Are active labour market policies effective in activating and integrating low-skilled individuals? An international comparison

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Abstract: This paper examines the effectiveness of active labour market policies (ALMP) in improving labour market outcomes, especially of low-skilled individuals. The empirical analysis consists of an aggregate impact approach based on a pooled cross country and time-series database for 31 advanced countries during the period 1985–2010. A novelty of the paper is that the analysis includes aspects of the delivery system to see how the performance of ALMP is affected by different implementation characteristics. Among the notable results, the paper finds that ALMP matters at the aggregate level. Training, employment incentives, supported employment and direct job creation measures show the most favourable results, both, in terms of reduced unemployment, but also in terms of increased employment and participation. Interestingly, start-up incentives are more effective in reducing unemployment than other ALMP policies. Moreover, the positive effects seem to be particularly beneficial for the low-skilled. In terms of implementation, the paper finds that the most favourable aspect is the allocation of resources to programme administration. Finally, a disruption of policy continuity is associated with negative effects for all labour market variables analysed.

Keywords: unemployment, employment, participation rate, active labour market policies, implementation, public employment services, training, start-up incentives.

JEL Codes: H24, H53, J08, J64, J65, J68

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1. Introduction

This paper aims to contribute to the debate regarding the effectiveness of activation measures. In particular, the purpose of the study is to assess how effective are active labour market programmes (ALMP) in improving the labour market outcomes, especially of low-skilled individuals, in bringing them back to employment and sustainably integrating them to the labour market. It finds that ALMP does matter at the aggregate level. Training, employment incentives, supported employment and direct job creation measures show the most favourable results, both for the overall and low-skilled populations. Spending in start-up incentives is also effective but mostly in terms of reducing the unemployment rate. Importantly, results show that ALMP policies are more effective for the low skilled. The paper includes aspects of the delivery system in the analysis to see if differences in the performance of active labour market programmes between countries arise from differences in the institutional framework and implementation of the policies studied. It finds that the allocation of resources to programme administration is most favourable aspect of implementation. Moreover, policies that are implemented pro-cyclically have stronger favourable effects during booms but also stronger unfavourable effects during crises, confirming the argument in favour of policy continuity. Interestingly, the size of the coefficients arising from policy and implementation variables, once interactions are included is noticeably higher. This demonstrates that a correct implementation of policies enhances their beneficial effect.

Since the 1990s there is an increased acceptance of the need of activation measures to strengthen the link between social protection, labour market policies and employment (Eichhorst and Konle-Seidl, 2008). Today, these policies are widely regarded as an important tool to fight unemployment. As a result, expenditure in ALMP is sizeable in most advanced economies and continues to increase. Success of ALMP, however, has not been invariably positive. Although some empirical evidence exists that points to a positive effect on the probability of finding employment (e.g. Graversen and van Ours, 2008; Roshold and Svarer, 2008; Lalive et al. 2005), the effects tend to be relatively small, making it unclear whether the positive outcomes are enough to compensate for the costs. Moreover, a central concern that remains is the risk that activation measures might be unsuitable to tackle longer-term issues such as skills, employability and financial independence, especially among the least employable jobless individuals (Carpenter, 2006).

Importantly, mixed results are in part due to the fact that what we know in terms of the effectiveness of activation measures is based on evaluations carried out using micro data. Although these evaluations are useful in determining the impact of policies on the individual, they fail to provide evidence on the wider economic or social impacts (or the lack of thereof) of such interventions. Indeed, activation measures are embedded in ample macroeconomic, labour market and social policy schemes. Hence, measuring their effectiveness calls for evaluations that are more comprehensive. This type of analysis, however, has not been carried out systematically yet, at least not for the case of ALMP. In fact, only two comprehensive studies were carried out at the beginning of the 90s (Layard et al., 1991 and OECD, 1993), which point to different results with regards to the effect of ALMP on unemployment rates. While Layard et al. (1991) find that ALMP have a negative effect on long-term unemployment, OECD (1993) argues that results are not robust enough to be conclusive. As such, existing knowledge on the aggregate effects of activation measures remains limited.

This paper aims to contribute to filling this gap in the literature. The analysis consists of an aggregate impact approach, which is better placed to measure both, the direct and indirect effects of ALMP. This will be done by ways of a pooled cross country and time-series analysis based on 31 advanced countries for which detailed annual data on different active labour market measures (focusing on those specifically targeted to low-skilled individuals) exists for the period 1985–2010. As such, this study contributes to the empirical evaluation of activation policies beyond what it is already known in four ways: First, the paper is focused on the labour market outcomes of low-skilled individuals that have been among the least researched marginalized groups. Second, this paper sheds light on the role of implementation strategies in explaining differences in the performance of ALMP between countries, which is another existing gap in the debate surrounding the success of activation policies. Third, it provides an update of the aggregate assessment approach by extending the time and country coverage of the dataset. Finally, it addresses the endogeneity problem that has weakened many of the analyses of ALMP.

2. Theoretical justification and transmission mechanisms

From the theoretical point of view, the traditional justification for ALMP has been to reduce labour market imbalances and counteract rigidities and distortions. This comes from the recognition that governments cannot address sustainably unemployment through demand expansion alone (Bellmann and Jackman, 1996a). ALMP are therefore needed, first, to facilitate the matching process between the supply and demand for labour so that a given number of job-seekers is associated with fewer vacancies. Moreover, activation measures are expected to boost productivity of the labour force. This increase in productivity implies a direct effect of activation measures on programme participants, but there may also be general productivity increases associated with externalities. In addition, activation measures are expected to maintain the level of effective labour supply by keeping the long-term unemployed and other groups of "outsiders" tight to the labour force (Layard and Nickell, 1986; Layard et al. 1991).

In terms of the transmission mechanisms, activation polices can influence employment and unemployment and give raise to a number of different effects in the overall economy working both via changes to the wage-setting structure and the demand for labour. Regarding the former, activation measures can have three different effects: (i) reduce reservation wages through the increased competition arising between newly laid-off workers and those newly activated (Layard et al. 2009); (ii) the wage-setting structure can be pushed downwards due to the increased efficiency of the matching process since employers have fewer incentives to attract labour through higher wages (Johnson and Layard, 1986); yet, (iii) activation measures can also increase reservation wages. Indeed, the concept of participating in a labour market programme may provide reassurance to wage earners since the risk of welfare loss from becoming unemployed is reduced (Calmfors and Skendinger, 1995)

Moreover, activation measures can affect the demand for labour in four different ways: (i) the improved efficiency of the matching process reduces the cost of vacancies – since they are filled more quickly – which can provide incentives to increase the number of vacancies. This is equivalent to an increase in labour demand (Pissarides, 1990; Carlmfors and Lang, 1995); (ii) activation measures (especially those related to training) have also an effect on productivity, which affect labour demand through a scale and a substitution effect. Indeed, an increase in the marginal productivity of labour may produce a *scale effect* that shifts labour demand upwards because a fall of the relative unit cost of labour provides an incentive to expand output by using more efficient units of labour. There is, however, an additional *substitution effect*

tending to reduce labour demand since one unit of product can be produced by less units of labour. The net effect on the demand for labour will be positive if the scale effect dominates the substitution effect, which will arise only in markets where labour demand is elastic (Calmfors, 1994). (iii) ALMP can also give raise to a signalling effect. Some authors affirm that ALMP have the ability of reducing the uncertainty of employers regarding the employability of job applicants when these have participated in a programme (OECD, 1993); and (iv) there is a deadweight effect (defined as hirings that would have occurred in the absence of the programme) and a substitution effect (jobs created for certain groups replace jobs for other groups due to the change in relative wage costs) arising from activation measures (Haveman and Hollister, 1991; Bjorklund and Holmlund, 1991, etc.). The two effects mainly apply to job creation programmes and mean that regular labour demand would be reduced.

The direction and magnitude of these individual effects would depend on the type of measure put in place and its target group (Appendix 1). According to Keynesian theory, measures aimed to overcome structural labour market imbalances (i.e. employment incentives, job-search assistance, public-job creation and certain other direct-job creation measures such as those offering hiring credits) can increase the level of employment through an income effect and a multiplier effect. In the case of placement services and all types of job-search assistance, the benefits to the labour market result from an increased effectiveness of search (Schmid et al. 2001, Bellman and Jackman 1996b, OECD, 1993). Assistance with job search might also increase the number of vacancies because opening posts becomes less costly for firms (Pissarides, 1990; Calmfors and Lang, 1995; OECD, 1993), which in turn expands labour demand. On the other hand, these measures, can lead to displacement and substitution effects, when jobs created for a certain category of workers replace jobs for other categories (OECD, 1993; Calmfors and Skedinger, 1995); and deadweight loss since hirings from the target group might have occurred even in the absence of the programme (Calmfors and Skedinger, 1995). Moreover, some economists predict a reduction in search efforts – and a raise in wage pressure – since government support may reduce the fear of unemployment (Bellman and Jackman, 1996a; Calmfors and Skedinger, 1995).

Labour-supply-oriented measures (including training, workers' subsidies, supported employment and rehabilitation policies and job rotation and job sharing measures), on the other hand, are expected to have little, if any, impact on the level of unemployment by reducing skill bottlenecks (Schmid, 1996). Yet, these measures will potentially have a stronger impact on the structure of unemployment by reducing the vulnerability of groups that are more exposed to risks in the labour market, such as the unskilled or long-term unemployed. This would have a redistributive and reallocating effect on employment opportunities. These measures will also increase the competition for available jobs, which is expected to reduce wage pressures and provide a favourable climate for job creation (Layard, 1990, in OECD, 1993). Search effectiveness can also be improved thanks to these policies, since participating on training courses can provide a positive signal to potential employers, reducing uncertainty about the employability of job applicants (Bellman and Jackman 1996b; Layard and Nickell, 1986; OECD, 1993). More generally, increases in productivity are thought to have positive externalities that contribute to general productivity increases (OECD, 1993) and to general technical progress of societies (Calmfors and Skedinger, 1995).

Yet, a number of detrimental effects could be expected as well. First, labour demand can be reduced if the scale effect arising from the improved employability of workers is dominated by the substitution effect resulting from the fact that a given output can be produced by fewer more efficient workers

(Calmfors and Skedinger, 1995). Moreover, participants may reduce their search efforts in the expectation that the course culminates (i.e. lock-in effect) (Bellman and Jackman 1996b; Calmfors and Skedinger, 1995), or if policies mitigate the fear of unemployment among the targeted individuals (OECD, 1994).[1] Many authors believe, however, that this state dependence is not a sufficient explanation (Calmfors and Lang, 1995) and that the assumption of myopia is overrated (Gergory, 1986). In general, ALMP that target disadvantaged groups (especially when used in conjunction with benefit conditionality) will put pressure on unemployed people to search harder for jobs, which will be associated with lower wage pressure and more jobs (Bellman and Jackman 1996a).

Specifically relevant for this paper, measures that focus on marginal groups (long-term unemployed, low-qualified individuals, etc.) are expected to maximize the competition effect and augment matching effectiveness. Indeed, low-skilled and long-term unemployed have a greater likelihood of falling out of the labour force (according to the strict definition) because, victims of discouragement, they have stopped looking for a job. ALMP, especially training, can increase their probabilities of finding employment by increasing their employability and facilitating matching (Layard et al. 2009). In this case, activation policies are expected to lower reservation wages, which can stimulate labour demand and facilitate employment (e.g. Kettner and Rebien, 2007). However, it can also result in wage moderation – if alternative options are limited – or in a bigger low-wage sector and even in a higher number of working-poor – in the absence of additional policies to raise employability (e.g. Clasen and Clegg, 2006). Importantly, the weaker the affiliation of targeted group to the labour market, the less likely it would be for activation measures to affect their employment prospects (Layard et al. 2009).

Importantly, in times of crisis, characterized by high levels of unemployment and low unfilled vacancies, a given level of aggregate employment needs to be assumed, which would reduce the effectiveness of ALMP. Indeed, when unfilled labour demand is low, ALMP will lead to substitution and displacement effects due to its unlikelihood to increase total employment. In this situation, ALMP targeting can be justified economically by its potential to affect specific groups even if the aggregate effects of these policies are low. As such, redistributing employment opportunities in favour of disadvantaged groups (e.g. low-skilled individuals) can be a way to enhance the effectiveness of ALMP (de Koning, 2001).

3. Empirical evaluation studies

Much has been written about effectiveness of activation measures based on evaluations carried out using micro-data and labour market flows, yet very little is known in terms the aggregate impact of these policies on the labour market as a whole or on specific groups such as low-skilled individuals. True, the existing evaluations carried out using micro-data have proved to be useful in providing reliable results regarding the impact of activation policies on the individual. Yet, even if all indirect effects are accounted for, which is not generally the case, many macro features of the environment and their interaction with the policies of interest, cannot be taken into consideration within this framework. It might well be the case, for example, that an ALMP has positive effects on the employment prospects of participants but at the expense of non-participants, yielding little or no benefit at the aggregate level. On

[1] The above, however, would imply that individuals are myopic in terms of the actual risks they face of unemployment. If this were true, myopic individuals would compare themselves with the rest of the population rather than with their vulnerable group. This will give them a sense of an increased competition, which will reduce their wage bargain (Bellman and Jackman 1996a).

the other side of the spectrum, policies may appear to have little individual effect but have in practice important overall effects[2] (de Koning, 2001).

Although recent studies have attempted to address this issue (Imbens, 2008),[3] external validity – i.e. the identified effects can only be held to be valid in the contexts in which they were estimated – continues to be an important limitation of exercises using micro data. Indeed, some of the most commonly used micro estimation techniques remove all common macro effects and require them to be separable from any individual effects (e.g. difference in differences), making it impossible to measure the relevance of macroeconomic shocks and their potential interaction with policies (Blundell and Costa Dias, 2000). Even when macro shocks can be accounted for, time invariant (within sample period) macro characteristics cannot. This is particularly relevant to the evaluation of labour market policy, since the wide range of different institutional and macro-economic contexts countries are faced with would not allow micro-econometric analysis to come to general conclusions about the effects of labour market policies.

Aggregate impact analyses are therefore necessary to provide a more comprehensive picture of the overall effects of ALMP policies. And although some new research has been conducted recently, no consensus has been reached yet at this level.

3.1 The flow model approach and its predecessors

At the aggregate level, several models have been used for assessing the impact of ALMP and these models have evolved over time. Analyses based on the flow model approach are, by far, the most commonly exploited methods to carry out research at the aggregate level in the field of activation policies. These models study the direct effects of ALMP on the friction between supply and demand and the transitions from unemployment to employment (de Koning, 2001). This type of model assumes an inverse steady state relationship between unemployment and vacancies arising from and employment adjustment process (Phelps, 1970). According to this function, the probability for an individual to leave unemployment depends on the availability of vacancies. In principle, large divergences between labour supply and demand should not exist. In reality, however, labour markets correspond to a much more dynamic combination of flows of workers across the economy and of jobs being constantly created and destroyed, both of which are matched in a sequential time-consuming manner (Ernst et al. 2011). According to this approach markets never clear and unemployment is never voluntary. ALMP has thus a role to play by increasing the flow from unemployment to employment, but also by decreasing the flow from employment to unemployment by means of training, for example.

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[2] An example of this are training policies aimed to prepare unemployed individuals in occupations in which shortage exists in the economy. At the micro-level, it may appear as if these policies had little or no individual effects. Indeed, job chances of the unemployed individuals participating in the programme do not increase, since usually targeted individuals for this type of programmes have usually good labour market prospects. Yet, at an aggregate level the benefit is likely to be important because other unemployed job seekers (most probably will lower labour market prospects) will benefit from jobs liberated by participants in their transition to other segments (de Koning, 2007).

[3] One of the strategies to do so has been to redefine the unit of interest to a higher aggregate that makes the stable-unit-treatment-assumption more plausible, the downside of this being loss of precision in the use of data. An alternative strategy has been to model the interactions required to capture the indirect effects of the general equilibrium (Bourguignon, et.al.; 2008, Lee and Wolpin, 2006; Lee, 2005; Blundell, et. al., 2004; Dufflo, 2004; Heckman, Lochner and Taber, 1998). The disadvantage associated with this approach is the need for an increased number of assumptions in the theory and more extensive datasets in empirical applications (Abbring and Heckman, 2007).

The oldest attempts to measure the impact of ALMP on the efficiency of the functioning of the labour market were based on this same line of thinking; this is, on a simplified version of the u/v-curve or the Beveridge curve (de Koning, 2001). This approach is born from the observation that high unemployment rates usually coincide with low vacancy rates, and vice versa. A number of studies were carried out since the mid-60s all through the 70s and 80s to study changes in the efficiency of the matching process. Over time, however, these analyses started to throw clear evidence of an upward shift of the u/v-curve, indicating that increasing levels of unemployment were associated with the same level of the vacancy rate (Driehuis, 1978; Harper, 1980; among others). At the time this finding was interpreted as a diminishing efficiency of the matching process.

During the 80s and 90s, however, several studies challenged this view[4] and a number of criticisms arose against the simplicity of the u/v-curve analysis and its lack of theoretical background. Authors pointed to the heterogeneity of labour as the explanation for the existing frictions in the labour market, which they realized occurred at the sub-market level. The flow-approach originates from this evolution of economic thought. Indeed, transition functions from unemployment to employment are closely related to u/v functions. Proponents of this approach (Blanchard and Diamond, 1989; de Koning and Arents, 1997) endorsed the notion that the matching function should be studied at a sub-sector or sub-market level. Basing the hiring functions on the supply and demand characteristics, this line of research proposed to study the matter (i.e. how to facilitate the mobility of workers between sub-markets) at a regional level (de Koning, 2007).

The regional flow-model approach has been increasingly applied during the last decade.[5] Empirically, advantages of this function include its dynamic character, as well as the possibility of incorporating unemployment duration in the analysis. This offers more possibilities to study the aggregate effect of ALMP than other approaches based on static relationships (de Koning, 2001). Moreover, this approach allows taking regional variations into consideration, which according to some analyses (Schmid et al., 2001) are central determinants of unemployment. Thus, the argument goes, this approach is one of the most effective means to unveil differences in the effectiveness of ALMP. More importantly, traditionally, this approach has been praised for its ability to deal with the simultaneity bias inherent in ALMP macro evaluations. It is championed that simultaneity bias would normally have a greater effect on unemployment equations than on flow models, since the dependant variable in the latter case (i.e. hirings) is not the direct object of political decisions (Anxo et al. 2001). In practice, however, this depends on the exact specification of the equations chosen[6] and the policy reaction function, rather than on the model used or on the regional or international configuration of the panel database. In fact, some studies based on this approach acknowledge that in spite of numerous efforts to deal with the problem,

[4] Warren (1980) and later den Butter and van Ours (1990) showed, for example, that the apparent decrease in the efficiency of the matching process was driven by the failure to take into account the duration component in the analysis. By considering separate matching functions for the various segments of unemployment by duration, it was shown that the shift in the u/v curve was the result of changing growth rates of employment rather than a diminishing efficiency in the matching process.

[5] See, for example, Anxo et al. (2001) for a regional aggregate impact analysis of ALMP in France and Sweden, carried out by means of an augmented matching function. Schmid et al. (2001) carried out a similar analysis for Germany with special focus on the long-term unemployed. In the same vein, De Koning and Arents (2001) have analysed the matter specifically for the Netherlands and Davia et al. (2001) for Spain. More recently, Hujer et al. (2009) used this approach for Western Germany and Dauth et al. (2010) for Austria.

[6] Reverse causality is more likely to be found when ALMP related variables are normalized by the labour force, for example (Calmfors and Skedinger, 1995).

their estimations might still be plagued with endogeneity (Schmid et al., 2001; de Koning and Arents, 2001).

On the other hand, the use of this kind of model to evaluate labour market policies entails a number of problems. First of all, the approach depends on the availability of aggregate quality data relative to the functioning of labour markets, both in terms of stocks but also flows. Yet, this information (especially data on job vacancies) usually lacks, which means that model specifications are, to some extent, driven by the existence of data rather than by theoretical justifications (de Koning and Arents, 2001). For example, a number of difficulties arise when attempting to difference between the effects of policies by specific population groups since long time series for employment, vacancies and unemployment flows according to occupations and educational groups at the regional level is simply not available (de Koning, 2001). The only sub-group that has so far being included in the regional flow analysis is unemployment by duration. Indeed, some authors have extended the analysis to include long-term unemployment (LTU) finding that activation policies have a strong impact on the reduction of LTU in Germany and Spain (Schmid et al., 2001), but have no significant effects on the outflows from LTU in the Netherlands and Spain (de Koning and Arents, 2001; Anxo et al. 2001).

More importantly, the limitation of this kind of models is that they are suited to determine only the direct effects of ALMP, while indirect effects are potentially numerous and significant. It is difficult, for example, to interpret gross effects of activation policies in the absence of information about the possible effects on wage formation and on productivity. Moreover, total demand and supply for labour are given within this framework and therefore the potential effect of wage subsidies or job creation measures on total labour demand are excluded from the analysis (de Koning, 2007). Finally identifying the exact nature of the measured effect is a challenge too (Anxo et al. 2001). In fact, Bellmann and Jackman (1996a) propose this methodology as a measurement of the net effect of labour market policies on the matching process (given windfall, substitution and displacement effects on outflows from unemployment).

