are intense debates in the academic circles regarding the size of the fiscal multiplier: is it lower or larger than 1.

Third, the aim is to identify the channels through which fiscal policy is efficient. In particular, we discuss three transmission channels: aggregate demand versus supply side effects, active labour market policies and the matching process as well as hours versus jobs, (the intensive versus the extensive margin of labour adjustment).

This section is divided into three parts. The first part discusses the existing empirical and theoretical literature. Part 2 presents a model helping to understand the role of the wage formation process in the transmission of fiscal policies. A final part focuses on labour market policies, illustrates the positive impact of active labour market policy on the matching between unemployed and vacancies, and compares it with the more general case of government consumption.

1. Literature review

This subsection discusses both the empirical and theoretical literature related to the impact of fiscal policy on the economy. We first review empirical studies, which measure the size of the multiplier in different countries and in different macroeconomic environments. We then discuss the ability of theoretical model at explaining the empirically observed fiscal multiplier.

Empirical evidences: heterogeneous fiscal multipliers

Size of the multiplier in advanced economy

The methodological set-up in estimating fiscal multipliers determines to a significant extent the size of the estimated multiplier. In addition, estimated multipliers depend on the time horizon over which they are assessed and the frequency of the underlying time series. Typically, short-term estimates are higher than longer term ones, but also depend on the evaluation methodology. The most important difficulty in these studies relates to the fact that in reduced form models only fiscal multipliers for exogenous government spending can be properly accounted for. Automatic stabilizers where the evolution of spending and taxation evolves endogenously with the cycle cannot be reliably accounted for, leaving out substantial parts of the public budget from a proper analysis and preventing a better understanding of the cyclicality of public finances.

In response to these difficulties, different authors have spent serious effort to single...
out discretionary changes in the stance of fiscal policies that are unrelated to cyclical conditions:

- Sectoral studies suggest a substantial impact of government spending on industrial activity as government spending is highly concentrated in a limited number of key sectors (e.g. IT, military equipment); estimated multipliers are often substantially larger than unity (Nekarda & Ramey 2010). In contrast, aggregate studies seem to support the view that much of such spending triggers sectoral readjustments with little aggregate effect (Barro & Redlick 2009).

- Estimations based on large-scale macroeconomic models typically point to sizeable fiscal multipliers that can be greater than 1 at least in the short-run. Models based on rational expectations usually show strong crowding out over the medium-term, which lowers the estimated fiscal multiplier quickly after impact, i.e. makes the impact of a fiscal policy shock short-lived (Burnside et al. 2004). On the other hand, models using behavioural consumption functions Gali et al. (2007), or those that integrate government employment or a wealth effects from government bonds (“non-Ricardian” models) show a more permanent effect of fiscal policy on economic activity even over the longer-term (Cavallo 2005; Cogan et al. 2009). The spending multiplier is 0.78 on impact and 1.74 at the end of the second year.

- Estimations based on (structural) Vector Auto Regression (VAR) analysis suggest that spending multipliers are typically small, below one and have decreased over time Blanchard and Perotti (2002). Multipliers related to tax cuts are even smaller and the effect of both an increase in government spending and a cut in taxes is short-lived. Finally, public spending principally acts through household consumption whereas its impact on business investment is nil or negligible (Fatas & Mihov 2001). In contrast to Blanchard and Perotti (2002), their estimates indicate a fiscal multiplier larger than one.