3.2 The macroeconomic approach

Meanwhile, a couple of efforts were developed in the late 80s and beginning of the 90s that presented a more general model that allowed for the study of the impact of ALMP on a number of critical economic variables that have an influence on the labour market (Layard and Nickell, 1986; Layard et al., 1991). This macroeconomic approach can be reduced to two form equations (labour demand and wage-setting relationships) and one structural equation (the Beveridge curve) (de Koning, 2001). The employment equation is a standard labour demand equation depicting the number of workers that firms wish to employ given the real wage rate. This relationship depends on factors such as product market competition and technological change. The second equation describes real wages as an (upward) function of employment. This relationship results from wage bargain but also wage efficiency considerations of firms, as well as exogenous variables such as capital intensity, benefits, the level of human capital, etc. Finally the Beveridge curve describes the existing frictions of the labour market, where the unemployment rate depends on the vacancy rate, as discussed before.

The main benefit of this approach is that it allows capturing the impact of ALMP on the efficiency of the matching process, while also taking into account the indirect effects of ALMP. The model is based on the assumption that employability of labour supply is enhanced thanks to ALMP, which facilitates

recruitment. Moreover, activation policies could reduce the friction between labour supply and demand, which has an enhancing impact on employment. Indirectly however, an increase in employability can have an effect on wage formation, which has effects on the labour market and in the overall economy. As such, this approach is capable of shedding light on the impact of ALMP on the matching process, on the size of the labour force, while also taking into account productivity effects, competition effects (insiders vs. outsiders), deadweight loss, and substitution, crowing-out and lock-in effects (Bellman and Jackman, 1996; Calmfors, 1994). No other approach allows capturing empirically the overall net effect of ALMP on the wide labour market.

In addition, this approach provides the framework for analysing internationally the impact of activation policies, which brings about additional benefits. For instance, over time advanced economies had tackled the same labour market challenges in different ways, especially in terms of the implementation of ALMP. Carrying out cross-country comparisons (rather than cross-regional ones) before and after policy changes allows us to learn much about the effects of these measures (Bellmann and Jackman, 1996a). Moreover, an international approach would be preferable to a country-specific time series analysis because most of the policy and institutional factors impinging labour show marked disparities from an international perspective but only moderate time changes at the national level. Finally, cross-country studies reduce the bias inherent in time-series analyses (OECD, 1993). Thus, a cross-country approach may provide a better basis for the identification of the potential effects of activation measures (Blöndal and Scarpetta, 1998).

Empirically, however, evidence from international comparisons on the impact of ALMP has been contentious. Historically, a major drawback encountered by the proponents of this cross-country approach is that the number of policy and institutional factors that can be included in the analysis is limited given the lack of comparable data across a large pool of countries. More importantly, conventional criticisms to this aggregate-type model have focused on the existence of a simultaneity bias (reverse causality). In fact, the econometric foundation of the equations used in macroeconomic studies of labour market policy has been often considered relatively weak, due to this problem. Simultaneity bias stems from the fact that although the scale of provision of ALMP is meant to affect the unemployment rate, the level of unemployment could also drive spending on ALMP if, for example, governments base their expenditure decisions on the magnitude of the problem they wish to address.

During the 90s, the quest for addressing reserve causality focused on defining a medium-term policy reaction function that could realistically predict policy spending patterns of governments. Two clearly opposed theoretical frameworks arose with regards to this issue. The first one assumed that governments based their decisions on a fix level of ALMP spending per unemployed person, which could vary slightly over time but that could not adjust fully with unemployment (Layard et al., 1991). Under these circumstances, the suggested solution to address the simultaneity problem was to look at average unemployment rates and average levels of spending on ALMP per unemployed person over the medium-term. If the assumed policy-reaction function were a realistic representation of reality, policy stance would indeed be exogenous in the proposed scheme. The second theoretical framework assumed that governments committed a given fraction of GDP to spending in ALMP over the medium-term, which did not adjust with the unemployment rate (OECD, 1993). In this situation, using ALMP spending per unemployed person would produce an endogeneity problem. This brought authors of the OECD study (1993) to measure ALMP spending as a share of GDP.

Importantly, different assumptions about governments' policy stance yielded different results with regards to the effect of ALMP on unemployment rates. Indeed, while Layard et al. (1991) find that ALMP have a negative effect on long-term unemployment, the OECD (1993) study argues that results are not robust enough to be conclusive. Unfortunately, it is still far from clear what a correct representation of the policy-reaction function is, and it might well be the case that whatever the representation, it would not be the same across countries. Conscious of this problem and of the importance of providing governments guidance on the effectiveness of activation policies, other efforts arose during the decade. These tried to address endogeneity mainly through fixed effects estimators and instrumental variables (Calmfors and Skendinger, 1995; Büttner and Prey, 1997; Schmid et al. 2001). However, given the incipient knowledge about estimators capable of dealing with reserve causality and methods to test the instruments' strength and overidentifying restrictions, it remained far from clear whether or not the endogeneity problem was actually addressed in these studies.

As such, at the beginning of the last decade, the macroeconomic approach for the study of the impact of ALMP reached a dead end due to the lack of an appropriate theoretical framework (Bellmann and Jackman, 1996b) and the existence of limited technical solutions to address the persisting simultaneity bias. Studies turned to the regional flow-model approach; yet, with no better solutions in terms of tackling the persistent simultaneity bias. As a result, despite a growing tendency of governments to use activation measures to fight the growing unemployment problem, little progress has been made since to unveil the macro impact of ALMP. Further research is therefore needed to provide additional knowledge on the effectiveness of ALMP at the aggregate level.

4. Empirical specification

As discussed above, existing knowledge on the aggregate effects of activation measures is still very limited. In spite of this, deepening the understanding of the broader effects of these policies is all the more relevant today. First, there has been a growing interest in activation measures during the last decade, which many countries see as the central policy to combat the persistently high levels of unemployment (Section 5). Meanwhile, countries are under tight budgets and given the mixed empirical evidence on the effectiveness of active labour market policies in boosting the labour market, spending on ALMPs is under careful scrutiny. Thus, effective management and implementation of activation policies has become a central objective both for governments but also intergovernmental and international organisations such as the European Commission and the OECD (European Commission, 1996; OECD, 1993 and 1994). Finally, the last decade has seen an important development of tools and methodologies to treat a wider range of empirical problems. For instance, a variety of econometric estimators, technical fixes and diagnostic tests exists today for treating the endogeneity issue.[7] Moreover, the availability of longer time series allows controlling better the responsiveness of policies and the business cycle (Schmid et al., 2001). As such, the potential for capturing the full effects of ALMP and deepening the understanding of the effectiveness of these policies has increased.

[7] In fact, there are a number of studies that have successfully used these techniques in international empirical analysis of labour market policies other than ALMP. Cahuc and Carcillo (2011), for example, used IV and GMM methods in their cross-country analysis of short time work arrangements during the 2008 recession to treat the endogeneity bias that plagued their results. Both IV and GMM methods yielded stable results, successfully correcting the endogeneity bias. In a similar study (using somewhat different estimation strategies), Hijzen and Martin (2013), address the problem of endogeneity through the use of an instrumental variable for short-time work based on the number of years for which a scheme has been in existence.

Based on these new developments, the present paper is a renewed effort to capture the overall effect of ALMP at a macroeconomic level. This paper extends the analysis of macroeconomic effects of ALMP, beyond what it is already known, in four ways. First, this paper estimates the effect of different active labour market policies on employment, unemployment and the participation of the overall population and of low-skilled individuals. While the impact of ALMP on long-term unemployed individuals has been studied by means of these models (see, for example, Bellmann and Lehmann, 1990; Schmid et al. 2001), empirical analysis specifically for the low-skilled has not been studied, as far as I could find. As such, this paper will fill this existing gap in the macroeconomic analysis of ALMP. Second, this paper includes aspects of the delivery system in the aggregate impact analysis to see if differences in the performance of active labour market programmes across countries arise from differences in the institutional framework of the policies studied. Importantly, studies in which the effectiveness of ALMP is linked to its implementation are scarce (Calmfors, 1994; Schmid et al., 2001; de Koning and van Nes, 1991). Third, this paper provides an update of the aggregate assessment approach by extending the time and country coverage of the dataset, from 1975-1993[8] to 1985-2010 and from around 20 to 31 advanced economies. The use of more recent data allows capturing changes in the effects of ALMP during the last crisis and comparing these effects with those of other crises. Finally, this paper addresses the endogeneity problem that has undermined many of the analyses of ALMP through the use of instrumental variables estimated with 2 stages least squares (2SLS). As it is argued later in the paper, these methods yield stable results unveiling reliable estimates of the overall net effect of activation policies in the labour market.

4.1 Description of the model

In order to assess how effective are active labour market programmes (ALMP) in improving the labour market outcomes, especially for low-skilled individuals, a panel data model is estimated in this section based on a structural equation with the following simple form:

$$LM = f(ALMP, IMPL, DC, STRUC, INST)$$

where, *LM* represents the selected labour market indicators, including those relative to the low skilled; *ALMP,* active labour market policy indicators; and *IMPL,* indicators relative to implementation characteristics. The remaining three groups of variables are controls: *DC* includes determinants of demand conditions, *STRUC* the structure of the labour market (which influences the speed of adjustment to structural change or demand and supply shocks) and *INST* a range of institutional arrangements.

The analysis consists of an aggregate impact approach based on a pooled cross-country and time-series database for 31 advanced countries with yearly information during the period 1985–2010. This allows increasing the number of observations and providing greater statistical power.

4.2 Selection of variables and hypotheses

Dependant variables

[8] Bellmann and Jackman (1996b).

Seven indicators were selected as dependant variables. The first three measure labour market outcomes of the overall population and include the unemployment rate, the employment-to-population ratio and the participation rate. The first indicator will allow measuring the effects of ALMP on the long-term level of the unemployment rate, but will not say much about whether its reduction is accompanied by higher employment or higher inactivity. To get the complete picture, the participation rate is taken into account to assess the impact of policies in bringing people back to the labour market and the employment rate to evaluate the factors that influence movements in the percentage of the adult population that actually has a job.

Regarding the specific effects of policies on the labour market outcomes of low-skilled individuals, as with the first model, I use the unemployment, employment and participation rates of low-skilled individuals as dependant variables. In addition, the share of low-skilled unemployed individuals as a percentage of total unemployment is used in the analysis. This allows taking into account the effects of policies on the issue of the "structuralization" of lack of skills in the labour market (Schmid et al., 2001). It is assumed that the higher the concentration of unemployment on the low-skilled, the higher the real wage rigidity and the higher the persistence of the unemployment rate – i.e. based on the assumption that wages at the lower end are not flexible due to labour institutions in place in charge of protecting low-wage incomes (Nickell and Bell, 1997). This type of distribution would also reinforce the argument in favour of policies that provide incentives to enhance the demand for low-skilled labour.

Policy intervention

In terms of what explains labour market outcomes, the fundamental question of this paper is whether ALMP can affect market variables of the overall population and more specifically the low skilled at the aggregate level. As discussed above, evidence from cross-country analyses on the effectiveness of ALMP has been contentious. The main problem in interpreting existing results arises from the strong simultaneity bias present between ALMP spending and unemployment. A correct representation of the policy stance of governments – on which base it will be anchored the definition of the policy variable – is therefore the first fundamental step to tackle the simultaneity problem. In this paper, it is assumed that the medium-term policy reaction function of governments regarding ALMP spending is based on a fixed level of expenditure per unemployed individual – which could be somewhat adjusted based on a cyclical component (Layard et al., 1991; Bellmann and Jackman, 1996b). This would imply a positive correlation between unemployment and total ALMP spending but a negative correlation between unemployment and ALMP spending per unemployed individual, which has been tested and is indeed the case for the panel of countries analysed in this paper. Following this representation of the policy stance, the policy intervention measure computed for the analysis is defined as real expenditure on ALMP per unemployed person (Heylen, 1993; Bellmann and Jackman, 1996b).[9]

As discussed in Section 2, in theory, ALMP is expected to reduce labour market imbalances and counteract rigidities and distortions, thus improving labour market outcomes. Different policies, however, can produce different effects depending on their objective, design, population targeted and implementation characteristics (see also Appendix 1). Placement services and all types of job-search

[9] The ratio of government expenditure in ALMP to GDP has also been used in the past (OECD, 1993). In this paper, this definition may not represent the correct policy stance of governments since in our sample of countries, the ratio ALMP to GDP does not remain constant over time, but declines even when considering only periods of economic growth.

assistance can increase the level of employment through an increased effectiveness of search (Schmid et al. 2001, Bellman and Jackman 1996b, OECD, 1993) and through an increase in the number of vacancies because opening posts becomes less costly for firms (Pissarides, 1990; Calmfors and Lang, 1995; OECD, 1993). Employment incentives and certain direct-job creation measures (such as those offering hiring credits) can increase the level of employment but can also lead to displacement and substitution effects, when jobs created for a certain category of workers replace jobs for other categories, and deadweight loss (OECD, 1993). Moreover, some economists predict a reduction in search efforts since government support may reduce the fear of unemployment (Bellman and Jackman, 1996a; Calmfors and Skedinger, 1995).

Labour-supply-oriented measures (including training, workers' subsidies, supported employment and rehabilitation policies and job rotation and job sharing measures), on the other hand, are expected to reduce skill bottlenecks but have little, if any, impact on the level of unemployment (Schmid, 1996). Yet, these measures will potentially have a redistributive and reallocating effect on employment opportunities by reducing the vulnerability of targeted groups. Negative effects may arise as well if participants reduce their search efforts in the expectation that the course culminates (i.e. lock-in effect) (Bellman and Jackman 1996b), or if policies mitigate the fear of unemployment among the targeted individuals (OECD, 1994). Finally, the overall effect on labour demand will depend on whether the scale effect arising from the improved employability of workers is dominated by the substitution effect resulting from the fact that a given output can be produced by fewer more efficient workers (Calmfors and Skedinger, 1995).

Implementation

Moreover, a group of variables measuring the implementation of policies has been included in the analysis. As seen above, financial resources per participant matter in terms of the effectiveness of ALMP, but the design and implementation of programmes is crucial as well (OECD, 1993). Different policies have different effects depending on their target or their interaction with labour market institutions and other specific characteristics (Appendix 1). What is more, in spite of the positive expected theoretical effects and the bulk of resources allocated to them, measures could have a small or even negative impact if they are badly targeted or incorrectly implemented.

With this in mind, four proxies have been calculated to measure implementation-related aspects. First, public expenditure on programme administration (as a percentage of total expenditure in ALMP) has been included to measure the size of the allocation of resources to the implementation of policies.[10] It is to be expected that policies will be more effective in countries that have higher spending on programme administration per unemployed individual, since that would imply that programmes are better resourced and that their administration is better equipped to deliver employment services efficiently.

In addition, the continuity and timing of policies may also have an impact on the effectiveness of policies (Schmid, 1996). It is expected that large fluctuations in public spending (i.e. exceeding cyclical

[10] This measure was criticized by Schmid (1996) because it does not provide information regarding its relationship to the level of unemployment. The author uses instead expenditure on ALMP as a percentage of GDP for each percentage point of unemployment as a standardized measure for the degree of fiscal commitment to the objective of full employment. This indicator, however, relies on the assumption that "the function of active labour market policy with respect to employment is the same for all levels of unemployment" (p. 756, footnote 7), which contradicts the policy stance assumption of this paper.

swings) would compromise the stability needed for implementation which would be detrimental in terms of effectiveness. Likewise, policies are expected to be more effective if they are implemented in a countercyclical manner. In other words, public spending on ALMP would need to run in opposite direction of the economic trend and parallel to changes in the unemployment rate. This would thus indicate an accurate timing in the implementation of policies.

Demand conditions

Moreover, it is assumed that the overall and low-skilled unemployment rates are determined by demand conditions, represented here by the growth rate of GDP. It is expected that an increasing demand should reduce the level of unemployment or at least slow down its growth. Yet, the effect of an increased demand does not have an immediate effect on the labour market. In fact, "structuralization" may even increase at first before falling sustainably (Schmid et al., 2001). To take into account this delay, a lag has been added to the demand conditions variable.

Structure of the labour market

The structure of national labour markets is taken into account as well, since it affects the speed of adjustment to shocks and structural change. Two characteristics of the labour market are especially interesting for this analysis. First, I included the concentration of the population on a particular skill level, measured by the share of the population with tertiary education. It is assumed in this paper that the higher the concentration of the high-skilled, the easier it would be for policies to be effective since highly educated individuals have more probabilities to find a job. On the other side of the spectrum, a highly concentrated population on the low-skilled would imply high competition for low-skilled jobs. Moreover, I included the middle- and high-skilled unemployment rates to control for the effects of large differences in unemployment rates across skill groups. However, results were not robust when both rates were used in the analysis, thus the middle-skilled unemployment rate was dropped to avoid the presence of multicollinearity.

Institutional arrangements

There was also an attempt to control for differences in institutional arrangements that can affect wage bargaining and macroeconomic performance. Union density (the proportion of workforce unionized) was included to control for insider power in wage bargaining, which may push wages upwards at a cost of lower employment (Layard et al. 2009), especially for groups whose labour supply is more elastic (Bertola et al., 2002) – e.g. low-skilled workers. Finally, the OECD index measuring the strictness of EPL for the layoff of temporary workers was included. Temporary layoff regulation may decrease the search effectiveness of the unemployed since workers who lose their jobs can be recalled. This reduces search effectiveness, with detrimental consequences on the level of employment (Bellmann and Jackman, 1996b).

Pure control variables

Finally, a dummy variable was added taking the value of 1 for countries that are members of the European Union. EU countries have a relatively integrated labour market due to the freedom in the

movement of workers between these countries. The *EU* variable has been therefore included to control for this special feature of the European labour market.

4.3 Empirical strategy

Seven different models have been estimated to measure the effectiveness of ALMP. The first three measure the effects of ALMP on labour market outcomes of the overall population and the other four the effects of policy variables on the specific target group of this analysis, the low-skilled.[11] For each specification, fixed effects, random effects and pooled ordinary least squares (OLS) models have been estimated. The appropriateness of the random- or fixed-effects specification has been tested by the Hausman test. In certain cases (employment rate, LFPR, low-skilled employment rate and low-skilled LFPR) a correlation of the entities' errors terms with the regressors was found, which invalidated the use of random effects. A fixed-effects model was used in these four cases.

Moreover, serial correlation is usually expected in macro panels with long time series like the one used in this paper, especially as a result of omitting variables that change gradually over time (Lusinyan and Bonato, 2007). I used the Lagram-Multiplier test (Wooldridge, 2002; Drukker, 2003) and the abar post-estimation technique (Roodman, 2006) to test for serial correlation in the idiosyncratic error terms. In all cases, the null hypothesis was rejected, concluding that the data suffered from first order autocorrelation. Under this circumstance, OLS, random- and fixed-effects models are biased and/or inconsistent, since they underestimate standard errors of the coefficients. An additional estimator was therefore used in all specifications: a feasible generalized least squares model (GLS) fitted for panel-data. This estimator allows for the assessment in the presence of AR(1) autocorrelation within panels, cross-sectional correlation and heteroskedasticity across panels. Results of the pooled ordinary least squares model (OLS), GLS (either fixed- or random-effects), and FGLS with AR1 correction are detailed in columns 1, 2 and 3, respectively, of the tables presented in Appendix 2.

In addition, as discussed above, given the specification of the models and the shape of the labour market policy variables, it can be expected that the different estimations will suffer from endogeneity or reverse causality. Indeed, it is not only ALMP that affect unemployment but it may also be the case that changes in unemployment could influence expenditure in ALMP. Under these circumstances, it has been widely demonstrated that coefficients estimated through OLS and GLS might be inconsistent and biased. Some authors have dealt with this problem by either normalizing ALMP to a fixed fraction of GDP over the medium-term or by using country-specific averages of ALMP expenditures over the period analysed. Neither solution is optimal in my view: the former assumes a policy stance that is not a correct representation of reality – at least in the panel of countries chosen for this study, as discussed above – and the latter eliminates the time varying property of the variables of analysis, something that seems incorrect giving the long period studied. To address the specification problem caused by reserve causality and take account of the presence of heteroskedasticity in a more optimal manner, a final estimation was carried out, instrumenting (i.e. finding variables correlated with the endogenous variables, but not correlated with error term) for the *policy cluster* and *job rotation and job sharing* variables and for the

[11] Dependent variables were controlled for non-stationarity through the augmented Dickey-Fuller test. In all cases (but one) the tests rejected the null hypotheses of non-stationarity at 1 and 5 per cent levels. The exception was the variable *share of low-skilled unemployed individuals* which did not pass the test and can be therefore assumed to be non-stationary.

implementation-related variables *continuity* and *timing* through a 2 stages least squares (2SLS) estimator.[12] The discussion of the results of this estimation and the tests and options used are discussed in Section 6.3 and presented in Appendix 6.

5. Data and descriptive statistics

5.1 Construction of the database

The variables used in the analysis draw from different sources of information. The exact definitions and sources can be found in Table 1. Labour market variables (employment, unemployment, labour force and working age population) for the overall population for the 31 member states analysed in this paper were collected from the Labour Force Survey dataset of OECD.[13]

Moreover, the low-skilled unemployment rate and the employment-to-population ratio of the low-skilled draw from the Eurostat database for the 23 European countries for which information is available in this dataset. For the remaining countries, I used ILO databases[14] to draw information for the low-skilled unemployment rate of Australia, Canada, Israel, Mexico and the United States; and national sources for Japan, Korea and New Zealand. Regarding the low-skilled employment rate, I used OECD Education at a Glance indictors (2004–2012) to gather information for Australia, Israel and Mexico, and national sources for Canada, Japan, Korea, New Zealand and the United States. The participation rate was calculated on the basis of the unemployment and employment rates. Finally, the share of low-skilled unemployed individuals as a percentage of total unemployment was gathered from the World Development Indicators database of the World Bank. Information in this database exists for the whole sample of countries, but data is more scattered in terms of number of years for which information exists – e.g. the latest year for which information is available is 2008.

Skill level is measured by the level of educational attainment as defined by the International Standard Classification of Education (ISCED) (UNESCO, 1997). As such, in this analysis low-skilled are individuals with pre-primary, primary and lower secondary education (levels 0-2 of ISCED), middle-skilled are those with upper secondary and post-secondary non-tertiary education (levels 3-4) and the high-skilled are individuals that have finalized tertiary education (levels 5-6). The definition of the variable in countries where information was gathered from national sources varies slightly. In Japan, low-skilled are individuals with primary school, junior or senior high school, middle-skilled those with junior college, and high-skilled are people that have coursed college or university, including graduate school. In Korea, low-skilled are middle-school graduates and under, middle-skilled are high school graduates and high-skilled are college and university graduates. In New Zealand, low-skilled are individuals with no school qualification, middle-skilled those with either school qualification or post school but no school qualification and high-skilled those with post school and school qualification. Finally, the low skilled category in Canada and the United States includes persons with no schooling and persons who received some schooling but did not obtain a secondary or high school diploma.

[12] The variable *start-up incentives* was not included among the endogenous variables because the results of the C test of exogeneity did not favour its inclusion. Indeed, when the orthogonality conditions of the model including this variable as exogenous were tested, the C test indicated robust results.

[13] All variables obtained from OECD, were gathered from OECD.Stat, which is an online repository of data and metadata for OECD countries and selected non-member economies.

[14] KILM (Key Indicators of the Labour Market) and ILO.Stat.

In addition, variables related to policy intervention (expenditure in active labour market policies) derive from OECD Employment Outlook databases and thus the categories used follow its classification and definitions. These categories include:

- *Training*: Public expenditure in targeted training programmes including institutional, workplace and integrated training and special support for apprenticeships.
- *Job rotation and job sharing:* Public expenditure in job rotation includes programmes promoting the full substitution of an employee by an unemployed person or a person from another target group for a fixed period. Job sharing schemes includes all measures promoting the partial substitution of employees by an unemployed person or a person from another target group.
- *Employment incentives*: Public expenditure in recruitment and employment maintenance incentives.
- *Supported employment and rehabilitation:* Includes public expenditure in measures to support employment, which consists of subsidies for the productive employment of persons with a permanently (or long-term) reduced capacity to work; and in rehabilitation, which refers to vocational rehabilitation for persons with a reduced working capacity.
- *Direct job creation:* Public expenditure in programmes aimed to create additional jobs for the long-term unemployed or persons otherwise difficult to place. Jobs created are usually of community benefit and are usually located in the public or non-profit sectors. Provisions for lifetime sheltered work in a non-productive environment should not be included.
- *Start-up incentives:* Public expenditure in programmes that promote entrepreneurship among unemployed and target groups.

Measures included in the analysis are restricted to targeted policies. This excludes measures that are generally available (e.g. in-work benefits that are available to all employees whose earnings fall below a threshold, or training and apprenticeship programmes that are generally available to employed adults or youth, etc.). Box 1 illustrates how different country specific policies fit the ALMP categories described above.

For each category, the variable computed was defined as real expenditure per unemployed person, following the policy stance analysis discussed above (i.e. which illustrates how countries in our sample take decisions regarding expenditure on ALMP). For comparability across countries, expenditures were converted to international dollars using purchasing power parity (PPP) exchange rates. In order to deal with the multicollinearity arising between policy variables, a cluster (Policy Cluster) was calculated bringing together training, employment incentives, supported employment and rehabilitation, and direct job creation policies.

Box 1. Country specific interventions and how they fit the different ALMP categories

This Box presents a list of all interventions reported by the government of Austria in 2011, grouped by type of active labour market policy according to the OECD categories defined above.

1. Austria

Training:

Institutional training: Promotion of occupational mobility (course cost and course related cost); Promotion of occupational mobility (living allowance); Support for training in institutions; Employment foundations; Further

training allowance* (Institutional training).

Workplace training: Support for training in enterprises (encourage persons in enterprises to participate in training measures – support for qualification of employees); Vocational training for the disabled.

Alternate training: None reported

Special support for apprenticeship: Promotion of apprenticeship training and vocational training; Supra-company apprentice training.

Job rotation and job sharing:

Job rotation: Further training allowance

Job sharing: Solidarity premium model (SOL); Promotion of job sharing during part-time parental leave.

Employment incentives:

Recruitment incentives: Promotion of regional mobility and entry into employment (travel allowance); Promotion of regional mobility and entry into employment (childcare allowance); Integration subsidy (EB); Allowance for enterprises without employees.

Employment maintenance incentives: Promotion of investment and restructuring.

Supported employment and rehabilitation:

Supported employment: Support for employment of the disabled through the BSBs; Integration enterprises (BSB).

Rehabilitation: None reported.

Direct job creation:

Socio-economic enterprises (SÖB) and non-profit employment projects (GBP); Childcare institutions.

Start-up incentives:

Business start-up programme (UGP+GB).

Notes: *Component of another program

Source: Eurostat (2013a).

One of the novelties of the analysis presented in this paper is the inclusion of implementation-related variables to measure the efficiency of ALMP analysis. Three performance indicators were constructed capturing three different dimensions of policy implementation: allocation of resources to the implementation of policies, continuity and timing in the implementation of programmes. The first dimension is measured by the overall expenditure on programme administration[15] as a percentage of total expenditure in ALMP. Second, following Schmid (1996), continuity in the implementation of programmes is measured by the dynamics of ALMP expenditure. Large annual variation in programme spending (fluctuations that exceed cyclical swings) would be the antithesis of continuity in implementation. This variation was captured by the difference between the fluctuation (measured by the standard deviation) in real GDP growth and that of the growth rate of expenditure in ALMP. Third, as explained above, the variable timing measures whether policies are implemented in a countercyclical or pro-cyclical manner (Schmid, 1996). To assess this, the regression coefficients between ALMP spending

[15] Defined by governments' expenditure in Public Employment Services, including: (ii) public expenditure in placement and related services such as referral to work opportunities, counselling and case management, training and other forms of assistance; (ii) benefit administration; and (iii) other services and activities, including both, the budget of institutions that manage placement and related services and ALMP but also the budget of institutions that administer the unemployment and early retirement benefits. It is important to note that in some countries the share of PES expenditure corresponding to the latter two subcategories might be significant. For example, Belgium, Italy, New Zealand and the United States have a significant share of (ii) in their total PES. Moreover, Canada, Czech Republic, France, Mexico, Poland, Portugal, Slovak Republic and Spain, have a significant portion of (iii); and in Ireland the mix of both categories represents the biggest share.

and both output and unemployment were calculated. A dummy variable was then created taking the value of 1 if expenditure on ALMP ran parallel to changes in the unemployment rate and counter the economic trend (i.e. when policies were implemented counter-cyclically) and 0 otherwise.

Regarding the demand conditions variable, GDP was taken from the OECD Economic Outlook dataset and draw from National Accounts. In addition, as explained above two aspects of the labour market are included to control for the structure of the labour market: the share of the population with tertiary education and the middle- and high-skilled unemployment rates. The former variable has been gathered from the World Development Indicators database of the World Bank. The latter two variables were gathered from the same sources from where the low-skilled unemployment rates were drawn. Finally, the two variables related to institutional arrangements – i.e. union density and strictness of employment protection for temporary employment – come, respectively, from the ICTWSS[16] and EPL databases of the OECD. EPL is measured by Version 1 of the indicator since it contains annual information since 1985 (although this version does not incorporate all the data items included in Version 3)[17].

The analysis is based on data for 31 OECD countries over a 25-year period, 1985–2010, which yields a total of 806 observations. However, information is not usually available for all countries for every year so most of the regressions are based on a smaller data set. For example, the number of countries is reduced to 27 when the different equations are carried out through the FGLS estimator with correction for first-order autocorrelation (i.e. the preferred specification) due to the unavailability of information about *union density* and *EPL for temporary workers* for Israel, Estonia, Luxembourg and Slovenia.

Table 1. Definitions and sources of variables used in the regression analysis

Variable	Definition	Source
Dependent:		
Unemployment rate	Unemployed persons aged 15-64 as a percentage of the labour force	OECD. Stat
Employment-to-population ratio	Employed persons aged 15-64 as a percentage of the population of the same age (working-age population).	OECD. Stat
Labour force participation rate	Employed and unemployment persons aged 15-64 as a percentage of the population of the same age (working-age population).	OECD. Stat
Low-skilled unemployment rate	Low-skilled unemployed individuals as a percentage of the total low-skilled in the labour force. Low-skilled are individuals with pre-primary, primary and lower secondary education (levels 0-2 of ISCED). Age definition varies according to different sources: 15-64 in the case of Eurostat data; 15+ for ILO data and data gathered for Canada, Japan, Korea and New Zealand; and 25-64 in the case of OECD data.	Eurostat, ILO and National sources
Low-skilled employment-to-population ratio	Low-skilled employed individuals as a percentage of the total low skilled in working-age. Low-skilled are individuals with pre-primary, primary	Eurostat, OECD and National sources

[16] Visser (2011).

[17] This is, item 16 (authorisation and reporting requirements for TWAs) and 17 (equal treatment for TWA workers) (www.oecd.org/employment/protection).

	and lower secondary education (levels 0-2 of ISCED). Age definition varies according to different sources: 15-64 in the case of Eurostat data; 15+ for ILO data and data gathered for Canada, Japan, Korea and New Zealand; 25-64 in the case of OECD data; and 25+ for the US data.	
Low-skilled labour force participation rate	Low-skilled employed and unemployment persons aged 15-64 as a percentage of the population of the same age (working-age population).	Author's calculations based on the low-skilled employment and unemployment rates.
Share of low-skilled unemployed individuals	Share of unemployed with primary education as a percentage of total unemployment.	World Bank, WDI database
Independent:		
Policy intervention:		
Policy Cluster	Public expenditure in training, employment incentives, supported employment and rehabilitation, and direct job creation policies. Measured as expenditure in thousands of US$ (PPP) per unemployed individual.	OECD. Stat
Public expenditure in training	Public expenditure in institutional, workplace and integrated training and special support for apprenticeship. Measured as expenditure in thousands of US$ (PPP) per unemployed individual.	OECD. Stat
Public expenditure in job rotation and job sharing	Public expenditure in job rotation and job sharing schemes. Measured as expenditure in thousands of US$ (PPP) per unemployed individual.	OECD. Stat
Public expenditure in employment incentives	Public expenditure in recruitment and employment maintenance incentives. Measured as expenditure in thousands of US$ (PPP) per unemployed individual.	OECD. Stat
Public expenditure in supported employment and rehabilitation	Public expenditure in supported employment and rehabilitation programmes. Measured as expenditure in thousands of US$ (PPP) per unemployed individual.	OECD. Stat
Public expenditure in direct job creation	Public expenditure in programmes aimed to create additional jobs. Measured as expenditure in thousands of US$ (PPP) per unemployed individual.	OECD. Stat
Public expenditure in start-up incentives	Public expenditure in programmes that promote entrepreneurship. Measured as expenditure in thousands of US$ (PPP) per unemployed individual.	OECD. Stat
Implementation:		
Allocation of resources for the implementation of policies	Public expenditure on programme administration (PES) as a percentage of total ALMP expenditure.	Author's calculations based on OECD. Stat
Continuity of programmes implemented	Difference between the standard deviation of real GDP growth and the standard deviation of the growth rate of real expenditure in ALMP during the whole period of	Author's calculations based on Schmid (1996)

	analysis.	
Timing in the implementation of programmes	Dummy variable taking the value of 1 when policies are implemented countercyclically (i.e. regression coefficient between ALMP spending and output is negative and that of ALMP spending and unemployment is positive); and 0 otherwise.	Author's calculations based on Schmid (1996)
Demand Conditions:		
Real Gross Domestic Product (GDP)	Annual growth rate of real GDP	OECD. Stat
Structure of the Labour Market:		
Share of the population with tertiary education	School enrolment, tertiary (% gross).	World Bank, WDI database
Middle-skilled unemployment rate	Middle-skilled unemployed individuals as a percentage of the total middle-skilled in the labour force. Middle-skilled individuals are those with upper secondary and post-secondary non-tertiary education (levels 3-4 of ISCED).	Eurostat, ILO and National sources
High-skilled unemployment rate	High-skilled unemployed individuals as a percentage of the total high-skilled in the labour force. High-skilled individuals are those that have finalized tertiary education (levels 5-6 of ISCED).	Eurostat, ILO and National sources
Institutional arrangements:		
Union density	Ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners.	OECD. Stat
EPL for temporary workers	Strictness of regulation on the use of temporary contracts. Version 1 (1985-2008) of the employment protection legislation indicator.	OECD. Stat
Other controls:		
Member of the European Union	Dummy variable taking the value of 1 if the country is a member of the European Union and 0 if it is not.	

5.2 Evolution of active labour market policies

Since the 90s there has been a growing interest in activation measures, which many countries see as the central policy to combat the persistently high levels of unemployment. Today, expenditure in ALMP is sizeable in most advanced economies and continues to increase. Between 2004 and 2009, ALMP expenditure grew continuously at an average annual rate of 5.8 per cent, reaching an accumulated growth of 32.5 per cent and a total spending of US$176.5 billion (PPP) in the five years to 2009. Only in 2010, this expansion ended and ALMP spending fell by close to 0.7 per cent (Figure 1, panel A). ALMP expenditure per unemployed individual has also increased in a sustained manner – by an accumulated 25.5 per cent between 2004 and 2008. In 2009 and 2010, however, this upward trend ended abruptly due to the rise in the number of unemployed as a consequence of the crisis.

In terms of the distribution of expenditure by type of policy, an important share of spending on ALMP (excluding PES and administration) remained concentrated in training measures, which represented close to 39 per cent of the total in 2010. Spending in employment incentives, direct-job creation and supported employment and rehabilitation measures also represented prominent shares with 22.2, 16.8

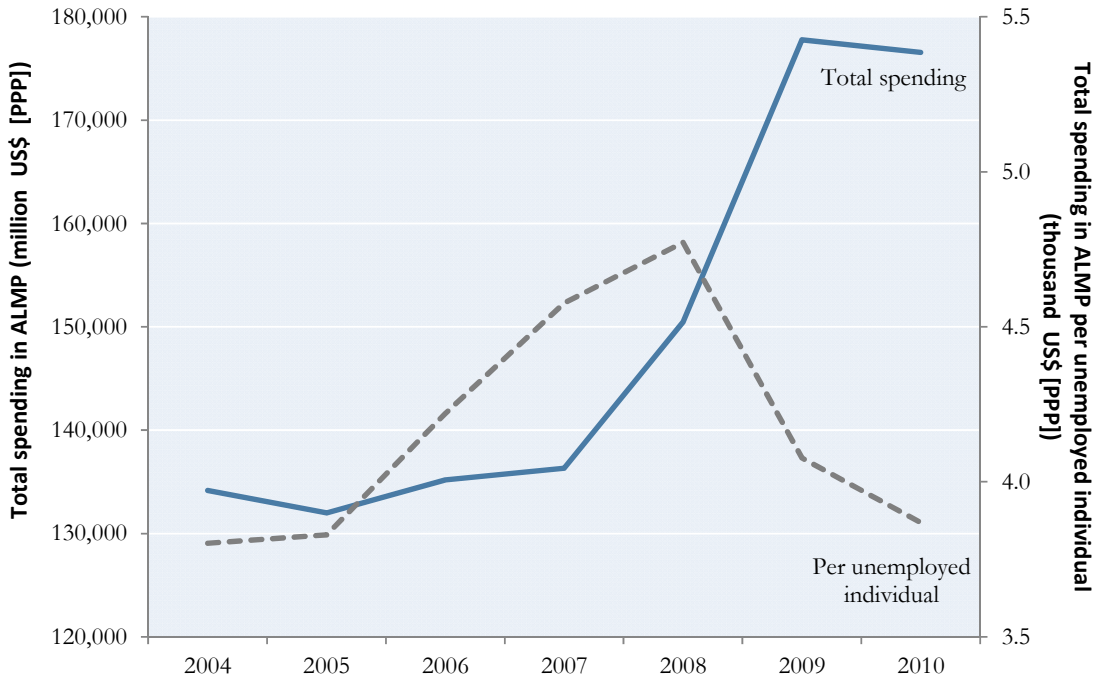
and 15.7 per cent, respectively. The share of expenditure in start-up incentives, on the other hand, remains low at 6.2 per cent of total expenditure and that of job rotation and job sharing programmes is negligible. Relative to 2004, the different groups of policies have maintained their relative importance, with minor exceptions. For example, a small decrease in the share of spending in supported employment and rehabilitation measures seems to have given way to an increase in spending in direct-job creation measures.

Importantly, the overall growth in expenditure on active measures during the period 2004–10 was driven by training, in spite of a decrease in its share. It accounted for one-third of the total increase in ALMP spending (excluding PES and administration) during the period (Figure 1, panel B). Employment incentives and direct-job creation measures are the second and third sources of growth in ALMP expenditure, accounting for around 27 and 24.5 per cent, respectively. Conversely, spending in supported employment and rehabilitation fell during the period, thus its contribution to growth only accounted for 7.7 per cent.

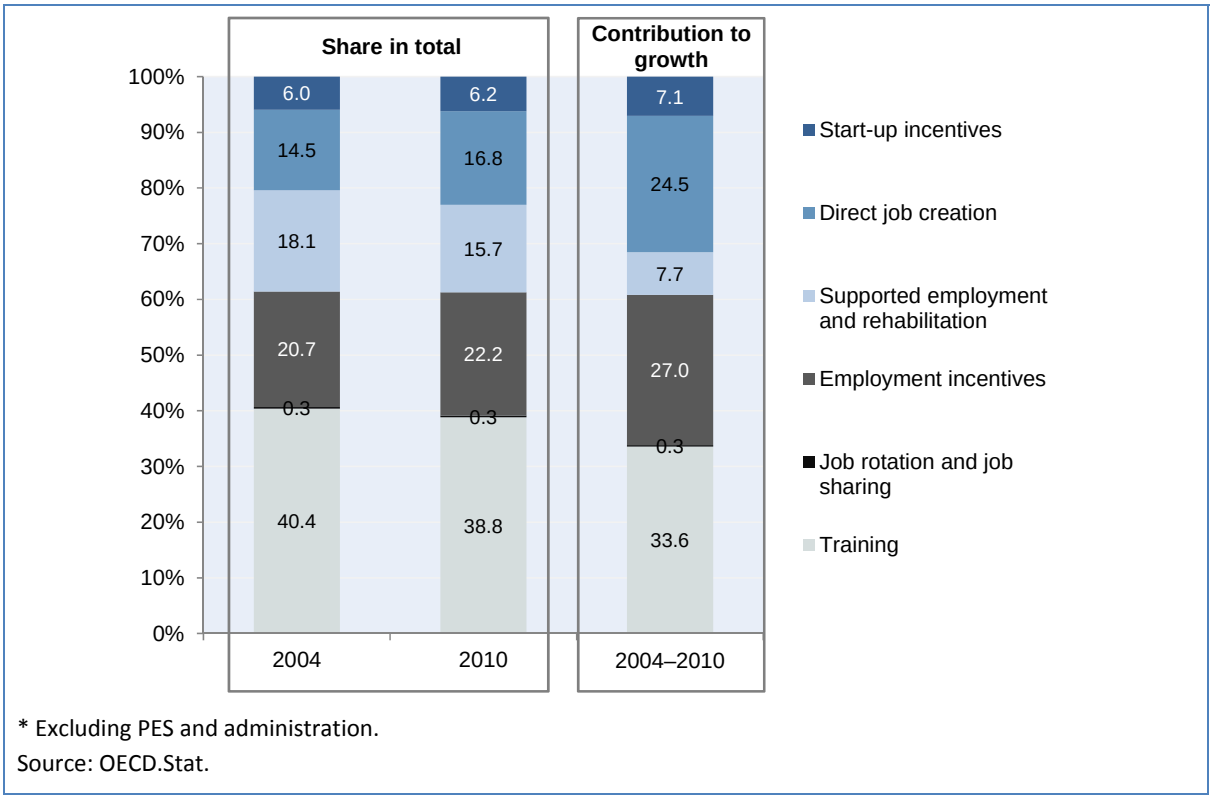
In sum, training continues to be the preferred tool of advanced countries' governments to address labour market problems. Meanwhile, employment incentives and direct-job creation measures have become the more and more important. The remaining of this section will test whether targeting spending towards these priority policies is the most effective way to address labour market imbalances.