- Finally, event studies have been used to assess the fiscal multipliers of discretionary changes in the stance of fiscal policies that could be considered to be exogenous to business cycle developments, such as the income tax rebates in the US in 2001, the 1995-stimulus package in Japan or the (automatic) deterioration of the stance of fiscal policies in Finland during the 1991-93 crisis. Due to the particular circumstances for each single measure, no general results arise from these studies regarding the effectiveness of the measure. Common to all seems to be, however, that measured effects have been relatively short-lived, confirming in this sense the above mentioned econometric results by Blanchard and Perotti (2002).
The fiscal multipliers depend on the type of fiscal and monetary policies and business cycle characteristics

Woodford (2010) analyses the size of the fiscal multiplier under different characteristics of the business cycle. In an economy with rigid prices and wages, the multiplier is smaller but close to unity. The type of monetary policy pursued by the Central Bank also affects the effectiveness of fiscal policies. The rise in interest rates following a fiscal expansion tends to reduce the fiscal multiplier, as higher interest rates depress consumption and investment. When monetary authorities maintain a constant path for the real interest rate, the fiscal multiplier is equal to unity. In periods of low or zero nominal interest rates, inflationary effect of fiscal stimulus may even increase the fiscal multiplier above one. The zero lower bound for monetary policy is likely to bind in periods of credit market crunch and prolonged recessions. Fiscal policy is therefore more efficient in bad times than in normal times. Woodford (2010) shows that the fiscal multiplier was as large as 2.29 during the Great Depression, in line with results of Christiano et al. (2009). Lastly, the efficiency of fiscal expansion is linked to its duration. The fiscal multiplier exceeds unity if fiscal expansion last as long as the duration of the credit crunch.

Smaller multipliers in developing economies

Ilzetzki et al. (2009) use a quarterly database of 45 countries, of which 25 developing economies to study the size of the fiscal multiplier, as well as the impact of financial fragility, exchange rate regimes and economic openness on the size of the multiplier.

- Fiscal multipliers in developed economies are larger and more persistent than in developing economies: The impact response of a 1% percent shock to government consumption is 0.05 percent in developed countries (multiplier of 0.24) and 0.01 percent in developing economies (multiplier of 0). The output response remains significantly positive for 24 quarters in developed economies versus 10 quarters in developing economies. Cumulative fiscal multiplier rises from 0.24 to 1.04 for high income countries versus 0.79 for low income countries.

- Exchange rate flexibility reduces the fiscal multiplier to zero: Predetermined exchange rate regimes have an impact multiplier of 0.2 and a cumulative multiplier of 1.5. Under flexible exchange rate the impact is zero both in the short and long run. Fiscal expansion increases output and raises interest rates, leading to an appreciation of the exchange rate. Under flexible exchange rates, the appreciation is effective, while it is counteracted by monetary policy under predetermined exchange rate regimes.

- Openness reduces fiscal multipliers almost to zero: The multiplier is lower in an open economy as a larger fraction of public consumption is translated into higher imports.
Highly indebted countries have lower fiscal multipliers: In developing economies, a higher level of external debt-to-GDP reduces the persistence of fiscal expansion to 4 quarters (fiscal multiplier are zero after 10 quarters).

Pro-cyclical spending in developing economies: “it rains, it pours”

Fiscal intervention is pro-cyclical in developing economies, contrary to developed economies where fiscal intervention is a-cyclical or counter-cyclical (Ilzetzki et al. 2009). Pro-cyclical fiscal intervention is mainly explained by the limited fiscal space of developing economies, which need prior increase in tax revenue to finance additional spending. Another explanation lies in a political economy argument, which puts forward that good time encourages rent seeking activities.

Modelling a positive fiscal multiplier: Limits of Ricardian models

Empirical evidences show that fiscal expansion crowds out private investment but increases consumption leading to positive fiscal multipliers. Real Business Cycle models have difficulties in accounting for a positive fiscal multiplier. Both private investment and consumption are crowded out by rising interest rate. The main mechanism behind Ricardian model is the negative wealth effect associated with government spending shocks. In the standard neoclassical model — as in Baxter and King (1993) — an increase in government spending raises the expected net present value of taxes of households. It follows that households decrease consumption and increase labour supply (while firms’ labour demand is not affected). A side effect is the downward impact on real wage. We discuss below four modifications to amend RBC models such as to derive positive fiscal multipliers compatible with empirical evidences.