Figure 1. Evolution of expenditure on ALMP, 2004–2010

Panel A. Total expenditure on ALMP



Panel B. Share of the expenditure by type of ALMP policy in 2004 and 2010 and in the change between 2004–2010 (percentages of total ALMP expenditure*)



* Excluding PES and administration.

Source: OECD.Stat.

5.3 Descriptive statistics

Basic descriptive statistics of the variables used in the analysis and their cross-correlations are summarized in Tables 2 and 3.

As shown by the pairwise correlation between the Policy cluster and the three implementation variables (Table 3), implementation variables are closely related to policy intervention ones, because the effect of policy interventions depends on the quality of implementation. In this situation, interaction terms may be needed to avoid a misspecification arising from the omission of these relationships. To avoid this problem, I tested a number of interaction terms, three of which proved significant indicating they should be added to the model to ensure a correct specification: *cluster * PES allocation*; *cluster * timing*; *cluster * continuity*.[18] Finally, an additional interaction was added between the variables *Cycle* and *timing* to capture the fact that countercyclical policies may be more or less effective depending on the moment of the economic cycle.

Table 2. Descriptive statistics

Variable	Obs	Mean	Standard Deviation	Minimum	Maximum
Dependent:					
Unemployment rate	731	7.5	3.9	0.6	23.9

[18] Omitting relevant interaction terms would constrain the partial derivatives of both *Policy Cluster* and the three implementation variables to be constant rather than varying, as they would be for the equation including the interaction terms (Baum, 2006, p. 125).

Employment-to-population ratio	731	66.5	8.0	46.9	84.4
Labour force participation rate	731	71.5	7.1	56.6	86.0
Low-skilled unemployment rate	511	12.2	7.7	2.1	53.4
Low-skilled employment-to-population ratio	498	47.0	12.1	13.3	71.9
Low-skilled labour force participation rate	490	52.7	11.3	24.5	74.5
Share of low-skilled unemployed individuals	520	36.6	15.5	0.5	78.4
Independent:					
Policy Cluster (thousand)	652	4.29	4.83	0.04	27.47
Public expenditure in training (thousand)	659	1.71	1.95	0.00	10.32
Public expenditure in job rotation and job sharing (thousand)	665	0.03	0.12	0.00	1.39
Public expenditure in employment incentives (thousand)	662	0.86	1.44	0.00	13.63
Public expenditure in supported employment and rehabilitation (thousand)	660	0.94	1.92	0.00	14.31
Public expenditure in direct job creation (thousand)	660	0.79	1.19	0.00	6.46
Public expenditure in start-up incentives (thousand)	664	0.10	0.14	0.00	0.81
Allocation of resources to the implementation of policies (per cent)	623	0.27	0.17	0.02	0.90
Continuity of programmes implemented	710	-15.0	14.7	-71.0	-1.2
Right timing in the implementation of programmes	806	0.8	0.4	0.0	1.0
Cycle (billions)	721	40,389	148,061	5.7	10,43,666
Real Gross Domestic Product (GDP)	690	2.8	2.9	-14.1	12.3
Share of the population with tertiary education	729	48.1	21.0	2.4	103.9
Middle-skilled unemployment rate	510	7.6	4.3	0.0	26.5
High-skilled unemployment rate	505	4.5	2.4	1.1	18.3
Union density	689	34.0	19.5	7.1	83.9
EPL for temporary workers	613	2.0	1.4	0.3	5.4
Member of the European Union	806	0.7	0.5	0.0	1.0

Table 3. Cross-correlations between independent variables of the model

	Cluster (Policy 1)	Training	Employment incentives	Supported employment and rehabilitation	Direct-job creation	**Job rotation and job sharing (Policy 2)**	**Start-up incentives (Policy 3)**	**Cluster* PES allocation**	**Cluster* Timing**	**Cycle* Timing**
Cluster (Policy 1)	1									
Training	0.83*	1								
Employment incentives	0.72*	0.51*	1							
Supported employment and rehabilitation	0.76*	0.49*	0.29*	1						
Direct-job creation	0.60*	0.31*	0.37*	0.30*	1					
Job rotation and job sharing (Policy 2)	0.14*	0.11*	0.09*	0.01	0.27*	1				
Start-up incentives (Policy 3)	0.07	0.13*	0.18*	-0.08*	-0.03	0.06	1			
Cluster*PES allocation	0.85*	0.61*	0.40*	0.89*	0.50*	0.05	-0.03	1		
Cluster*Timing	0.99*	0.82*	0.69*	0.76*	0.61*	0.15*	0.04	0.84*	1	
Cycle*Timing	-0.10*	-0.12*	-0.06	-0.09*	0.02	-0.04	-0.12*	-0.11*	-0.09*	1
PES allocation	-0.35*	-0.35*	-0.31*	-0.11*	-0.30*	-0.17*	-0.22*	-0.07	-0.33*	0.13*
Continuity in implementation	0.25*	0.25*	0.13*	0.18*	0.16*	0.13*	0.07	0.31*	0.25*	-0.43*
Correct timing of policies	0.36*	0.35*	0.19*	0.22*	0.28*	0.12*	-0.03	0.34*	0.43*	0.14*
Real GDP	-0.10*	-0.13*	-0.06	-0.09*	0.02	-0.04	-0.12*	-0.12*	-0.09*	1*
Growth rate of real GDP	-0.09*	-0.10*	-0.07	-0.09*	0.03	0.01	-0.02	-0.12*	-0.09*	0.10*
Population with tertiary education	0.09*	0.13*	-0.02	0.09*	0.02	0.18*	-0.11*	0.15*	0.09*	0.18*
UNR middle-skilled individuals	-0.42*	-0.40*	-0.20*	-0.32*	-0.22*	0.02	0.07	-0.40*	-0.42*	-0.18*
UNR of high-skilled individuals	-0.32*	-0.27*	-0.11*	-0.28*	-0.22*	-0.06	0.12*	-0.32*	-0.33*	-0.09*
Union density	0.47*	0.46*	0.48*	0.22*	0.22*	0.35*	0.12*	0.22*	0.48*	-0.25*
EPL (temporary workers)	0.13*	0.11*	0.17*	0.0	0.16*	0.16*	0.04	0.03	0.11*	-0.07

Error! Reference source not found.. **(Cont.) Cross-correlations between independent variables of the model**

	PES allocation	Continuity in implementation	Correct timing of policies	Real GDP	Growth rate of real GDP	Population with tertiary education	UNR middle-skilled individuals	UNR of high-skilled individuals	Union density	EPL (temporary workers)
PES allocation	1									
Continuity in implementation	-0.10*	1								
Correct timing of policies	-0.16*	0.15*	1							
Real GDP	0.13*	-0.43*	0.14*	1						
Growth rate of real GDP	-0.05	-0.16*	-0.04	0.10*	1					
Population with tertiary education	0.01	0.04	0.26*	0.18*	-0.09*	1				
UNR middle-skilled individuals	-0.03	-0.09*	-0.29*	-0.18*	0.0	-0.03	1			
UNR of high-skilled individuals	-0.15*	0.02	-0.16*	-0.09*	-0.07	0.01	0.73*	1		
Union density	-0.26*	0.23*	0.26*	-0.25*	-0.08	-0.05	-0.05	-0.11*	1	
EPL (temporary workers)	-0.40*	0.03	-0.01	-0.07	-0.12*	-0.24*	0.25*	0.32*	0.08	1

Notes: * = significant at the 5 per cent level; UNR=Unemployment rate; Policy variables are measured as public expenditure in thousand US$ (PPP) per unemployed individual; Cluster variable includes: training, employment incentives, supported employment and rehabilitation, and direct job creation policies.

6. Econometric results

6.1 Description of results

Tables 4, 5, 6 and 7 below report the effect of expenditures on ALMP on the unemployment, employment and labour force participation rates of the overall population and low-skilled individuals and on the share of low-skilled unemployed individuals. All models presented in these tables report results estimated by FGLS with AR1 correction, which is the preferred specification. For each parameter, interactions were added one by one to check whether results change with each addition. This allows flagging the size of variations produced by the inclusion of interaction terms which, in most cases, are correlated with the underlying explanatory variables.

Effects on the unemployment rate

Estimates relative to the unemployment rate are presented in Table 4. Results show that the *policy cluster* (this is public expenditure in training, employment incentives, supported employment and rehabilitation and direct job creation measures) has a significant negative effect on the total unemployment rate and the unemployment rate of the low-skilled. The effect of start-up incentives on the unemployment rates of both groups is also negative and significant. Finally, job rotation and job sharing has a negative but non-significant effect on the unemployment rate of these groups, which might due to the fact that expenditure in these policies is small in relative terms. Interestingly, in general, ALMP policies seem to be more effective in reducing the unemployment rate of the low skilled than that of the overall population.

Importantly, implementation seems to matter too. Raising the share of PES in total ALMP expenditure has a reducing effect on the unemployment rate of both population groups but this effect is significantly different from zero only in the case of the overall unemployment rate. The variable timing, which measures whether policies are implemented in a countercyclical or procyclical manner matters too, implying that countercyclical policies (*timing*=1) have an unemployment reducing effect. Finally, the effect of policy continuity is significant only in the case of the low-skilled and has a negative effect as well but only once the *cycle-timing* interaction is included.

Importantly, the interaction of *timing* with the *policy cluster* is also significant and has a positive effect on the unemployment rate of both population groups. It suggests that when policies are implemented in a countercyclical manner (*timing*=1), the unemployment reducing effect of the policy cluster is lower.[19] This implies that policies that are implemented procyclically have a stronger unemployment reducing effect during booms but also a stronger unemployment enhancing effect during crises. This confirms the argument in favour of policy continuity that suggests investing in activation measures during booms when resources are available but also during crises when the unemployed need that support the most. This argument is also confirmed by the *cycle-timing* interaction, which is also significant for the low-skilled. It shows that when policies are implemented countercyclically, the elasticity of the unemployment rate to the cycle is lower. The interaction between the *policy cluster* and the share of PES is also significant for the low-skilled group, albeit only at the 10 per cent level. It shows that the

[19] Given the equation of the interaction effect: unr = a + b1 cluster + b2 (cluster*timing) + b3 timing + e, the effect of the interaction term when timing=1 is given by unr = (b1 + b2)*cluster + b3 and the effect of the interaction term when timing=0 is given by unr = b1*cluster.

unemployment reducing effect of the *policy cluster* becomes stronger as more ALMP resources are devoted to PES and administration.[20]

Interestingly, the size of the coefficients arising from policy and implementation variables, once interactions are included is noticeably higher. This demonstrates that a correct implementation of policies (e.g. namely right timing and the allocation of resources to PES) enhances the unemployment reducing effect of the *policy cluster*.[21]

Other control variables – such as of union density, the share of the population with tertiary education, the strictness of employment protection for temporary workers and the unemployment rate of low-skilled individuals – also show significant effects. As explained above in more detail, these variables have been included in the analysis to control for the structure of the national labour markets (which may affect the speed of adjustment to shocks and structural change) and for differences in institutional arrangements (that can affect wage bargaining and macroeconomic performance). Their coefficients will not be analysed in this paper since their individual effects are (at least partly) already taken up by the other explanatory variables.[22]

Effects on the employment rate

Table 5 presents the results of the employment rate estimations of the two population groups. By and large, these findings show the mirror image of the unemployment rate's results. The *policy cluster* has a significant positive effect on the employment rate of the overall and low-skilled populations. The effect of start-up incentives is also positive but this time is only significant for the overall population. Job rotation and job sharing has again a negative but non-significant effect on both employment rates. Finally, in line with previous results, ALMP policies seem to be more effective in boosting the employment rate of the low skilled.

The impact of implementation variables also shows the mirror image of unemployment rate estimations. An increased allocation of resources towards PES, for example, has a positive effect on the employment rate of both population groups but this effect is significantly different from zero only in the case of the overall population's employment rate. Moreover, the effect of policy continuity is positive and significant for both population groups suggesting that supporting policy continuity would have a boosting effect on the employment rates of the overall and low-skilled populations.

The interaction term between the *policy cluster* and the allocation of resources to PES is also significant in the case of the low-skilled and is positively correlated. The analysis of this interaction[23] illustrates that as more ALMP resources are allocated towards PES and administration, the favourable effect of the policy cluster on the low-skilled employment rate becomes stronger. In addition, whether policies are

[20] It is important to note that although the *policy cluster*PES allocation* and *cycle*timing* interactions are non-significant for the overall unemployment rate, they have been included in the specification given the results of the joint test of interaction coefficients in favour of their inclusion (i.e. interaction terms are jointly significant). In this circumstance, a misspecification would occur when considering a reduced version of the model without these interactions (Baum, 2006).

[21] See Appendix 3 for the graphic interpretation of the different interaction effects.

[22] In particular, as shown by Appendix 4, these control variables show significant results when used as explanatory variables of the two main policy variables *policy cluster* and *start-up incentives*.

[23] See Appendix 3 for the graphic interpretation of the different interaction effects.

implemented in a countercyclical or procyclical manner also influences the magnitude of the effect of the *policy cluster* on the employment rate of both population groups (i.e. interaction term between *policy cluster* and *timing*). The effect of this interaction term is also a mirror image of that of the unemployment rate but with the same implications. In other words, it has a negative significant effect on the employment rate of both population groups, implying that when policies are implemented in a countercyclical manner (*timing*=1), the employment enhancing effect of the *policy cluster* is lower. The interpretation of these effects remains the same as in the case of the unemployment rate. This effect is also confirmed by the *cycle-timing* interaction, which is significant only for the overall population. It suggests that when policies are implemented countercyclically, the elasticity of the employment rate to the cycle is lower.

Labour force participation rate (LFPR)

Active labour market policy intervention has also significant effects in the participation rate of the overall and low-skilled populations. Table 6 presents the parameter estimates for LFPR of the two population groups. The *policy cluster* variable is positively and significantly correlated with the labour force participation rates of both population groups, albeit only at the 10 per cent level for the low-skilled group.

Implementation variables also have some level of significance. Policy continuity has a positive and significant effect on both labour force participation rates. Moreover, increasing the allocation of resources towards PES has a positive effect on the participation rates of both population groups but this effect is significantly different from zero only in the case of the overall participation rate.

The interaction term between the *policy cluster* and the allocation of resources to PES is also significant in the case of the low-skilled participation rate and is positively correlated. As it was the case with the low-skilled employment and unemployment rates, the analysis of this interaction's parameter illustrates that as more ALMP resources are devoted to PES and administration, the favourable effect of the *policy cluster* on the low-skilled participation rate becomes stronger. Similarly, the *cluster-timing* interaction is significant only for the low skilled. In line with the low-skilled employment rate's findings, it has a negative significant effect. The analysis of this interaction's coefficient suggests that when policies are implemented in a countercyclical manner (*timing*=1), the participation enhancing effect of the policy cluster is lower. The interpretation of this effect remains the same as in the case of the employment and unemployment rates. As with the unemployment and employment rates, the effect of policies is enhanced when interactions are included in the analysis.

It is important to note, that in the case of the LFPR of the overall population individual and joint tests for the non-significance of interactions terms could not be rejected so all interactions were dropped from the equation.

Share of low-skilled unemployed individuals

Active labour market policy intervention (as measured by the *policy cluster* variable) is also beneficial in reducing the negative "structuralization" of unemployment on weaker groups of the labour market, in this case the low-skilled. Table 7 presents the parameter estimates for the share of low-skilled unemployed individuals. Unlike the other models, only the *policy cluster* and the timing of the intervention show significant results, negative in both cases.

A note of caution is in order regarding the robustness of this last model since results did not always hold across the different estimations, mainly in the case of estimations that did not include country dummies. This might be explained by the fact that the structure of unemployment is particularly heterogeneous across countries. Country dummies were thus included in the OLS and GLS (AR1) estimations to account for the unexplained country-to-country variation. Adding country dummies, however, has the risk of saturating the model, as it can be seen by the size of variance in model (1).

6.2 Interpretation of results

To give an idea of the size of the effects, I use the coefficients in the first columns of tables 4 to 7 (which show effects of explicative variables before adding the interactions) as basis for some calculations. It can be observed that increasing an additional standard deviation in the policy cluster (US$4.8 thousand [PPP] per unemployed) would reduce the overall unemployment rate by around 2 percentage points and the low-skilled unemployment rate by close to 3 percentage points. Importantly, the effect would be more important for the low-skilled since this increase in spending would be accompanied by a decrease of 1.5 percentage points in the share of low-skilled unemployed individuals (in total unemployment). In terms of employment, raising one standard deviation the expenditure on these policies would boost the overall employment rate by around 2.1 percentage points and the employment rate of the low-skilled by 2.7 percentage points. Finally, this would be associated as well with an increase in the labour force participation rates of the two groups by 1.6 and 1.7 percentage points, respectively. Importantly, in general, ALMP policies seem to be more effective in reducing the unemployment rate of the low skilled than the overall population. This, seems intuitively correct; first, because most policies are targeted towards this more disadvantaged group. Second, because higher-skilled individuals are expected to be better equipped to find jobs by themselves and so policies targeted to them appear less effective due a potential deadweight loss.

The effect of start-up incentives is also non negligible, albeit less significant in the case of the low-skilled. An increase by one standard deviation (US$140 [PPP] per unemployment) in expenditure allocated to start-up incentives would be accompanied by a 0.43 and 0.62 percentage points decrease in the unemployment rates of the overall and low-skilled populations, respectively. In terms of employment, this increase in spending would raise the employment rate of the overall population by 0.29 percentages points.

In more detail, these results suggest that a country with a 10 per cent rate of unemployment (such as France or the United States in 2010) would need to spend around US$25,000 (PPP) in policy cluster-type measures for every unemployed they want to reduce – i.e. reducing 0.4 for every 10 unemployed would cost US$10,000 (PPP) in a country with an unemployment rate of 10 per cent. Following the same logic, this same country would need to spend around US$3,300 (PPP) in start-up incentives for one fewer unemployed. Thus, start-up incentives are more effective in reducing unemployment than the policy cluster. Unfortunately, countries usually spend less on the latter, in part because it is commonly believed that these policies benefit more the higher skilled who also need less government assistance. Lower expenditure would mean that attaining efficient levels of expenditure in start-up incentives per unemployment individual would probably be harder. France, for example, would need to raise its expenditure per unemployed individual – relative to its 2010 expenditure – by over 270 and 565 per cent, respectively, in the cluster of policies and start-up incentives if the country is to attain the necessary levels for these policies to be the most efficient. This finding is in line with results from micro-

econometric analyses, which show that start-up incentives are associated with a "double dividend" if subsidized businesses create additional jobs in the future (Caliendo and Künn, 2013).

The story is different, however, for a country with 20 per cent unemployment rate such as Spain. In this case, the necessary expenditure in cluster policies to reduce by one the number of unemployed would be over US$50,000 (PPP), which is above the annual labour compensation per employee of US$40,044 (PPP). In this case, start-up incentives also offer a "bigger bang for the buck" (around US$6,500 [PPP] for one fewer unemployed). Yet, this level of expenditure entails an increase of 1,650 per cent of Spain's 2010 expenditure in start-up incentives per unemployed individual, which seems unlikely.

To put these numbers in perspective, the annual labour compensation per employee in France was much higher than these ALMP costs in 2010 totalling around US$47,500 (PPP) – e.g. it was US$42,890 (PPP) in average in the OECD. Spending in activation policies seems thus both economically and socially more efficient than having the government employ these people directly. Moreover, keeping these unemployed individuals attached to the benefit system has also costs for the government and for society as a whole. Specifically for France, in 2010 the cost for society[24] of having one unemployed under the out-of-work maintenance and support income was around US$12,800 (PPP) per participant. In addition, the government spent over US$7,300 (PPP) per participant in 2010 in income support measures, principally for the unemployed that had exhausted their entitlement to unemployment benefits.[25] Importantly, the longer individuals are unemployed the less likely is that they find jobs without assistance. As such, activation measures will be likely needed to facilitate the return to work of these long-term unemployed individuals.

Finally, as shown above, implementation also has an important effect. Before adding the different interactions, an increase by one percentage point in the share of PES (in total ALMP expenditure) would be associated with a decrease of 3.3 percentage points in the overall unemployment rate, and an increase by 4.2 and 3.5 percentage points in the overall employment and participation rates, respectively. Moreover, a disruption of policy continuity is associated with a reduction of 0.17 and 0.14 percentage points in the overall and low-skilled employment rates, respectively. Lack of continuity in the implementation of policies would also affect negatively the overall and low-skilled participation rates by 0.11 and 0.16 percentage points, respectively.

Interestingly, the size of effects arising from policy and implementation variables, once interactions are included is higher. This means that the interaction of the cluster of policies with the right implementation measures (e.g. namely right timing of policies and the share of PES spending) enhances their unemployment reducing effect.[26] Moreover, some of the implementation variables become significant only once these interactions are in place. This is the case of policy continuity which would be associated with a decrease in the low-skilled unemployment rate of 0.16 percentage points.

[24] This mainly includes the cost of the unemployment insurance system, but also the 50 per cent of the special employment assistance programme (AEPE) bared by the unemployment insurance system; and the 40 per cent specific solidarity allowance and pension equivalent allowance financed by the solidarity contributions of State employees (Author's calculations based on Eurostat, 2013b).

[25] This includes the cost of the partial unemployment scheme (transferred to enterprises), the temporary delay allowance (ATA), the 50% of the special employment assistance (AEPE) bared by the Central government; and the 60% of specific solidarity and pension equivalent allowances financed by the State budget (Ibid).

[26] See Appendix 3 for the graphic interpretation of the different interaction effects.

Table 4. Regression results on the unemployment rate adding one interaction at a time

	Unemployment rate					Low-skilled unemployment rate				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Cluster (Policy 1)	-0.387*** (0.0373)	-0.321*** (0.0701)	-2.073*** (0.239)	-0.394*** (0.0372)	-2.023*** (0.245)	-0.568*** (0.0825)	-0.331** (0.165)	-3.130*** (0.493)	-0.584*** (0.0808)	-2.968*** (0.515)
Job rotation and job sharing (Policy 2)	-0.736 (0.576)	-0.834 (0.580)	-0.830 (0.558)	-0.716 (0.589)	-0.905 (0.554)	0.245 (1.257)	-0.0957 (1.225)	0.00750 (1.106)	0.320 (1.241)	-0.231 (1.164)
Start-up incentives (Policy 3)	-3.065*** (0.768)	-3.137*** (0.767)	-2.158*** (0.750)	-2.998*** (0.782)	-2.320*** (0.740)	-4.423** (1.802)	-4.926*** (1.771)	-2.866* (1.652)	-5.257*** (1.785)	-3.856** (1.725)
Cluster * PES allocation		-0.323 (0.291)			-0.315 (0.278)		-1.015 (0.634)			-1.089* (0.601)
Cluster * Timing			1.707*** (0.240)		1.722*** (0.238)			2.617*** (0.494)		2.675*** (0.494)
PES allocation	-3.298*** (1.008)	-2.897*** (1.063)	-4.564*** (0.967)	-3.451*** (1.005)	-4.096*** (1.018)	-2.005 (2.228)	-0.601 (2.353)	-3.865* (2.096)	-2.200 (2.183)	-2.633 (2.251)
Continuity in implementation	0.0102 (0.0146)	0.0112 (0.0145)	0.00602 (0.0138)	0.000672 (0.0155)	0.000143 (0.0146)	0.0104 (0.0437)	0.0210 (0.0442)	0.0247 (0.0435)	-0.192*** (0.0641)	-0.155** (0.0607)
Correct timing of policies	-1.432* (0.828)	-1.394* (0.837)	-3.110*** (0.770)	-1.166 (0.772)	-2.930*** (0.810)	-2.558* (1.335)	-2.500* (1.370)	-6.097*** (1.533)	0.0230 (1.428)	-3.625** (1.543)
Cycle * Timing				-2.73e-06 (2.02e-06)	-3.10e-06 (2.01e-06)				-1.90e-05*** (4.54e-06)	-1.79e-05*** (4.37e-06)
Growth rate of real GDP	-0.0528** (0.0266)	-0.0523** (0.0265)	-0.0580** (0.0258)	-0.0512* (0.0273)	-0.0569** (0.0253)	-0.0185 (0.0681)	-0.0245 (0.0654)	-0.0365 (0.0596)	-0.0304 (0.0673)	-0.0354 (0.0622)
Population with tertiary education	0.0125 (0.0111)	0.0126 (0.0111)	0.0211** (0.0104)	0.0155 (0.0111)	0.0240** (0.0107)	0.0145 (0.0228)	0.0156 (0.0227)	0.0338 (0.0222)	0.0398* (0.0231)	0.0592*** (0.0224)
Union density	0.0431*** (0.0152)	0.0416*** (0.0154)	0.0245* (0.0136)	0.0345** (0.0143)	0.0212 (0.0145)	0.0497* (0.0262)	0.0409 (0.0274)	0.0342 (0.0274)	0.0338 (0.0256)	0.00771 (0.0259)
EPL for temporary workers	-0.117 (0.171)	-0.137 (0.172)	-0.0755 (0.159)	-0.0957 (0.167)	-0.101 (0.161)	-1.277*** (0.334)	-1.242*** (0.334)	-1.095*** (0.325)	-1.186*** (0.326)	-1.079*** (0.313)
EU	3.404***	3.433***	3.821***	3.319***	3.620***	6.293***	6.339***	6.716***	6.124***	6.752***

	(0.755)	(0.764)	(0.665)	(0.704)	(0.709)	(1.164)	(1.200)	(1.234)	(1.125)	(1.117)
Constant	7.357*** (1.255)	7.313*** (1.262)	9.041*** (1.163)	7.385*** (1.196)	8.991*** (1.189)	13.24*** (2.340)	13.09*** (2.362)	15.78*** (2.385)	8.788*** (2.511)	11.64*** (2.459)
Observations	452	452	452	452	452	336	336	336	336	336
Number of countries[27]	27	27	27	27	27	27	27	27	27	27

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. All models have been estimated by FGLS with AR1 correction (preferred specification).

Table 5. Regression results on the employment rate adding one interaction at a time

	Employment rate					**Low-skilled employment rate**				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Cluster (Policy 1)	0.436*** (0.0527)	0.390*** (0.100)	1.396*** (0.314)	0.463*** (0.0529)	1.167*** (0.346)	0.563*** (0.110)	0.190 (0.199)	1.701*** (0.644)	0.685*** (0.118)	1.850*** (0.712)
Job rotation and job sharing (Policy 2)	-0.883 (0.711)	-0.826 (0.725)	-0.773 (0.682)	-1.056 (0.745)	-0.832 (0.724)	-1.264 (1.389)	-0.696 (1.392)	-0.999 (1.300)	-1.926 (1.609)	-0.908 (1.497)
Start-up incentives (Policy 3)	2.085** (0.947)	2.198** (0.963)	1.559* (0.923)	2.282** (0.975)	1.898** (0.967)	1.146 (1.891)	1.762 (1.889)	0.558 (1.800)	1.929 (2.134)	1.577 (2.030)
Cluster * PES allocation		0.220 (0.381)			0.297 (0.378)		1.672** (0.754)			1.826** (0.799)
Cluster * Timing			-0.979*** (0.311)		-0.791** (0.330)			-1.189* (0.638)		-1.638** (0.682)
PES allocation	4.153*** (1.232)	3.911*** (1.328)	4.658*** (1.215)	4.043*** (1.256)	4.120*** (1.351)	3.103 (2.673)	0.870 (2.822)	3.745 (2.591)	4.182 (2.944)	2.443 (3.012)
Continuity in implementation	0.172*** (0.0387)	0.174*** (0.0388)	0.159*** (0.0377)	0.213*** (0.0392)	0.191*** (0.0385)	0.135** (0.0629)	0.125** (0.0626)	0.121* (0.0627)	0.236*** (0.0874)	0.183** (0.0828)
Correct timing of policies	-2.901***	-2.989***	-1.448	-5.943***	-4.247***	-4.550**	-4.743**	-2.591	-6.666***	-4.052*

[27] Israel has been dropped from all regressions due to total unavailability of information about union density. Estonia and Luxembourg were dropped from GLS (AR1) regressions because not enough information on EPL for temporary workers was available to carry out the analysis. The same occurred with Slovenia but with two variables, union density and EPL for temporary workers. This is relevant for all equations presented in tables 5, 6, 7 and 8.

	(0.943)	(0.942)	(1.022)	(1.061)	(1.240)	(2.074)	(2.075)	(2.328)	(2.074)	(2.277)
Cycle * Timing				0.00109***	0.000891***				7.53e-06	5.26e-06
				(0.000251)	(0.000267)				(6.25e-06)	(6.15e-06)
Cycle	6.30e-06**	6.52e-06**	5.51e-06**	-0.00108***	-0.00088***					
	(2.80e-06)	(2.81e-06)	(2.77e-06)	(0.000251)	(0.000268)					
Growth rate of real GDP	-0.0265	-0.0273	-0.0204	-0.0355	-0.0283	0.0699	0.0684	0.0813	0.0450	0.0587
	(0.0377)	(0.0380)	(0.0361)	(0.0397)	(0.0380)	(0.0747)	(0.0737)	(0.0697)	(0.0873)	(0.0796)
Unemployment rate of the high skilled	-0.773***	-0.771***	-0.712***	-0.832***	-0.768***	-0.585***	-0.563***	-0.523***	-0.540***	-0.433**
	(0.0797)	(0.0801)	(0.0797)	(0.0816)	(0.0825)	(0.170)	(0.169)	(0.170)	(0.185)	(0.182)
Union density	0.0622***	0.0647***	0.0642***	0.0692***	0.0730***	0.0872**	0.100**	0.0907**	0.0945**	0.117***
	(0.0173)	(0.0176)	(0.0174)	(0.0161)	(0.0168)	(0.0408)	(0.0411)	(0.0425)	(0.0379)	(0.0395)
EPL for temporary workers	-0.655***	-0.655***	-0.677***	-0.453**	-0.516**	2.151***	2.149***	1.880***	2.639***	2.381***
	(0.203)	(0.203)	(0.200)	(0.206)	(0.206)	(0.445)	(0.442)	(0.438)	(0.457)	(0.445)
EU	-8.606***	-8.651***	-8.712***	-10.08***	-9.932***	-9.361***	-9.570***	-9.365***	-9.761***	-10.10***
	(0.763)	(0.760)	(0.773)	(0.764)	(0.783)	(1.870)	(1.872)	(1.995)	(1.673)	(1.744)
Constant	76.90***	76.96***	75.15***	80.71***	78.57***	51.43***	51.60***	49.64***	52.11***	49.36***
	(1.422)	(1.421)	(1.495)	(1.594)	(1.783)	(3.163)	(3.149)	(3.387)	(3.216)	(3.354)
Observations	364	364	364	364	364	352	352	352	352	352
Number of countries	27	27	27	27	27	27	27	27	27	27

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. All models have been estimated by FGLS with AR1 correction (preferred specification).

Table 6. Regression results on the participation rate adding one interaction at a time

	Participation rate	Low-skilled participation rate			
	(1)	(1)	(2)	(3)	(4)
Cluster (Policy 1)	0.340*** (0.0535)	0.346*** (0.105)	-0.00243 (0.192)	1.569** (0.666)	1.360* (0.695)
Job rotation and job sharing (Policy 2)	-1.481* (0.786)	-0.571 (1.319)	-0.0946 (1.360)	-0.559 (1.348)	-0.0841 (1.404)
Start-up incentives (Policy 3)	0.587 (1.126)	-0.0873 (1.998)	0.729 (2.050)	-0.576 (2.056)	0.223 (2.130)
Cluster * PES allocation			1.681** (0.736)		1.736** (0.755)
Cluster * Timing				-1.202* (0.657)	-1.345** (0.665)
PES allocation	3.540** (1.377)	1.171 (2.570)	-0.773 (2.757)	2.321 (2.657)	0.550 (2.867)
Continuity in implementation	0.112*** (0.0265)	0.157*** (0.0610)	0.152** (0.0607)	0.160*** (0.0608)	0.155** (0.0606)
Correct timing of policies	-3.748*** (0.794)	-4.362** (2.091)	-4.750** (2.044)	-2.979 (2.219)	-3.246 (2.172)
Growth rate of real GDP	-0.0705* (0.0428)	0.0438 (0.0725)	0.0380 (0.0738)	0.0416 (0.0741)	0.0341 (0.0762)
Population with tertiary education	0.0494*** (0.0139)	-0.0472 (0.0298)	-0.0475 (0.0298)	-0.0554* (0.0302)	-0.0572* (0.0304)
Unemployment rate of the high skilled	-0.201** (0.0840)	-0.0954 (0.167)	-0.0517 (0.169)	0.0135 (0.178)	0.0714 (0.180)
Union density	0.0999*** (0.0156)	0.127*** (0.0402)	0.140*** (0.0398)	0.133*** (0.0396)	0.148*** (0.0390)
EPL for temporary workers	-0.873*** (0.204)	1.383*** (0.435)	1.465*** (0.435)	1.417*** (0.437)	1.525*** (0.437)
EU	-7.094*** (0.691)	-7.905*** (1.874)	-8.230*** (1.830)	-8.390*** (1.840)	-8.806*** (1.784)
Constant	76.04*** (1.461)	58.87*** (3.436)	58.91*** (3.397)	57.23*** (3.510)	57.05*** (3.470)
Observations	336	326	326	326	326
Number of countries	27	27	27	27	27

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. All models have been estimated by FGLS with AR1 correction (preferred specification).

Table 7. Regression results on the share of low-skilled unemployed individuals adding one interaction at a time

	Share of low skilled unemployed individuals			
	(1)	(2)	(3)	(4)
Cluster (Policy 1)	-0.315**	-0.723**	-1.574*	-1.995**
	(0.157)	(0.296)	(0.924)	(0.955)
Job rotation and job sharing (Policy 2)	1.967	2.486	1.781	2.287
	(2.006)	(2.026)	(1.988)	(2.008)
Start-up incentives (Policy 3)	-2.711	-1.121	-1.409	0.175
	(3.513)	(3.656)	(3.594)	(3.734)
Cluster * PES allocation		1.861		1.816
		(1.161)		(1.153)
Cluster * Timing			1.261	1.284
			(0.907)	(0.903)
PES allocation	2.574	0.190	1.739	-0.586
	(4.302)	(4.574)	(4.288)	(4.553)
Continuity in implementation	-0.153	-0.140	-0.150	-0.137
	(0.133)	(0.133)	(0.131)	(0.132)
Correct timing of policies	-12.50**	-13.69**	-14.98**	-16.20**
	(6.159)	(6.184)	(6.367)	(6.392)
Growth rate of real GDP	0.185	0.186	0.188	0.189
	(0.119)	(0.119)	(0.118)	(0.118)
Population with tertiary education	-0.00653	-0.0117	0.00846	0.00387
	(0.0414)	(0.0413)	(0.0426)	(0.0425)
Unemployment rate of the high skilled	-0.651***	-0.609***	-0.795***	-0.756***
	(0.232)	(0.233)	(0.255)	(0.256)
Union density	0.154	0.169*	0.170*	0.185*
	(0.0971)	(0.0971)	(0.0976)	(0.0976)
EPL for temporary workers	1.630**	1.705**	1.581**	1.652**
	(0.785)	(0.784)	(0.780)	(0.779)
EU	-26.76***	-26.91***	-27.90***	-28.07***
	(5.949)	(5.917)	(5.991)	(5.960)
Constant	58.00***	59.20***	59.78***	60.95***
	(6.389)	(6.417)	(6.469)	(6.493)
Observations	306	306	306	306
Number of countries	27	27	27	27

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. All models have been estimated by FGLS with AR1 correction (preferred specification) run with country dummies.

6.3 Sensitivity analysis

This section discusses the robustness checks that have been carried out to evaluate the sensitivity of the parameters presented in tables 4, 5, 6 and 7, based on a number of alternative specifications and tests reported in appendices 5 and 6.

The use of different samples – i.e. overall population and low-skilled – in each labour market equation, as discussed in the previous section, can be considered as the first robustness check. Results hold and seem to be coherent between the two population groups analysed. Moreover, robustness of results was checked by excluding key countries (in terms of the relative size of their ALMP expenditure), namely Denmark, Netherlands and Sweden, and by running the regressions on EU countries only. With some exceptions, changing the sample does not seem to alter the big lines of the estimation results (see Appendix 5). The window of time was also modified to see whether results held when studying only the last decade. Overall results seem to hold, with two exceptions: first the policy cluster reveals a loss of significance in affecting the share of low-skilled unemployed. Second, the allocation of resources to PES and the timing of policies no longer affect directly the unemployment rate but through the interaction with the policy cluster.

Reduced estimations were also carried out, although results are not provided in this paper. In particular, I estimated three reduced models for each dependent variable: the first model estimates only the influence of the three policy interventions; the second model tests only implementation variables; and the third model presents the results of the full model. In the description of results, the concentration was on the estimations of the full model only.

Along with these additional specifications carried out, a number of tests were included in the different specifications. First, the dependent variables were controlled for non-stationarity through the augmented Dickey-Fuller test. In all cases (but one) the tests rejected the null hypotheses of non-stationarity at 1 and 5 per cent levels. The exception was the variable *share of low-skilled unemployed individuals* which seems to be non-stationary. Moreover, the different models were controlled for heteroskedasticity using the robust option available. Robust results did not look very different from non-robust results.

The problems of serial correlation, heteroskedasticity and endogeneity have been taken especially seriously and have been dealt with through a number of tests and estimation techniques. First of all, the Lagram-Multiplier test (Wooldridge, 2002; Drukker, 2003) and the abar post-estimation technique (Roodman, 2006) were used to test for serial correlation in the idiosyncratic error terms. Given that the results of these tests confirmed the presence of first order autocorrelation, all specifications were run with a FGLS estimator, which allows the assessment in the presence of AR(1) autocorrelation within panels, cross-sectional correlation and heteroskedasticity across panels.

Moreover, to address the reverse causality problem, a final estimation was carried out, instrumenting (i.e. finding variables correlated with the endogenous variables, but not correlated with error term) for the *policy cluster* and *job rotation and job sharing* variables and for the implementation-related variables *continuity* and *timing* through a 2 stages least squares (2SLS) estimator.[28] In addition to the other exogenous

[28] The variable *start-up incentives* was not considered endogenous because the results of the C test of exogeneity did not favour its inclusion among the endogenous group. Indeed, when the orthogonality conditions of the model including this variable as exogenous were tested, the C test indicated robust results.

variables of the model, I used two sets of instruments in the analysis. The first one is a set of macroeconomic and structural variables including *fiscal deficit* or *public debt* depending on the specification,[29] *inflation*, the *share of the population with tertiary education* and *total expenditure in passive labour market policies*. Moreover, the *differenced unemployment rate* was included in the models explaining the employment rate and the two labour force participation rates and the variable *terms of trade* in the models explaining the unemployment rate, low-skilled employment rate and labour force participation rate. The second is a set of governability-related indicators. This set includes two indicators of the colour of the party;[30] a dummy variable, *reform,* taking the value of 1 if a reform to active labour market policies was put in place in that year in the country and 0 otherwise;[31] and a continuous variable, *durable,* illustrating the number of years that have passed since a change in governability was implemented in the country (Marshal et al., 2013). *Reform* was excluded from the models explaining the employment rate, labour force participation rate and low-skilled labour force participation rate because its addition proved to be redundant. *Durable* was also excluded from the two labour force participation rate equations for the same reason.

Results are presented in Appendix 6 and broadly confirm the findings discussed in previous sections. Accounting for the endogeneity of policy and implementation variables leads to the same effect of the *policy cluster* and *start-up incentives*. In fact, *start-up incentives* become significant in boosting the low-skilled participation rate and in reducing the share of low-skilled unemployment. A difference in the results however, is that *job rotation and job sharing* becomes significant in most of the equations (with the exception of the overall employment rate and the low-skilled participation rate) but in an ambivalent manner. An increase in spending in this policy appears to be detrimental for the unemployment and employment rates, but positive in boosting overall participation and in reducing the share of low-skilled unemployment. This seems intuitive given the aim of these policies, i.e. promoting a full or partial substitution of an employee by an unemployed person or a person from another target group. The allocation of resources towards PES also gains significance in the specifications related to the low-skilled when instruments are added. The same occurs with the variable *continuity* in implementation, with exception of the low-skilled employment and overall participation rates. Finally, the variable *timing* continues to the significant and negatively related with the different employment and participation rates. A change occurs however in the sign of this variable's effect on the unemployment rate equations. When instruments are included, the coefficient of timing in these two equations becomes positive, implying that when policies are implemented in a countercyclical manner they would have an unemployment increasing effect. This represents now the mirror image of the employment and participation rates equations. The interpretation of these results would be the same explained above. True, policies that are implemented countercyclically may have stronger unfavourable effects during booms (when pro-cyclical policies should be implemented) but also stronger favourable effects during crises. This confirms the argument in favour of policy continuity.

[29] To avoid correlation of the instrument with the error term, fiscal deficit was used in the unemployment rate and share of low-skilled unemployed equations and public debt in the remaining equations.

[30] *Cabinet composition 1*, illustrates the percentage of right-wing or left-wing parties (the variable with the lowest correlation with the dependant variable was chosen for each model) in total cabinet posts, weighted by days (Armigeon et al., 2013a; 2007). *Cabinet composition 2* corresponds to the Schmidt-Index, which takes a value of 1 to 5 depending on whether there is a dominance of right-wing or left-wing parties in the composition of cabinets (Armigeon et al., 2013b).

[31] fRDB-IZA Reforms Database (Anelli et al., no available).