Low inter-temporal elasticities in consumption

The contribution of Monacelli and Perotti (2008) (MP hereafter) is to reduce the negative wealth effect of government spending shocks described above by altering the specification of preferences. In particular, they use a class of preferences recently introduced by Jaimovich and Rebelo (2008). This class of preferences includes two polar cases: the standard King, Rebelo and Plosser (1988) utility function as well as the Greenwood, Hercowitz and Huffman (1988) (GHH hereafter) utility function. The negative wealth effect on labour is strong in the former case whereas it is shut down in the latter case. In the presence of nominal price rigidities, higher aggregate demand then generates quantity effects and an increase in labour demand.

Monacelli et al. (2010) (MPT hereafter) explore the negative wealth effect of government spending shocks on labour supply within a non-Walrasian labour market. They develop a real model in which the labour market is subject to search and matching frictions. In this model, the labour variable is described by its extensive margin. Preferences are modelled following Shimer (2010). MPT focuses on the interaction between the
negative wealth effect of government spending shock and firms’ hiring decision. Their main result is that public intervention crowds out private consumption unless the inter-temporal elasticity of substitution between work and leisure is relatively low. Low inter-temporal elasticities are then combined with a specific wage bargaining process, which also leads to an increase in labour demand following fiscal expansion.

Wealth effect and private consumption

A second way to break the Ricardian equivalence is to introduce wealth effects in private consumption. Private consumption is likely to rise if households take into account the rise in private wealth generated by debt financed public intervention. Models in this vein modify the Euler equation such that government debt affects positively consumption decisions. Perpetual youth models introduce household cohorts that are characterized by a constant probability of death. The overlapping of generations introduces a wedge between the discount rate of individual households and the collective time preference rate of society. A main implication of this wedge is the existence of a wealth effect in aggregate consumption. As a consequence, debt-financed government spending is not completely counterbalanced by a decrease in private expenditures as consumption increases.

Credit rationing and public debt

Credit rationing is yet another way to depart from Ricardian equivalence. In Challe et al (2007) households and firms are credit constrained, which limits private consumption and investment. Debt financed fiscal expansions raise the value of the collateral of borrower, which is used by banks as a criteria to grant new loans to private agents. Higher debt facilitates self-insurance by bonds holders and relaxes borrowing constraints. In return, constrained households and firms increase both consumption and the demand for labour. They show that both the RBC predictions (lower consumption and wages) as well as the New Keynesian predictions (higher consumption and wages) may take place depending on the relative strengths of the liquidity and wealth effects. The overall effect depends on how quickly the reversion of public debt takes place: the faster the reversion of public debt, the lower the wealth effect and credit relaxation. These results are obtained in an otherwise standard model with fully flexible prices and wages, separable utility and no external productivity effects.

Non-optimizing households

Finally, a direct way to break Ricardian equivalence is to assume that some households are not optimizing inter-temporally but rather consume their entire wage income in each period. Gali et al. (2007) propose such a model, assuming two types of households. Some households are maximizing, while others are acting following rule-of-thumb. The later type of agents has no savings and consumes all its income. Hand-to-mouth households are non-Ricardian and are unable to substitute consumption and savings. Public intervention is therefore efficient the larger the size of the non-optimizing population.
Fiscal intervention raises private consumption through its positive effect on households’ budget constraint. Typically, these models require the share of non-optimizing households to be larger than 60% to get meaningful economic results.

2. Assessing fiscal policy effectiveness in macroeconomic models

Different labour market institutions

During the crisis, several governments have strengthened firms’ incentives for labour hoarding by reducing the average number of hours of work instead of cutting jobs. The intention is to maintain jobs and labour income, while retaining the skills within firms and speeding up the economic recovery. This extension of the model tries to understand what factors drives the intensive and the extensive margin of labour adjustment. In particular, the objective is to assess the impact of different types of bargaining institutions on unemployment following an increase in fiscal spending and aggregate demand.

There are three main transmission channels involved here. First, an increase in government spending generates an aggregate demand effect in the presence of nominal price stickiness. Only a small share of firms can increase prices in the face of higher demand for goods. Other firms increase production. It follows that firms increase their demand for labour inputs too. Second, the type of bargaining on hours and wages affect the fiscal multiplier. The extent to which firms increase hours work or jobs determines the ability of fiscal policy to fight unemployment. Most studies that rely on a matching framework assume a standard Nash bargaining structure where firms and workers negotiate over wages and hours of work per employed individual. In the following, we want to compare this set-up with one where firms and workers negotiate over wages while firms choose unilaterally the number of hours that each employed worker should work. Third, the negative wealth effect linked with the Ricardian equivalence is reduced by adopting a particular form of utility function. Recent work on fiscal multipliers has demonstrated the importance of the leisure-consumption trade-off in explaining the effectiveness of public stimulus packages. In particular the work summarised above has put forward that fiscal multipliers are particularly high when the inter-temporal elasticity of consumption is low.

Main features of the model

The model set-up follows Monacelli and Perotti (2008) in considering the utility function introduced by Greenwood, Hercowitz, and Huffman (1988) (GHH) into the business cycle literature. Using GHH preferences implies that the negative wealth effect on labour supply that is induced by higher government spending is shut down. Labour markets dynamics are characterised by a search and matching process in the
wholesale sector whereas wages are determined through mutual bargaining. Jobs are only created in the wholesale sector which is perfectly competitive. The monopolistically competitive retail sector proceeds at the transformation of wholesale goods to a homogenous final good to be sold to the consumer. Price rigidities in the retail sector in the form of Calvo-type price stickiness create inflation dynamics described by the New Keynesian Phillips curve.

Government spending is fully financed through higher taxation (no deficit spending) and supposed to follow an autonomous spending path. In contrast, monetary policy is implemented through the gross nominal short-term interest rate that follows a Taylor-rule, i.e. depends on the inflation and output gap.

Key to the dynamics of the model is the bargaining process over wage and hours worked per employed worker. We differentiate between two widely recognised bargaining forms: right-to-manage bargaining and efficient bargaining. In the first form, firms and workers negotiate over the appropriate wage and leave the determination of hours worked per employed worker to the firms. In the second form, we consider that workers and firms negotiate over both average hours worked per employed worker and average pay to maximize the joint surplus of any individual match. The total hours worked will then be determined through the number of open vacancies and the bargaining outcome on the hours of work per employed individual. The differences between the two resides, therefore, in the fact that only the efficient bargaining guarantees maximization of the joint match surplus and hence a maximum of new job vacancies being opened at each period of time.

**Summary of results**

On the basis of these model assumptions, efficient bargaining can be shown to significantly improve the pass-through of government spending on employment creation and output (see Erreur ! Source du renvoi introuvable.). As a matter of fact, the fiscal multiplier is larger under efficient bargaining than in the case where firms keep the right to manage the average number of hours worked (see Erreur ! Source du renvoi introuvable. upper left panel). On the labour market, employment reacts much more vigorously under an efficient bargaining process than otherwise as consistently more vacancies are being created as long as the shock lasts. In addition, average hours worked per employed individual increase more strongly, at least in the initial periods after the shock impact, raising total hours worked more than in the right-to-manage situation. As a consequence, both output and consumption increase, in line with the observed empirical stylised facts alluded to above. The model predicts that the changes in labour input (total hours worked) implied by the government spending shock are mostly adjusted along the intensive margin.
3. General government spending vs. active labour market policies

The effectiveness of public stimulus measures not only depends on the particular wage bargaining institutions prevailing in an economy but also on the different channels through which the spending measures are implemented. Most papers assume that public spending competes with private spending in the market for consumption goods to boost domestic demand. In reality, however, government spending is implemented through many other channels, some of which have a more direct bearing on economic activity. One of the channels that we are exploring in the following concerns the effectiveness at which matching takes place on the labour market. Indeed, most active labour market programs contain as part of their components instruments to promote search activities of unemployed and to improve information exchange regarding available workers and open vacancies.