All 2SLS models were estimated using the gmm and robust options to compute efficient estimates in presence of heteroskedasticity and serial correlation. The exception was the estimation of the *share of low-skilled unemployed* where the robust option was not used. The models showed robust results in the test for the validity of instruments in an overidentified context (J statistic of Hansen to test for overidentifying restrictions) implying that the group of instruments used is suitable and that it satisfies the required orthogonality conditions. To test whether there are sufficient valid instruments to identify the model (i.e. models are not underindentified) and whether models are not relying on weak instruments, the Anderson's canonical correlations approach was used. The null hypothesis was rejected in all models implying that there are enough adequate instruments to estimate the equations. This was confirmed as well by Shea's partial R2 (Baum, 2006).

Finally, an analysis of the variance was carried out in each of the 7 models to assess the percentage of the variability of the result that was explained by explanatory variables and how much of that variability was left unexplained. In the case of the overall unemployment rate, the R-squared showed that 84.1 per cent of the variance was explained by independent variables, while it was 90 per cent in the case of the low-skilled unemployment rate. Although high, these are still within the rule of thumb of 90 per cent that is acceptable. The variance analysis for the employment and participation rates showed as well shares of the variance within the limits acceptable. These figures were 74.6 per cent and 49.9 per cent for the employment rates of the overall and low-skilled populations, respectively; and 62.2 per cent and 48 per cent the participation rates of the overall and low-skilled populations, respectively. In contrast, the segment of the variance explained by the explanatory variables in the estimation of the share of low-skilled unemployed individuals was 92.8 per cent. This shows that the use of country dummies to control for country-specific characteristics might be saturating the model in this last case.

These additional analyses broadly confirm the estimation results discussed above. Indeed, results remain largely robust across various specifications, including pooled OLS, OLS models with robust standard errors, random-effects and fixed-effects models depending on the results of the Hausman test (not reported here), models with country dummies, FGLS estimator to account for serial correlation, as well as the instrumental variable estimator 2SLS. Importantly, the results concerning the effect of ALMP in shaping the "structuralization" of unemployment on the low-skilled remained more sensitive. Robustness checks show that results not always hold across the different estimations, mainly in the case of estimations that did not include country dummies. This might be explained by the fact that the structure of unemployment is particularly country specific.

7. Conclusion

This paper examines the effectiveness of active labour market policies (ALMP) in improving labour market outcomes, especially that of low-skilled individuals, in bringing them back to employment and sustainably integrating them to the labour market. Much has been written about effectiveness of activation measures based on evaluations carried out using micro-data, yet very little about their effectiveness at the aggregate level. This paper aims to contribute to filling this gap in the literature through an aggregate impact approach which is better placed to measure both, the direct and indirect effects of ALMP. This will be done by ways of a pooled cross-country and time-series database for 31 advanced countries during the period 1985–2010. Different models were estimated to measure the effect of six different ALMP and three dimensions of implementation (i.e. allocation of resources to public

administration, continuity and timing in the implementation of programmes) on the unemployment, employment and participation rates of the overall and low-skilled populations and the share of low-skilled unemployed individuals. Controls for demand conditions, the structure of the labour market and differences in institutional arrangements were included as well. For each specification, different estimators were used to control for cross-country heterogeneity, account for serial correlation and address the specification problem caused by reverse causality.

In sum, I find that ALMP matters at the aggregate level. Public expenditure in training, employment incentives, supported employment and rehabilitation and direct job creation measures (i.e. the *policy cluster*) show the most favourable results. In particular, *policy cluster* has a significant unemployment reducing effect and a significant employment and labour participation expanding effect for the overall and low-skilled populations – albeit a low significance on the participation rate of the low skilled (Table 8). In addition, results suggest that expenditure in these policies has the potential of reducing the share of low-skilled unemployed. Spending in start-up incentives is effective as well but only in reducing the unemployment rate of both population groups and in boosting the employment rate of the overall population. Results on the rest of labour market variables studied are non-significant. Likewise, the effect of job rotation and job sharing measures is non-significant in all estimations carried out.

In terms of implementation, results show that the most favourable aspect is the allocation of resources to programme administration. Indeed, while the allocation of resources to PES has a direct and favourable impact on labour market variables of the overall population; it affects labour variables of the low-skilled through an interaction with the *policy cluster*. In other words, increasing the allocation of resources towards PES would have a reducing effect in the case of the overall unemployment rate and an expanding effect in the case of the overall employment and participation rates. The direct effect of this variable on the labour market outcomes of the low-skilled, however, is non-significant. Meanwhile, the interaction term between the *policy cluster* and the allocation of resources to PES is significant in the case of the low-skilled. This effect illustrates that as more ALMP resources are devoted to PES and administration, the favourable effect of the *policy cluster* on the low-skilled unemployment, employment and participation rates becomes stronger.

Second, a disruption of policy continuity would be associated with negative effects for all labour market variables analysed. The effect of policy continuity is significant negative in the case of the low-skilled unemployment rate and significant positive in the case of the employment and participation rates of both population groups. No significance was found, however, in the effect of this variable on the overall unemployment rate and the share of the unemployed low-skilled.

Finally, the variable timing, which measures whether policies are implemented in a countercyclical manner revealed a significant and negative relationship with all labour market variables analysed but the participation rate of the low-skilled. These results suggest that countercyclical policies (*timing*=1) have an unemployment reducing effect[32] but also an employment and participation reducing effect. Although this might seem surprising, this effect cannot be analysed in isolation. The interaction of *timing* with the *policy cluster* is also significant for some of the variables and has a positive effect on the unemployment rate of

[32] When instruments are included in the analysis to address the endogeneity problem, these two relationships become positive (and are the only ones that result in a change in sign due to the instrumenting) suggesting an unemployment increasing effect of countercyclical policies.

both population groups and negative effect employment rate of both population groups and the participation rate of the low-skilled. The complete picture would suggest that policies that are implemented pro-cyclically have stronger favourable effects during booms but also stronger unfavourable effects during crises, confirming the argument in favour of policy continuity. Policy continuity is also supported by the *cycle-timing* interaction in the two variables where effects were significant: the low-skilled unemployment rate and the overall population employment rate. In these two cases, the interaction shows that when policies are implemented countercyclically, the elasticities of the unemployment and employment rates to the cycle are lower. Interestingly, the size of the coefficients arising from policy and implementation variables, once interactions are included is noticeably higher. This demonstrates that a correct implementation of policies enhances their beneficial effect.

Table 8. Synopsis of regression results

	UNR	UNR LSK	EMP RATE	EMP RATE LSK	LFPR	LFPR LSK	Share of LSK UN
Policy Cluster	(-)***	(-)***	(+)***	(+)***	(+)***	(+)*	(-)**
Job rotation and job sharing	NS	NS	NS	NS	NS	NS	NS
Start-up incentives	(-)***	(-)**	(+)**	NS	NS	NS	NS
Cluster * PES allocation	NS	(-)*	NS	(+)**		(+)**	NS
Cluster * Timing	(+)***	(+)***	(-)**	(-)**		(-)**	NS
PES allocation	(-)***	NS	(+)***	NS	(+)**	NS	NS
Continuity in implementation	NS	(-)**	(+)***	(+)**	(+)***	(+)**	NS
Correct timing of policies	(-)***	(-)**	(-)***	(-)*	(-)***	NS	(-)**
Cycle * Timing	NS	(-)***	(+)***	NS			
Cycle			(-)***				
Growth rate of real GDP	(-)**	NS	NS	NS	(-)*	NS	NS
EU	(+)***	(+)***	(-)***	(-)***	(-)***	(-)***	(-)***
Constant	(+)***	(+)***	(+)***	(+)***	(+)***	(+)***	(+)***
Observations	452	336	364	352	336	326	306
Table	5	5	6	6	7	7	8
Column	3	6	3	6	3	6	3

Notes: Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.
UNR= unemployment rate; LSK= low-skilled; EMP RATE= employment rate; LFPR= labour force participation rate; UN= unemployed; and NS means non-significant.

Appendix 1: Expected effects of specific ALMP on the labour market

Measure	Type of ALMP	Expected to affect:	Channel	Actual effect:	Effect in the:	Transmission mechanism	Effect on the labour market
Create jobs for specific groups	- Direct-job creation	Matching process	Wage-setting schedule	Reduced search effectiveness (unintended effect)	Short-term	Participants may reduce their search efforts in the knowledge that the employment services will find work for them (Bellman and Jackman 1996b).	Reduced employment
Create jobs for specific groups	- Direct-job creation	Job creation	Wage-setting schedule (workers subsidies). Labour demand (hiring credits).	Job creation (intended effect)	Short-term (effects on the labour market on the medium-term)	Wage subsidies reduce workers' wage expectations increasing labour supply at any given market wage and reducing unemployment (Ohlsson, 1995). Hiring credits, on the other hand, reduce the effective wage paid by employers shifting labour demand upwards (Neumark, 2011).	Increased employment and effective wages. No inflation of real wages in the long term.
Create jobs for specific groups	- Direct-job creation - Employment incentives and other subsidised employment policies.	Deadweight loss	Labour demand	Deadweight loss (unintended effect)	Short- to medium-term	Reduced efficiency of programmes since hiring from the target group would have occurred even in the absence of the programme (Calmfors and Skedinger, 1995; Martin and Grubb, 2001; García-Pérez et al., 2009; Cebrián et al., 2011).	Deadweight loss lowers efficiency of programmes if not properly targeted
Improve skills and competencies	- Training - Supported employment and rehabilitation (subsidisation)	Matching process	Wage-setting schedule	Improved search effectiveness (intended effect)	Short-term	Participants in training courses provide a positive signal to potential employers, reducing uncertainty about the employability of job applicants (Bellman and Jackman 1996b; Layard and Nickell, 1986; OECD, 1993).	Reduced unemployment
Improve skills and competencies	- Training	Matching process	Wage-setting schedule	Reduced search effectiveness (unintended effect)	Short-term	Participants may reduce their search efforts because of a potentially attractive course or in the expectation that the course culminates (i.e. lock-in effect) (Bellman and Jackman 1996b; Calmfors and Skedinger, 1995).	Reduced employment
Improve skills and competencies	- Training - Supported employment and	Matching process	Wage-setting schedule	Facilitated matching (intended effect)	Long-term	Training would adjust the qualifications of jobseekers to the structure of demand (OECD, 1993) and reduce "structuralization" (Schmid	Lower unemployment at least among

	rehabilitation (where there is provision of vocational training)					et al. 2001). Specifically for the low-skilled, it would increase cross-sector mobility by qualifying them for work in sectors where the demand for labour is growing (Bellman and Jackman 1996a).	targeted groups.
Improve skills and competencies	- Training - To certain degree supported employment and rehabilitation (subsidisation) and direct-job creation measures with on-the-job training components.	Productivity	Labour demand	Increased productivity (intended effect)	Long-term	Increases in productivity can have externalities that contribute to general productivity increases (OECD, 1993) and to general technical progress of societies (Calmfors and Skedinger, 1995).	Reduced unemployment
Improve skills and competencies	- Training - To certain degree supported employment and rehabilitation (subsidisation) and direct-job creation measures with on-the-job training components.	Productivity	Labour demand	Substitution effect (unintended effect)	Long-term	Importantly, the labour demand can be reduced if this scale effect of labour productivity outweighs the substitution effect arising because a given output can be produced by fewer, more efficient workers (usually when the labour demand is elastic) (Calmfors and Skedinger, 1995).	Increase in employment and wages if scale effect offsets substitution effect.
Prevent inactivity and skill erosion	- Training - To some extent, subsidised employment policies.	Labour supply	Wage-setting schedule	Increased search effectiveness (intended effect)	Short-term	Maintain the unemployed active and available during recessions, which would reduce the number of vacancies and lower the wage pressure (Calmfors and Skedinger, 1995; OECD, 1993).	Positive effect on the effective supply of labour.
Provide assistance with job search	- PES - To some extent, employment incentives	Competition for insiders	Wage-setting schedule	Increased competition (intended effect)	Short-term	Downward pressure on wages due to increased competition for vacancies (Bellman and Jackman 1996b; OECD, 1993; Layard et al. 1991; Calmfors and Skedinger, 1995).	Lower wages and lower unemployment.
Provide assistance with job search	- PES - Training	Matching process	Wage-setting schedule	Improved search effectiveness (intended effect)	Short- to medium-term	Placement services can improve the effectiveness of search (Bellman and Jackman 1996b, OECD, 1993). Some believe, however,	Reduced unemployment and reduced vacancies.

						that this positive effect depends on quality of implementation (de Koning, 1993).	
Provide assistance with job search	- PES	Matching process	Wage-setting schedule	Reduced search effectiveness (unintended effect)	Short-term	Assistance with job search might raise wage pressure by reducing the fear of unemployment (Bellman and Jackman, 1996a; Calmfors and Skedinger, 1995).	Reduced employment
Provide assistance with job search	- PES - To some extent, direct-job creation	Matching process	Labour demand	Improved search effectiveness (intended effect)	Medium- to long-term	Assistance with job search might also increase the number of vacancies because opening posts becomes less costly for firms (Pissarides, 1990; Calmfors and Lang, 1995; OECD, 1993; Davia et al. 2001).	Increased labour demand and reduced unemployment.
Targeted policies to specific groups	- Job rotation and job sharing - Supported employment and rehabilitation (subsidisation)	Competition for insiders and outsiders	Wage-setting schedule	Increased competition (intended effect)	Short-term	Programmes targeting specific groups can also create more competition for vacancies, creating downward pressure on wages (Bellman and Jackman 1996b).	Lower wages and lower unemployment. But also increased welfare for the vulnerable groups targeted.
Targeted policies to specific groups	- Job rotation and job sharing - Supported employment and rehabilitation (subsidisation) - Direct-job creation	Competition for insiders and outsiders	Labour demand	Substitution effect (unintended or intended effect)	Short-term	Substitution effect occurs when jobs created for a certain category of workers replace jobs for other categories (OECD, 1993; Calmfors and Skedinger, 1995; de Koning and Arents, 2001; Martin and Grubb, 2001; Dauth et al. 2010).	Reduced labour demand for regular employment. Total effect on employment would depend on the scale of the substitution effect.
Targeted policies to specific groups	- Job rotation and job sharing - Supported employment and rehabilitation (subsidisation)	Labour supply	Wage-setting schedule	Reduced search effectiveness (unintended effect)	Short-term	Targeted policies to specific groups (e.g. youth, long-term unemployed, low-skilled) could mitigate the fear of unemployment among the targeted individuals and thus, reduce the incentives to search for jobs (OECD, 1995).[33]	Reduced employment
Targeted	- Job rotation and	Matching	Wage-setting	Increased search	Short-term	Many authors believe that state dependence is	Lower wages and

[33] The above, however, would imply that individuals are myopic in terms of the actual risks they face of unemployment. If this were true, myopic individuals would compare themselves with the rest of the population rather than with their vulnerable group. This will give them a sense of an increased competition, which will reduce their wage bargain (Bellman and Jackman 1996a).

policies to specific groups	job sharing - Supported employment and rehabilitation (subsidisation)	process and competition effects for insiders and outsiders	schedule	effectiveness (intended effect)	(effects on the labour market on the medium-term)	not a sufficient explanation (Calmfors and Lang, 1995; Huger et al. 2009) and that the assumption of myopia is overrated (Gergory, 1986). In general, ALMP that target disadvantaged groups (especially when used in conjunction with benefit conditionality) will put pressure on unemployed people to search harder for jobs, which will be associated with lower wage pressure and more jobs (Bellman and Jackman 1996a).	lower unemployment.
Targeted policies to the self-employed	- Start-up incentives	Job creation	Labour demand	Job creation	Short-term	Measures to promote entrepreneurship are expected to enhance the number of entrepreneurs with the explicit view to contribute to job creation (European Commission, 2003).	Reduced unemployment. But also increased welfare for the vulnerable groups targeted.
Targeted policies to the self-employed	- Start-up incentives	Competition for insiders	Labour demand	Displacement effect (unintended effect)	Long-term	Increased competition could imply that the businesses set up by the beneficiaries of start-up incentives drive other existing (unsubsidised) businesses out of the market (Román et al., 2013).	Reduced unemployment and increased employment if new self-employed do not displace unsubsidised entrepreneurs.

Appendix 2: Regression results based on three different estimation techniques

Table A1.1. Regression results on the unemployment rate

	Unemployment rate			Low-skilled unemployment rate		
	(1)	(2)	(3)	(1)	(2)	(3)
Cluster (Policy 1)	-2.469*** (0.230)	-2.435*** (0.227)	-2.023*** (0.245)	-2.843*** (0.483)	-2.797*** (0.470)	-2.968*** (0.515)
Job rotation and job sharing (Policy 2)	-1.377* (0.768)	-1.386* (0.764)	-0.905 (0.554)	-1.795 (1.415)	-1.841 (1.391)	-0.231 (1.164)
Start-up incentives (Policy 3)	-5.729*** (0.934)	-5.589*** (0.925)	-2.320*** (0.740)	-4.010** (1.877)	-4.268** (1.835)	-3.856** (1.725)
Cluster * PES allocation	-0.694** (0.294)	-0.650** (0.288)	-0.315 (0.278)	0.00688 (0.679)	-0.175 (0.658)	-1.089* (0.601)
Cluster * Timing	2.198*** (0.224)	2.152*** (0.222)	1.722*** (0.238)	2.153*** (0.458)	2.147*** (0.446)	2.675*** (0.494)
PES allocation	-6.935*** (1.182)	-6.993*** (1.123)	-4.096*** (1.018)	-3.137 (3.148)	-2.995 (2.989)	-2.633 (2.251)
Continuity in implementation	0.0258* (0.0147)	0.0256* (0.0141)	0.000143 (0.0146)	0.257*** (0.0916)	0.138** (0.0676)	-0.155** (0.0607)
Correct timing of policies		-4.544*** (1.454)	-2.930*** (0.810)		-6.967** (3.331)	-3.625** (1.543)
Cycle * Timing	-7.52e-06 (5.87e-06)	-2.61e-06 (3.22e-06)	-3.10e-06 (2.01e-06)	-3.89e-06 (9.94e-06)	-2.25e-06 (6.67e-06)	-1.79e-05*** (4.37e-06)
Growth rate of real GDP	-0.107** (0.0453)	-0.105** (0.0447)	-0.0569** (0.0253)	0.0594 (0.0903)	0.0727 (0.0883)	-0.0354 (0.0622)
Population with tertiary education	0.0366*** (0.00950)	0.0315*** (0.00885)	0.0240** (0.0107)	0.0154 (0.0250)	0.0123 (0.0219)	0.0592*** (0.0224)
Union density	0.0962*** (0.0211)	0.0759*** (0.0180)	0.0212 (0.0145)	0.0844 (0.0588)	0.0604 (0.0449)	0.00771 (0.0259)
EPL for temporary workers	-0.518** (0.200)	-0.487*** (0.185)	-0.101 (0.161)	-1.439*** (0.483)	-1.479*** (0.436)	-1.079*** (0.313)
EU		3.013** (1.372)	3.620*** (0.709)		6.180** (3.071)	6.752*** (1.117)
Constant	9.089*** (1.364)	11.01*** (1.906)	8.991*** (1.189)	19.47*** (3.522)	19.96*** (4.398)	11.64*** (2.459)
Observations	455	455	452	339	339	336
R-squared	0.841			0.900		
Number of countries[34]		30	27		30	27

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. (1) Pooled ordinary least squares model (OLS); (2) GLS (either fixed- or random-effects); and (3) FGLS with AR1 correction. OLS estimates include country dummies.

[34] Israel has been dropped from all regressions due to total unavailability of information about union density. Estonia and Luxembourg were dropped from GLS (AR1) regressions because not enough information on EPL for temporary workers was available to carry out the analysis. The same occurred with Slovenia but with two variables, union density and EPL for temporary workers. This is relevant for all equations presented in Appendix 1.