Main features of the model

To implement such forms of active labour market policies, we start with a search and matching model following Ravenna and Walsh (2008) to which is added a government sector. In this basic framework, the transmission channel between fiscal policy and the real economy is similar to the transmission channel under Ricardian equivalence. An increase in government consumption reduces households’ consumption and private
investment. It also depresses the labour market, as higher interest rate tends to reduce the surplus of an additional match and the incentive of firms to hire.

We consider the role of labour market policies as regards their contribution to easing the matching process. For that purpose, the traditional matching function is extended to incorporate labour market spending. The Cobb-Douglas matching function is now made of three elements: unemployment, vacancies and active labour market spending. The main result is that labour market spending improves employment, leading to an increase in output. The transmission channel at work here stands in contrast to that underlined in the previous model. A first transmission mechanism is a supply side effect. Active labour market policies increase the production of goods by improving the level of employment. There are therefore two supply side effects at work at the same time, a negative effect linked to the crowding out of private resources and a positive effect linked to more efficient labour markets. In addition, an aggregate demand effect results from nominal price stickiness. This leads to the following results:

- First, in the case of flexible price, the model is dominated by the supply side and higher government consumption crowds out private spending. Investment and consumption decrease and over-balance the impact of higher public spending on aggregate demand. The output multiplier is negative and equal to -0.08 after four semesters.
Second, when public spending takes the form of active labour market policies, the positive impact of government spending on the labour market boost firms’ production generating a positive fiscal multiplier. Active labour market policies in this framework improve the matching between unemployed and vacancies. The output multiplier is 0.31 on impact and 0.43 after one year, while the employment multiplier is 0.11 on impact and 0.18 after a year.

Third, there is an optimal level of labour market spending. For certain values of the labour market spending to GDP ratio, the positive supply side effect is so strong that it crowds in private spending and leads to an increase in consumption and investment. In such a case, the multiplier is much larger and reaches 0.56 on impact for output (0.83 after one year) and 0.2 on impact for employment (0.31 after one year).

Finally, in the presence of price rigidities, the interaction between the labour market effects and the aggregate demand effects produces fiscal multiplier close to 2 on impact. In an extension of the model, prices set by firms are characterized by rigidities generating quantity adjustment in the good market. Following an increase in public spending, firms facing higher aggregate demand are not able to charge higher prices and therefore increase production. There is an aggregate demand effects associated with fiscal policy.

Summary of results

Figure 1.7 displays the dynamic of the economy following a positive shock on labour market policy spending (solid line). For the sake of comparison, dynamics generated by Ricardian models are also represented in the same figure (dashed line). An increase in government consumption produces the usual crowding out of private consumption and output in line with the properties of a Ricardian economy.

In contrast, an increase in labour market spending produces a positive multiplier effect and an increase in employment. The output multiplier is positive but smaller than one: On impact it reaches 0.31 and 0.43 after one year, in contrast to the Ricardian case, which exhibits a negative output multiplier of 0.08 after one year. The employment multiplier is positive too: 0.11 on impact and 0.18 after four semesters. Positive effects on employment and output are related to the improved efficiency of the labour markets induced by labour market spending. Labour market spending increases the number of matches and the overall level of employment. This effect more than offset the crowding out of consumption and investment. This result is similar with the baseline result of Monacelli et al. (2010) except that the rise in employment is not linked to the specificities of the wage bargaining. In Monacelli et al. (2010), the positive multiplier effect is related to the crowding out of consumption, which reduces the disutility of work activities and lead workers to accept a lower wage.
Figure 1.7: Positive Labour market spending vs. Ricardian spending

Note: The graph displays the reaction of the main macroeconomic aggregates following a positive shock on labour market spending (green line). The dash line illustrates the baseline results produced by a Ricardian model.