Table A1.2. Regression results on the employment rate

	Employment rate			Low-skilled employment rate		
	(1)	(2)	(3)	(1)	(2)	(3)
Cluster (Policy 1)	2.919***	0.917***	1.167***	4.208***	0.941**	1.850***
	(0.473)	(0.270)	(0.346)	(0.930)	(0.454)	(0.712)
Job rotation and job sharing (Policy 2)	-3.201**	-0.846	-0.832	-9.899***	1.214	-0.908
	(1.590)	(0.721)	(0.724)	(3.809)	(1.252)	(1.497)
Start-up incentives (Policy 3)	5.918***	0.914	1.898**	11.07***	-0.777	1.577
	(1.516)	(0.848)	(0.967)	(3.595)	(1.481)	(2.030)
Cluster * PES allocation	-0.381	-0.116	0.297	2.141*	1.026*	1.826**
	(0.524)	(0.337)	(0.378)	(1.245)	(0.593)	(0.799)
Cluster * Timing	-2.154***	-0.711***	-0.791**	-3.509***	-0.893**	-1.638**
	(0.442)	(0.254)	(0.330)	(0.883)	(0.426)	(0.682)
PES allocation	10.35***	2.163	4.120***	15.48***	-3.743	2.443
	(1.826)	(1.432)	(1.351)	(4.431)	(2.807)	(3.012)
Continuity in implementation	0.144***	0.232***	0.191***	0.393***	0.180*	0.183**
	(0.0379)	(0.0477)	(0.0385)	(0.0916)	(0.0939)	(0.0828)
Correct timing of policies	-2.662**		-4.247***	-7.335***		-4.052*
	(1.248)		(1.240)	(2.159)		(2.277)
Cycle * Timing	0.000595**	-0.000422	0.000891***	2.16e-05***	-2.44e-05**	5.26e-06
	(0.000240)	(0.000563)	(0.000267)	(6.05e-06)	(1.04e-05)	(6.15e-06)
Cycle	-0.000589**	0.000428	-0.000884***			
	(0.000240)	(0.000563)	(0.000268)			
Growth rate of real GDP	-0.531***	-0.185***	-0.0283	-0.590**	-0.173**	0.0587
	(0.101)	(0.0454)	(0.0380)	(0.247)	(0.0799)	(0.0796)
Unemployment rate of the high skilled	-0.916***	-1.057***	-0.768***	-0.507**	-0.809***	-0.433**
	(0.0997)	(0.0734)	(0.0825)	(0.219)	(0.131)	(0.182)
Union density	0.0782***	-0.225***	0.0730***	0.140***	0.142***	0.117***
	(0.0154)	(0.0242)	(0.0168)	(0.0370)	(0.0432)	(0.0395)
EPL for temporary workers	-0.660***	-0.504**	-0.516**	4.067***	-0.125	2.381***
	(0.234)	(0.216)	(0.206)	(0.531)	(0.374)	(0.445)
EU	-10.12***		-9.932***	-11.59***		-10.10***
	(0.575)		(0.783)	(1.249)		(1.744)
Constant	75.53***	82.02***	78.57***	46.16***	49.58***	49.36***
	(1.982)	(1.331)	(1.783)	(3.845)	(2.409)	(3.354)
Observations	367	367	364	355	355	352
R-squared	0.746	0.762		0.499	0.331	
Number of countries		30	27		30	27

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. (1) Pooled ordinary least squares model (OLS); (2) GLS (either fixed- or random-effects); and (3) FGLS with AR1 correction.

Table A1.3. Regression results on the participation rate

	Participation rate			Low-skilled participation rate		
	(1)	(2)	(3)	(1)	(2)	(3)
Cluster (Policy 1)	0.561***	-0.00223	0.340***	5.338***	0.223	1.360*
	(0.0617)	(0.0451)	(0.0535)	(0.978)	(0.479)	(0.695)
Job rotation and job sharing (Policy 2)	-3.169*	-1.184*	-1.481*	-4.987	0.568	-0.0841
	(1.716)	(0.674)	(0.786)	(3.917)	(1.208)	(1.404)
Start-up incentives (Policy 3)	5.774***	1.357	0.587	8.335*	0.513	0.223
	(1.752)	(0.889)	(1.126)	(4.272)	(1.677)	(2.130)
Cluster * PES allocation				2.730**	1.552***	1.736**
				(1.239)	(0.580)	(0.755)
Cluster * Timing				-4.957***	-0.551	-1.345**
				(0.940)	(0.446)	(0.665)
PES allocation	8.395***	-2.154	3.540**	22.23***	-5.856**	0.550
	(1.714)	(1.381)	(1.377)	(4.412)	(2.753)	(2.867)
Continuity in implementation	0.0852***	0.214***	0.112***	0.136**	0.190**	0.155**
	(0.0229)	(0.0439)	(0.0265)	(0.0580)	(0.0899)	(0.0606)
Correct timing of policies	-4.681***		-3.748***	-1.006		-3.246
	(0.673)		(0.794)	(2.100)		(2.172)
Growth rate of real GDP	-0.560***	-0.247***	-0.0705*	-0.403	-0.204***	0.0341
	(0.105)	(0.0430)	(0.0428)	(0.246)	(0.0781)	(0.0762)
Population with tertiary education	0.0816***	0.0369***	0.0494***	-0.0901**	0.00879	-0.0572*
	(0.0146)	(0.0112)	(0.0139)	(0.0372)	(0.0219)	(0.0304)
Unemployment rate of the high skilled	-0.230**	-0.479***	-0.201**	0.291	-0.274**	0.0714
	(0.0963)	(0.0616)	(0.0840)	(0.223)	(0.131)	(0.180)
Union density	0.0848***	-0.102***	0.0999***	0.200***	0.176***	0.148***
	(0.0142)	(0.0278)	(0.0156)	(0.0376)	(0.0516)	(0.0390)
EPL for temporary workers	-0.856***	-0.629***	-0.873***	3.666***	-0.562	1.525***
	(0.228)	(0.234)	(0.204)	(0.533)	(0.419)	(0.437)
EU	-7.047***		-7.094***	-11.71***		-8.806***
	(0.559)		(0.691)	(1.316)		(1.784)
Constant	73.80***	81.50***	76.04***	44.05***	54.10***	57.05***
	(1.492)	(1.724)	(1.461)	(3.589)	(3.175)	(3.470)
Observations	339	339	336	329	329	326
R-squared	0.622	0.507		0.481	0.141	
Number of countries		30	27		30	27

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. (1) Pooled ordinary least squares model (OLS); (2) GLS (either fixed- or random-effects); and (3) FGLS with AR1 correction.

Table A1.4. Regression results on the share of low-skilled unemployed individuals

	Share of low skilled unemployed individuals		
	(1)	(2)	(3)
Cluster (Policy 1)	-3.044***	-2.431**	-1.995**
	(1.008)	(0.988)	(0.955)
Job rotation and job sharing (Policy 2)	5.036**	4.922**	2.287
	(2.483)	(2.474)	(2.008)
Start-up incentives (Policy 3)	-1.131	-1.099	0.175
	(4.222)	(4.157)	(3.734)
Cluster * PES allocation	3.258**	3.505***	1.816
	(1.367)	(1.335)	(1.153)
Cluster * Timing	1.892**	1.275	1.284
	(0.939)	(0.920)	(0.903)
PES allocation	2.203	1.831	-0.586
	(5.921)	(5.734)	(4.553)
Continuity in implementation	-0.140	0.0215	-0.137
	(0.196)	(0.137)	(0.132)
Correct timing of policies		-6.246	-16.20**
		(7.092)	(6.392)
Growth rate of real GDP	0.388**	0.318*	0.189
	(0.169)	(0.167)	(0.118)
Population with tertiary education	-0.00589	-0.0475	0.00387
	(0.0450)	(0.0411)	(0.0425)
Unemployment rate of the high skilled	-0.977***	-0.831***	-0.756***
	(0.273)	(0.264)	(0.256)
Union density	0.252**	0.186**	0.185*
	(0.106)	(0.0865)	(0.0976)
EPL for temporary workers	3.059***	3.342***	1.652**
	(0.927)	(0.858)	(0.779)
EU		0.235	-28.07***
		(6.358)	(5.960)
Constant	27.66***	37.26***	60.95***
	(6.714)	(9.422)	(6.493)
Observations	309	309	306
R-squared	0.928		
Number of countries		30	27

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. (1) Pooled ordinary least squares model (OLS); (2) GLS (either fixed- or random-effects); and (3) FGLS with AR1 correction. Model (3) includes country dummies.

Appendix 3: Graphic interpretation of the different interaction effects

Table A2.1. Moderating effect of *timing* on the relationship between *policy cluster* and the *unemployment rate*

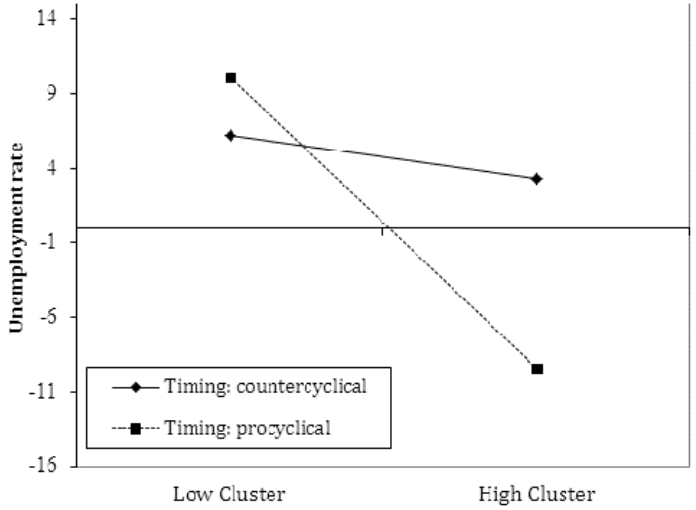


Table A2.2. Moderating effect of *timing* on the relationship between *policy cluster* and the *low-skilled unemployment rate*

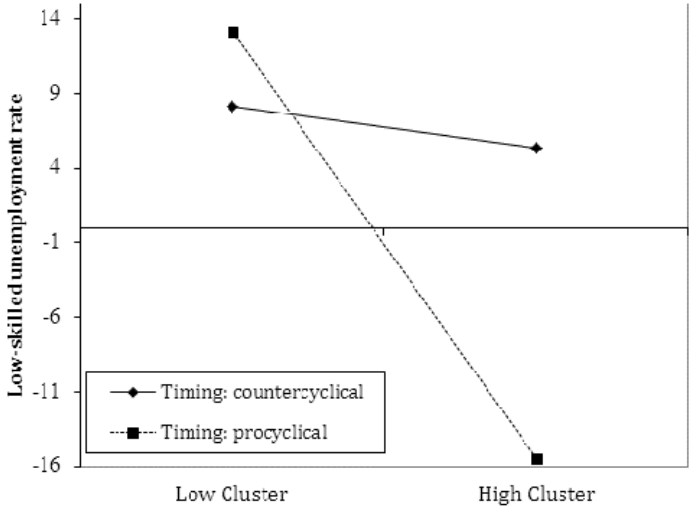


Table A2.3. Moderating effect of *PES allocation* on the relationship between *policy cluster* and the *low-skilled unemployment rate*

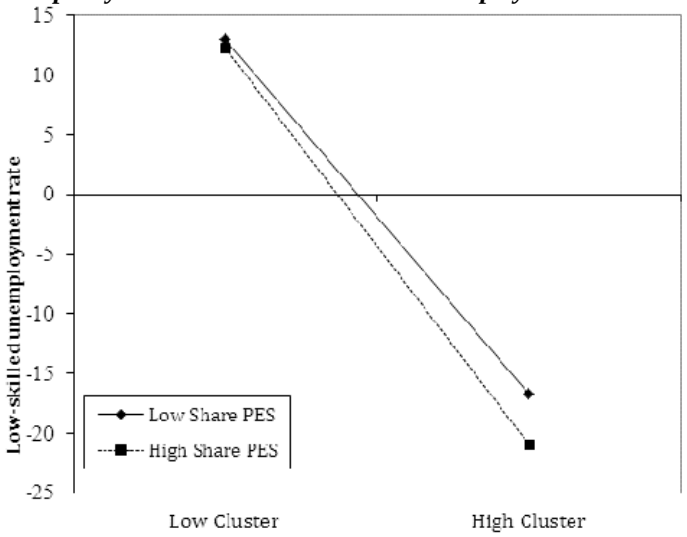


Table A2.4. Moderating effect of *timing* on the relationship between *policy cluster* and the *employment rate*

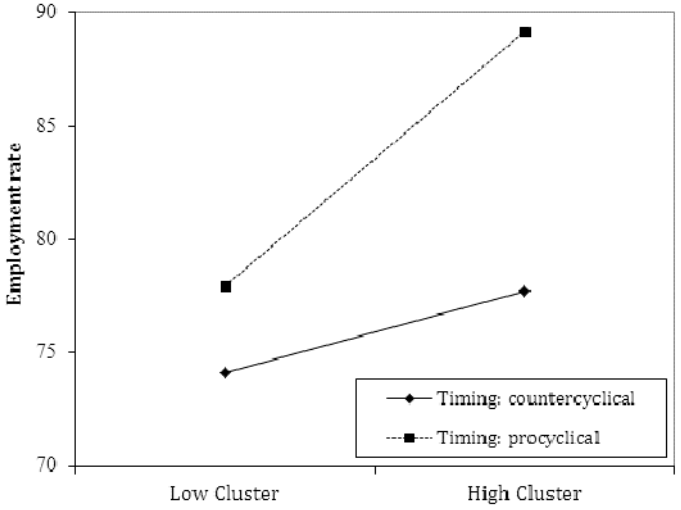


Table A2.5. Moderating effect of *timing* on the relationship between the *cycle* and the *employment rate*

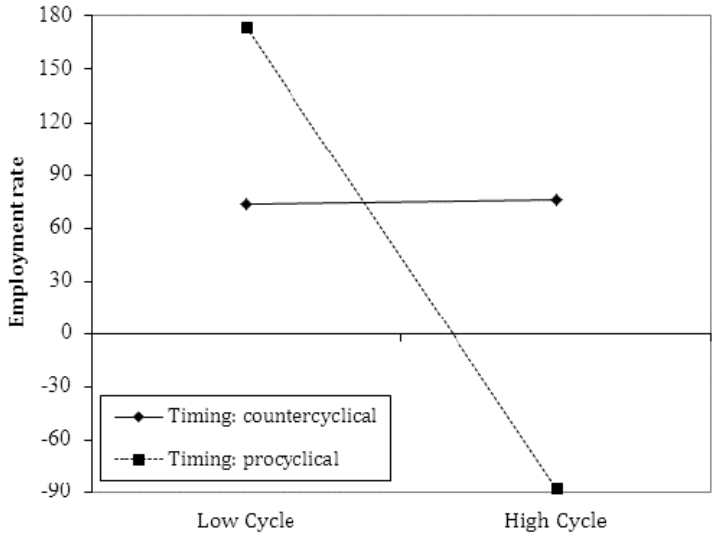


Table A2.6. Moderating effect of *timing* on the relationship between *policy cluster* and the *low-skilled employment rate*

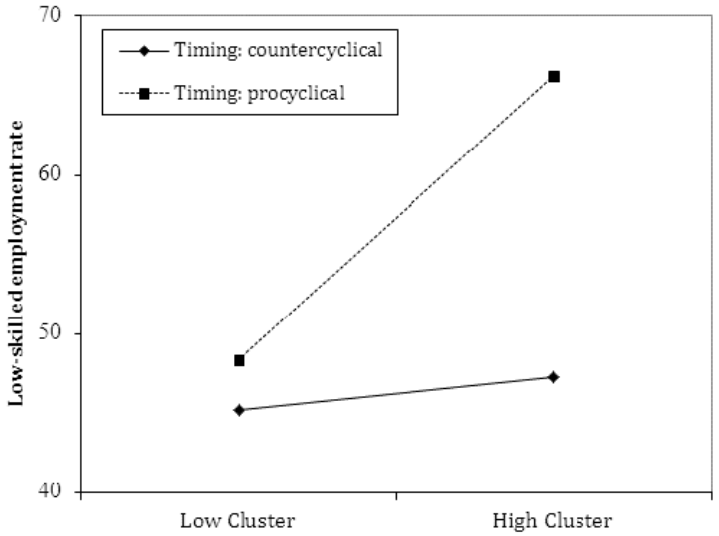


Table A2.7. Moderating effect of *PES allocation* on the relationship between *policy cluster* and the low-skilled employment rate

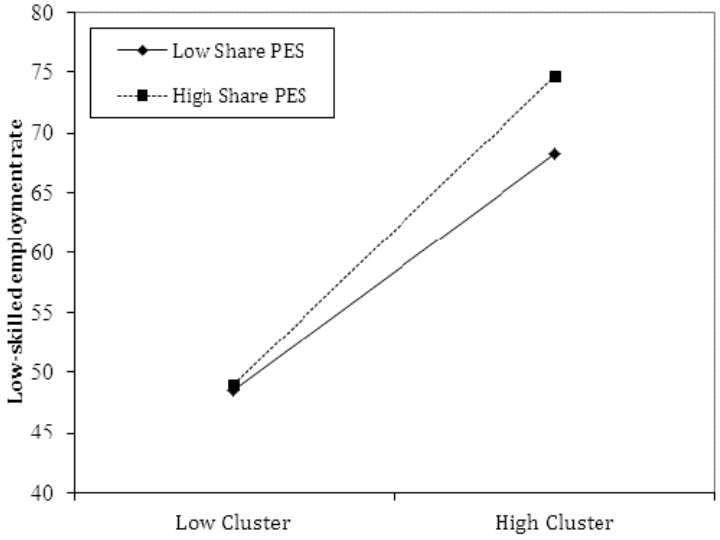


Table A2.8. Moderating effect of *timing* on the relationship between *policy cluster* and the *low-skilled labour force participation rate*

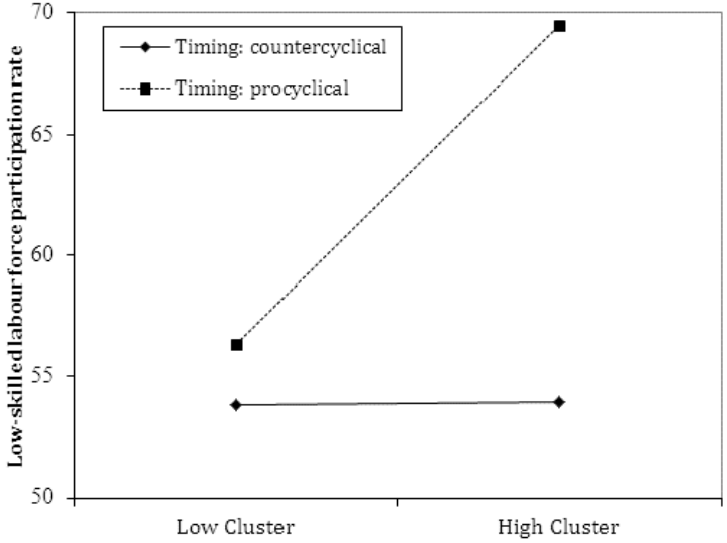
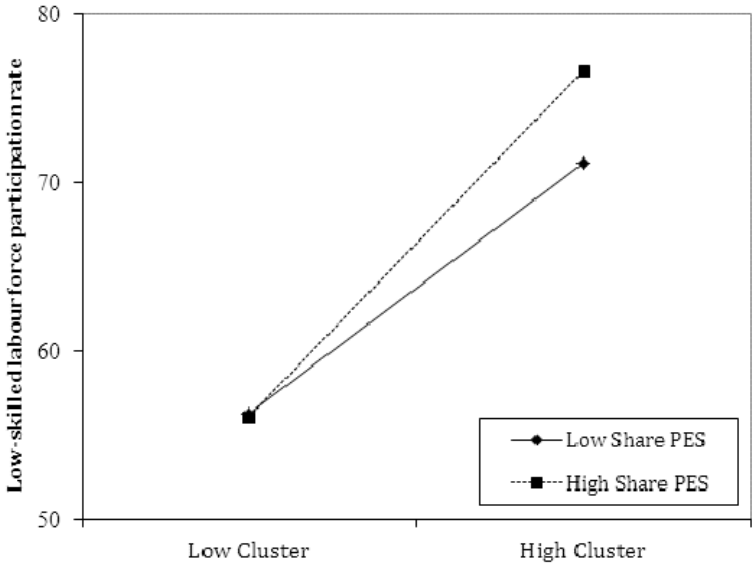


Table A2.9. Moderating effect of *PES allocation* on the relationship between the *policy cluster* and the *low-skilled labour force participation*



Source: Author's calculations based on the coefficients presented in the last columns of Tables 5, 6, 7 and 8. Figures are based on the worksheet presented in Dawson (2014).