Erreur ! Source du renvoi introuvable. 1.8 displays the dynamic of the main macroeconomic variables following a positive shock on labour market spending when the steady state level of active labour market spending to GDP is decreased from 1.2% to 0.7%, which correspond to the value of this ratio for the USA. The fiscal multiplier is now as large as 0.56 on impact and 0.83 after one year. The employment multiplier is larger too and reaches 0.2 on impact and 0.31 after one year. Furthermore, consumption is now responding positively to public spending. Despite a negative reaction on impact, consumption turns positive after three semesters. It seems that the increase in output generated by higher employment crowds in private consumption. The positive impact of public spending on employment boosts output through a supply side effect. The positive impact on consumption that follows over balances the negative impact of higher public spending on private consumption. There is therefore an optimal level of active labour market spending to GDP, for which the efficiency of fiscal multiplier is the highest. This feedback channel stands in contrast to existing models, which produce an increase in consumption either by assuming non-separability in the utility function between labour supply and consumption or by relying on a wealth effect as in the perpetual youth model.

Figure 1.9 enquires the case when the positive supply side effect related to active labour market policies is combined with an aggregate demand effect resulting from nominal price rigidities. These rigidities are central when discussing fiscal policy to the extent
Figure 1.8: Crowding-in of private consumption

Note: The graph displays the reaction of the main macroeconomic aggregates following a positive shock on labour market spending.

Figure 1.9: Crowding-in of private consumption
that they generate quantity adjustments. Following fiscal policy, firms respond to the surge in aggregate demand by raising prices. In the presence of price rigidities, firms must also increase output to meet excess demand. Ravn et al. (2006) for instance use price stickiness to produce a positive fiscal multiplier. Adding price rigidities should trigger an increase in private consumption given that firms increase labour inputs and that the real wage increases. Nominal price rigidities also limit the crowding out of private consumption. Finally, nominal price rigidities impact on the incentive of firms to hire. The markup now enters the marginal productivity of labour in the surplus equation from an additional match. The fall in the mark-up raises the marginal productivity of labour and contributes to the improvement of the labour market alongside labour market policies. The resulting effect should be a larger multiplier effect. The main result is that the fiscal multiplier is now much larger and almost equal to 2 on impact. Accordingly, the employment multiplier is reaches 0.8. Consumption increases and is hump-shaped.

C. Future extensions

The model is currently in a beta version and further results are being expected as detail is added and the model refined. In particular, the following aspects are currently been implemented:

**Open economy:**

Following the earlier GEL (mark I), the open economy dimension needs to be developed. In order to make GEL2 more appealing for country-specific analysis, however, a first step consists of implementing only an open-economy version rather than a multi-country model. The latter version will become relevant for the Green Jobs part and will be developed in due course. Taking into account an external sector is likely to alter the results discussed in the previous section. The fiscal multiplier appears to be smaller in an open economy as public consumption translates into higher imports or into an appreciation of the exchange rate. Fiscal policy coordination seems as well to be a key aspect of a successful economic recovery of the actual crisis.

**Greening of the economy**

Lastly, there has been no discussion of the green dimension of the model so far. Our modelling strategy in this respect will be to introduce a second sector into the model as discussed in section B. Furthermore, a pollution function that tracks CO2 emissions needs to be added, which would then feedback into the production function. Such an approach is in line with common economic models of climate change such as Nordhaus (2008) or Greiner and Semmler (2009). This framework will enable us to study two important questions: A first issue concerns the dynamics of the relative sizes of the green and the brown sectors over time. A second issue addresses the transition of workers between the two sectors and the question of unemployment.
References


Answers from a macroeconomic-modelling approach