Appendix 4: Results of estimations using the variables on labour market structure as control variables (equations 1 to 14) and as explanatory variables (equations 15 to 16)

	UNR (1)	UNR (2)	UNR_LSK (3)	UNR_LSK (4)	EMP RATE (5)	EMP RATE (6)	EMP RATE_LSK (7)	EMP RATE_LSK (8)
Cluster (Policy 1)	-2.023***		-2.968***		1.167***		1.850***	
	(0.245)		(0.515)		(0.346)		(0.712)	
Job rotation and job sharing (Policy 2)	-0.905		-0.231		-0.832		-0.908	
	(0.554)		(1.164)		(0.724)		(1.497)	
Start-up incentives (Policy 3)	-2.320***		-3.856**		1.898**		1.577	
	(0.740)		(1.725)		(0.967)		(2.030)	
Cluster * PES allocation	-0.315		-1.089*		0.297		1.826**	
	(0.278)		(0.601)		(0.378)		(0.799)	
Cluster * Timing	1.722***		2.675***		-0.791**		-1.638**	
	(0.238)		(0.494)		(0.330)		(0.682)	
PES allocation	-4.096***		-2.633		4.120***		2.443	
	(1.018)		(2.251)		(1.351)		(3.012)	
Continuity in implementation	0.000143		-0.155**		0.191***		0.183**	
	(0.0146)		(0.0607)		(0.0385)		(0.0828)	
Correct timing of policies	-2.930***		-3.625**		-4.247***		-4.052*	
	(0.810)		(1.543)		(1.240)		(2.277)	
Cycle * Timing	-3.10e-06		-1.79e-05***		0.000891***		5.26e-06	
	(2.01e-06)		(4.37e-06)		(0.000267)		(6.15e-06)	
Growth rate of real GDP	-0.0569**		-0.0354		-0.0283		0.0587	
	(0.0253)		(0.0622)		(0.0380)		(0.0796)	
Population with tertiary education	0.0240**	-0.0110	0.0592***	-0.0259				
	(0.0107)	(0.0117)	(0.0224)	(0.0236)				
Unemployment rate of the high skilled					-0.768***	-0.832***	-0.433**	-0.866***
					(0.0825)	(0.0618)	(0.182)	(0.139)
Union density	0.0212	0.0416**	0.00771	0.0394	0.0730***	-0.0327	0.117***	0.0489
	(0.0145)	(0.0171)	(0.0259)	(0.0353)	(0.0168)	(0.0233)	(0.0395)	(0.0431)
EPL for temporary workers	-0.101	-0.154	-1.079***	-0.580*	-0.516**	-0.652***	2.381***	0.953**
	(0.161)	(0.179)	(0.313)	(0.338)	(0.206)	(0.188)	(0.445)	(0.385)
EU	3.620***		6.752***		-9.932***		-10.10***	
	(0.709)		(1.117)		(0.783)		(1.744)	
Constant	8.991***	6.763***	11.64***	13.08***	78.57***	73.37***	49.36***	48.15***
	(1.189)	(1.045)	(2.459)	(2.077)	(1.783)	(1.015)	(3.354)	(1.883)
Observations	452	533	336	370	364	399	352	384
Number of countries	27	27	27	27	27	27	27	27

	LFPR (9)	LFPR (10)	LFPR_LSK (11)	LFPR_LSK (12)	Share of LSK UN (13)	Share of LSK UN (14)	Policy Cluster (15)	Start-up incentives (16)
Cluster (Policy 1)	0.340***		1.360*		-1.995**			
	(0.0535)		(0.695)		(0.955)			
Job rotation and job sharing (Policy 2)	-1.481*		-0.0841		2.287			
	(0.786)		(1.404)		(2.008)			
Start-up incentives (Policy 3)	0.587		0.223		0.175			
	(1.126)		(2.130)		(3.734)			
Cluster * PES allocation			1.736**		1.816			
			(0.755)		(1.153)			
Cluster * Timing			-1.345**		1.284			
			(0.665)		(0.903)			
PES allocation	3.540**		0.550		-0.586			
	(1.377)		(2.867)		(4.553)			
Continuity in implementation	0.112***		0.155**		-0.137			
	(0.0265)		(0.0606)		(0.132)			
Correct timing of policies	-3.748***		-3.246		-16.20**			
	(0.794)		(2.172)		(6.392)			
Cycle * Timing								
Growth rate of real GDP	-0.0705*		0.0341		0.189			
	(0.0428)		(0.0762)		(0.118)			
Population with tertiary education	0.0494***	0.0334***	-0.0572*	-0.0181	0.00387	-0.0387	0.0353**	0.000614
	(0.0139)	(0.0111)	(0.0304)	(0.0259)	(0.0425)	(0.0364)	(0.0149)	(0.000766)
Unemployment rate of the high skilled	-0.201**	-0.184***	0.0714	-0.251*	-0.756***	-0.461**	-0.468***	-0.0153***
	(0.0840)	(0.0518)	(0.180)	(0.132)	(0.256)	(0.190)	(0.0744)	(0.00418)
Union density	0.0999***	0.000104	0.148***	0.0908**	0.185*	0.152*	0.0430*	0.000846
	(0.0156)	(0.0217)	(0.0390)	(0.0403)	(0.0976)	(0.0912)	(0.0242)	(0.000985)
EPL for temporary workers	-0.873***	-0.688***	1.525***	0.458	1.652**	1.833***	-0.0400	0.00317
	(0.204)	(0.160)	(0.437)	(0.364)	(0.779)	(0.576)	(0.215)	(0.0108)
EU	-7.094***		-8.806***		-28.07***			
	(0.691)		(1.784)		(5.960)			
Constant	76.04***	72.95***	57.05***	52.03***	60.95***	49.56***	3.121**	0.0988
	(1.461)	(1.190)	(3.470)	(2.381)	(6.493)	(4.684)	(1.396)	(0.0640)
Observations	336	370	326	357	306	335	364	367
Number of countries	27	27	27	27	27	27	27	27

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent. All models have been estimated by the baseline GLS (AR1) regression. UNR= unemployment rate; LSK= low-skilled; EMP RATE= employment rate; LFPR= labour force participation rate; UN= unemployed.

Appendix 5: Checking robustness of estimations by changing the sample of countries and the window of time

	Unemployment rate				Low-skilled unemployment rate			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Cluster (Policy 1)	-2.023*** (0.245)	-1.689*** (0.267)	-2.406*** (0.285)	-1.427*** (0.281)	-2.968*** (0.515)	-2.530*** (0.599)	-4.300*** (0.649)	-2.501*** (0.608)
Job rotation and job sharing (Policy 2)	-0.905 (0.554)	-1.328** (0.613)	-0.863 (0.672)	-0.679 (0.546)	-0.231 (1.164)	-1.068 (1.414)	0.247 (1.592)	0.265 (1.269)
Start-up incentives (Policy 3)	-2.320*** (0.740)	-2.365*** (0.784)	-2.349*** (0.897)	-1.704** (0.845)	-3.856** (1.725)	-3.525* (2.023)	-3.436 (2.281)	-2.572 (1.919)
Cluster * PES allocation	-0.315 (0.278)	-2.179*** (0.597)	0.00385 (0.338)	-0.605* (0.346)	-1.089* (0.601)	-3.755*** (1.387)	-0.643 (0.772)	-1.591** (0.762)
Cluster * Timing	1.722*** -2.023***	1.549*** -1.689***	2.029*** -2.406***	1.309*** (0.272)	2.675*** (0.494)	2.601*** (0.528)	3.897*** (0.620)	2.471*** (0.590)
PES allocation	-4.096*** (1.018)	-2.916*** (1.106)	-6.938*** (1.382)	-1.916 (1.290)	-2.633 (2.251)	-0.792 (2.570)	-7.722** (3.063)	1.100 (2.976)
Continuity in implementation	0.000143 (0.0146)	0.00367 (0.0147)	-0.0372 (0.0379)	-0.166*** (0.0538)	-0.155** (0.0607)	-0.184*** (0.0644)	-0.451*** (0.0833)	-0.644*** (0.104)
Correct timing of policies	-2.930*** (0.810)	-2.084** (0.924)	-3.948*** (1.026)	-1.269 (1.057)	-3.625** (1.543)	-2.539 (1.640)	-3.758* (2.165)	-0.481 (2.098)
Cycle * Timing	-3.10e-06 (2.01e-06)	-4.08e-06* (2.20e-06)	-7.64e-05 (7.93e-05)	-9.55e-06*** (3.08e-06)	-1.79e-05*** (4.37e-06)	-2.08e-05*** (4.55e-06)	-0.000224* (0.000129)	-3.91e-05*** (6.02e-06)
Growth rate of real GDP	-0.0569** (0.0253)	-0.0525* (0.0269)	-0.0829** (0.0370)	-0.0552* (0.0330)	-0.0354 (0.0622)	-0.00736 (0.0723)	0.0460 (0.107)	-0.0240 (0.0778)
Population with tertiary education	0.0240** (0.0107)	0.0294** (0.0117)	0.0214 (0.0151)	0.0195 (0.0147)	0.0592*** (0.0224)	0.0700*** (0.0245)	0.0465 (0.0316)	0.0518* (0.0309)
Union density	0.0212 (0.0145)	0.0360* (0.0185)	-0.000133 (0.0146)	0.00743 (0.0162)	0.00771 (0.0259)	0.0263 (0.0320)	-0.0115 (0.0277)	-0.0125 (0.0318)
EPL for temporary workers	-0.101 (0.161)	0.00187 (0.196)	0.320* (0.188)	0.244 (0.235)	-1.079*** (0.313)	-1.105*** (0.347)	-0.401 (0.406)	-0.792* (0.475)
EU	3.620*** (0.709)	3.505*** (0.810)		4.176*** (0.664)	6.752*** (1.117)	7.047*** (1.133)		9.118*** (1.244)
Constant	8.991*** (1.189)	8.100*** (1.340)	14.07*** (1.449)	3.707** (1.775)	11.64*** (2.459)	9.609*** (2.647)	17.37*** (3.092)	0.380 (3.522)
Observations	452	384	302	210	336	293	224	207
Number of countries	27	24	18	24	27	24	18	24

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

(1) Baseline GLS (AR1) regression; (2) Excluding Denmark, Netherlands and Sweden; (3) Excluding non EU countries; (4) Reduced window of time: 2000–2010.

	Employment rate				Low-skilled employment rate			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Cluster (Policy 1)	1.167*** (0.346)	0.845** (0.342)	1.334*** (0.422)	1.162*** (0.424)	1.850*** (0.712)	1.287* (0.731)	5.434*** (0.933)	1.718* (0.937)
Job rotation and job sharing (Policy 2)	-0.832 (0.724)	-0.298 (0.750)	-1.313 (0.890)	-0.521 (0.734)	-0.908 (1.497)	-0.218 (1.578)	-2.984 (2.072)	-1.175 (1.860)
Start-up incentives (Policy 3)	1.898** (0.967)	1.017 (0.949)	2.694** (1.182)	0.884 (0.993)	1.577 (2.030)	0.416 (2.050)	3.131 (2.665)	0.0123 (2.504)
Cluster * PES allocation	0.297 (0.378)	2.433*** (0.712)	0.295 (0.478)	0.967** (0.462)	1.826** (0.799)	5.273*** (1.545)	1.282 (1.058)	3.276*** (1.162)
Cluster * Timing	-0.791** (0.330)	-0.649** (0.305)	-0.938** (0.402)	-0.977** (0.401)	-1.638** (0.682)	-1.503** (0.662)	-4.904*** (0.887)	-1.800** (0.895)
PES allocation	4.120*** (1.351)	3.731*** (1.320)	6.011*** (1.994)	5.736*** (1.861)	2.443 (3.012)	1.055 (3.026)	14.54*** (4.375)	5.308 (4.625)
Continuity in implementation	0.191*** (0.0385)	0.212*** (0.0354)	0.222*** (0.0530)	0.377*** (0.0704)	0.183** (0.0828)	0.144* (0.0798)	0.497*** (0.114)	0.716*** (0.174)
Correct timing of policies	-4.247*** (1.240)	-6.350*** (1.148)	-4.129** (1.621)	-5.019*** (1.750)	-4.052* (2.277)	-5.630** (2.361)	0.0531 (3.047)	-7.808** (3.353)
Cycle * Timing	0.000891*** (0.000267)	0.00112*** (0.000245)	0.000262 (0.000671)	0.000786*** (0.000301)	5.26e-06 (6.15e-06)	4.04e-06 (6.12e-06)	-0.000302 (0.000190)	3.23e-05*** (9.85e-06)
Growth rate of real GDP	-0.0283 (0.0380)	-0.0187 (0.0373)	-0.0247 (0.0582)	-7.70e-07** (3.00e-07)	0.0587 (0.0796)	0.0638 (0.0797)	0.0176 (0.137)	0.0649 (0.113)
Unemployment rate of the high skilled	-0.768*** (0.0825)	-0.740*** (0.0792)	-0.857*** (0.117)	-0.00912 (0.0436)	-0.433** (0.182)	-0.312* (0.183)	0.184 (0.246)	-0.232 (0.310)
Union density	0.0730*** (0.0168)	-0.00731 (0.0186)	0.0968*** (0.0198)	-0.483*** (0.129)	0.117*** (0.0395)	0.0475 (0.0490)	0.153*** (0.0394)	0.137*** (0.0498)
EPL for temporary workers	-0.516** (0.206)	-0.519** (0.207)	-0.402 (0.274)	0.103*** (0.0199)	2.381*** (0.445)	2.434*** (0.483)	1.689*** (0.589)	3.772*** (0.767)
EU	-9.932*** (0.783)	-10.94*** (0.720)		-0.646* (0.332)	-10.10*** (1.744)	-11.44*** (1.834)		-12.40*** (1.977)
Constant	78.57*** (1.783)	81.88*** (1.689)	67.66*** (2.209)	-10.36*** (0.868)	49.36*** (3.354)	50.79*** (3.432)	32.29*** (4.258)	54.76*** (5.472)
Observations	364	320	239	225	352	308	239	222
Number of countries	27	24	18	26	27	24	18	26

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

(1) Baseline GLS (AR1) regression; (2) Excluding Denmark, Netherlands and Sweden; (3) Excluding non EU countries; (4) Reduced window of time: 2000–2010.

	Participation rate				Low-skilled participation rate			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Cluster (Policy 1)	0.340*** (0.0535)	0.467*** (0.0767)	0.261*** (0.0587)	0.466*** (0.0643)	1.360* (0.695)	0.898 (0.714)	5.267*** (0.946)	2.674*** (0.948)
Job rotation and job sharing (Policy 2)	-1.481* (0.786)	-1.113* (0.675)	-1.314* (0.712)	-1.115 (0.992)	-0.0841 (1.404)	0.426 (1.476)	-1.822 (2.138)	-0.462 (1.830)
Start-up incentives (Policy 3)	0.587 (1.126)	-0.873 (0.975)	0.118 (1.090)	-0.678 (1.393)	0.223 (2.130)	-0.719 (2.180)	3.080 (3.092)	-1.681 (2.797)
Cluster * PES allocation					1.736** (0.755)	4.543*** (1.517)	1.819* (1.051)	3.028*** (1.151)
Cluster * Timing					-1.345** (0.665)	-1.245* (0.643)	-4.935*** (0.899)	-2.854*** (0.915)
PES allocation	3.540** (1.377)	3.789*** (1.170)	1.393 (1.577)	8.074*** (1.857)	0.550 (2.867)	-0.547 (2.875)	14.96*** (4.347)	8.909* (4.607)
Continuity in implementation	0.112*** (0.0265)	0.115*** (0.0246)	0.134*** (0.0440)	0.143*** (0.0310)	0.155** (0.0606)	0.130** (0.0605)	0.537*** (0.106)	0.281*** (0.0854)
Correct timing of policies	-3.748*** (0.794)	-4.329*** (0.807)	-6.217*** (1.072)	-4.293*** (0.923)	-3.246 (2.172)	-4.907** (2.258)	-1.997 (2.698)	-0.944 (2.823)
Growth rate of real GDP	-0.0705* (0.0428)	-0.0328 (0.0345)	-0.0599 (0.0478)	-0.0876 (0.0619)	0.0341 (0.0762)	0.0411 (0.0766)	-0.00501 (0.143)	0.0112 (0.114)
Population with tertiary education	0.0494*** (0.0139)	0.0448*** (0.0128)	0.0617*** (0.0201)	0.0794*** (0.0196)	-0.0572* (0.0304)	-0.0554* (0.0312)	-0.0505 (0.0448)	-0.0561 (0.0486)
Unemployment rate of the high skilled	-0.201** (0.0840)	-0.146** (0.0728)	-0.222** (0.0987)	0.239 (0.155)	0.0714 (0.180)	0.189 (0.181)	1.015*** (0.250)	0.571* (0.322)
Union density	0.0999*** (0.0156)	0.0229 (0.0191)	0.129*** (0.0194)	0.0860*** (0.0187)	0.148*** (0.0390)	0.0848* (0.0480)	0.220*** (0.0374)	0.193*** (0.0508)
EPL for temporary workers	-0.873*** (0.204)	-1.012*** (0.198)	-0.469** (0.239)	-1.257*** (0.324)	1.525*** (0.437)	1.504*** (0.475)	1.229** (0.588)	2.835*** (0.779)
EU	-7.094*** (0.691)	-7.581*** (0.709)		-8.267*** (0.784)	-8.806*** (1.784)	-10.14*** (1.868)		-13.85*** (2.096)
Constant	76.04*** (1.461)	78.26*** (1.411)	69.38*** (1.860)	73.56*** (1.824)	57.05*** (3.470)	58.63*** (3.609)	38.08*** (4.525)	52.57*** (4.508)
Observations	336	293	224	207	326	283	224	204
Number of countries	27	24	18	24	27	24	18	24

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

(1) Baseline GLS (AR1) regression; (2) Excluding Denmark, Netherlands and Sweden; (3) Excluding non EU countries; (4) Reduced window of time: 2000–2010.

	Share of low skilled unemployed individuals			
	(1)	(2)	(3)	(4)
Cluster (Policy 1)	-1.995** (0.955)	-3.099*** (1.044)	-0.00568 (0.758)	-0.486 (1.391)
Job rotation and job sharing (Policy 2)	2.287 (2.008)	2.652 (2.222)	2.977* (1.537)	2.175 (2.020)
Start-up incentives (Policy 3)	0.175 (3.734)	0.344 (4.420)	6.322** (2.975)	-17.65*** (5.350)
Cluster * PES allocation	1.816 (1.153)	3.315 (2.375)	3.331*** (0.924)	0.491 (1.339)
Cluster * Timing	1.284 (0.903)	1.329 (0.915)	-0.821 (0.714)	0.726 (1.337)
PES allocation	-0.586 (4.553)	-3.931 (4.822)	-1.194 (4.076)	-0.949 (6.518)
Continuity in implementation	-0.137 (0.132)	-0.150 (0.132)	-0.197* (0.106)	-25.23*** (2.621)
Correct timing of policies	-16.20** (6.392)	-7.337 (6.181)	-10.66 (6.646)	146.4*** (20.30)
Growth rate of real GDP	0.189 (0.118)	0.238* (0.125)	0.245** (0.112)	0.147 (0.136)
Population with tertiary education	0.00387 (0.0425)	0.0736 (0.0464)	-0.196*** (0.0475)	0.0710 (0.0616)
Unemployment rate of the high skilled	-0.756*** (0.256)	-0.926*** (0.264)	0.174 (0.232)	-1.743*** (0.437)
Union density	0.185* (0.0976)	0.201* (0.105)	0.103 (0.106)	0.0473 (0.169)
EPL for temporary workers	1.652** (0.779)	1.990** (0.914)	0.414 (0.604)	-2.315 (1.518)
EU	-28.07*** (5.960)	-17.84*** (5.553)		-51.84*** (9.334)
Constant	60.95*** (6.493)	48.93*** (9.460)	41.14*** (6.483)	-348.0*** (40.72)
Observations	306	266	202	201
Number of countries	27	24	18	24

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

(1) Baseline GLS (AR1) regression with country dummies; (2) Excluding Denmark, Netherlands and Sweden; (3) Excluding non EU countries; (4) Reduced window of time: 2000–2010.

Appendix 6: Results of IV estimations (2SLS)

	Unemployment rate	Low-skilled unemployment rate	Employment rate	Low-skilled employment rate	Participation rate	Low-skilled participation rate	Share of low skilled unemployed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cluster (Policy 1)	-0.594***	-0.776***	0.725*	1.117***	0.809**	1.734***	-1.636***
	(0.0872)	(0.183)	(0.423)	(0.223)	(0.325)	(0.469)	(0.617)
Job rotation and job sharing (Policy 2)	7.559***	7.996**	27.01	-9.628**	30.30**	0.688	-27.95**
	(2.812)	(3.989)	(16.59)	(4.657)	(13.16)	(22.61)	(14.05)
Start-up incentives (Policy 3)	-4.099***	-11.54***	7.809***	4.389	2.600	19.33***	-46.79***
	(1.563)	(2.227)	(3.015)	(2.939)	(2.748)	(3.983)	(11.54)
PES allocation	-12.17***	-21.83***	6.399	10.13**	1.174	30.88***	-103.9***
	(2.025)	(4.328)	(4.006)	(4.394)	(2.583)	(5.527)	(18.24)
Continuity in implementation	-0.487***	-0.683***	0.568***	0.281	0.0134	0.810**	-1.956**
	(0.0787)	(0.182)	(0.191)	(0.235)	(0.125)	(0.354)	(0.840)
Correct timing of policies	6.647***	5.558**	-13.75***	-20.10***	-12.63***	-15.67***	-11.41
	(0.986)	(2.205)	(3.807)	(3.039)	(2.831)	(5.078)	(9.284)
Constant	7.932***	15.20***	95.74***	56.76***	91.01***	56.46***	103.6***
	(1.573)	(3.482)	(6.976)	(4.055)	(3.040)	(6.754)	(12.32)
Observations	226	175	314	175	314	305	156
R-squared	0.422	0.478	0.320	0.690	0.068	0.359	0.134
Underidentification test (Kleibergen-Paap rk Wald statistic)	61.5***	30.49***	22.39***	40.94***	21.25***	21.29***	16.37***
Weak-instrument-robust inference (Anderson-Rubin Wald test)	79.82***	58.94***	73.12***	152.8***	39.32***	37.73***	105.66***
Overidentification test of all instruments (Hansen J statistic)	5.832	5.675	6.19	7.65	4.599	2.671	1.933

Notes: Standard errors are in parentheses. Significance levels: *significant at 10 per cent; **significant at 5 per cent; ***significant at 1 per cent.

All models have been estimated by 2SLS, using gmm and robust options to compute efficient estimates in presence of heteroskedasticity and autocorrelation. The exception is (7) where the robust option was not used.

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