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The quantification of structural reforms: Introducing country-specific policy effects

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By Balázs Égert and Peter Gal

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Abstract/Résumé

The quantification of structural reforms: Introducing country-specific policy effects

This paper discusses country-specific effects of structural reforms. It shows how sizeable and interesting country-specific effects can be identified in a panel setting by conditioning the impact of individual policies on their own level or on the stance of other policies and institutions. This approach allows for the incorporation of a potentially large set of additional policy areas including institutions and policy areas with limited time-series availability (e.g. sub-components of the Product Market Regulation indicator, housing market regulations and policies, Doing Business indicators and the quality of institutions such as the rule of law indicator or the efficiency of the legal system). Results suggest that for instance more stringent product market regulation hurts more in more open economies, better institutions amplify the positive effect of R&D, more spending on active labour market policies attenuates the negative effects of product market regulation; and tax wedge reduction leads to less employment gains when EPL is not very stringent.

JEL Classification: D24, E17, E22, E24, J08

***Keywords*:** structural reform, product and labour market regulation, institutions, non-linear effects, policy interactions, productivity, investment, employment, OECD.

La quantification des réformes structurelles: L'introduction des effets spécifiques aux pays

Ce document discute les effets spécifiques aux pays des réformes structurelles. Il montre comment les effets spécifiques à un pays peuvent être identifiés dans un panel en conditionnant l'impact des politiques individuelles sur leur propre niveau ou sur la position d'autres politiques et institutions. Cette approche permet l'intégration d'un ensemble potentiellement important de domaines politiques supplémentaires incluant des institutions et des politiques avec une disponibilité limitée des séries temporelles (sous-composantes de l'indicateur Réglementation des marchés de produits, réglementations et politiques du marché immobilier, indicateurs Doing Business et la qualité des institutions telles que l'indicateur de l'état de droit ou l'efficacité du système judiciaire). Les résultats suggèrent que, par exemple, une réglementation plus stricte des marchés de produits nuit davantage à des économies plus ouvertes ; plus de dépenses de meilleures institutions amplifient l'effet positif des dépenses en R & D; une augmentation des dépenses consacrées aux politiques actives du marché du travail atténue les effets négatifs de la réglementation des marchés de produits ; et la réduction du coin fiscal entraîne moins de gains d'emplois lorsque l'EPL n'est pas très stricte.

***JEL Classification*:** D24, E17, E22, E24, J08

***Mots-clés*:** réforme structurelle, réglementation du marché du travail et des produits, institutions, effets non-linéaires, interactions politiques, productivité, investissement, emploi, OCDE.

Table of contents

THE QUANTIFICATION OF STRUCTURAL REFORMS: INTRODUCING COUNTRY-SPECIFIC POLICY EFFECTS 5

1. Introduction 5
2. Main features of the new framework: a reminder 5
3. Country-specific policy effects: methodological considerations 7
   3.1. Country-specific effects obtained in a linear framework 7
   3.2. More extensive country-specific effects 7
   3.3. Smooth non-linear effects 8
   3.4. Asymmetric effects 8
   3.5. Threshold non-linear effects 8
   3.6. Non-linear effects through interactions between policy variables 9
   3.7. The role of time-invariant variables: regulations and institutions 10
4. Empirical estimates of country-specific policy effects 11
   4.1. Multi-factor productivity 12
   4.2. Capital intensity 14
   4.3. Employment rate 17
   4.4. Summary of the policy impact estimates 20
5. Country-specific policy effects: simulation results 21

Annex A. Descriptive Statistics 27

Annex B. Alternative Reform Scenarios 28

Tables

Table 1. MFP and policy interactions: threshold non-linearities 13
Table 2. MFP and policy interactions: evidence from interaction terms 14
Table 3. Capital deepening and policy interactions: threshold non-linearities 16
Table 4. Capital intensity and policy interactions: evidence from interaction terms 17
Table 5. Employment rate and policy interactions: threshold non-linearities 19
Table 6. Employment rate and policy interactions: evidence from interaction terms 20
Table 7. Reform impacts from policies conditional on the level of other policies and institutions 21

Figures

Figure 1. Channels of transmission to per capita GDP 6
Figure 2. Non-linear effects of policies and institutions on MFP (in %) 23
Figure 3. Non-linear effects of policies & institutions on capital deepening (in %) 24
Figure 4. Non-linear effects of policies & institutions on employment (in p.p.) 25

Boxes

Box 1. The Dynamic OLS Estimator 11

THE QUANTIFICATION OF STRUCTURAL REFORMS: INTRODUCING COUNTRY-SPECIFIC POLICY EFFECTS

By Balázs Égert and Peter Gal[1]

1. Introduction

1. The quantification of the effect of structural reforms on per capita income presented in Égert and Gal (2016) builds on a framework that i) covers a relatively large number of policy variables and channels through which they influence GDP per capita, ii) estimates relationships over a period including the immediate post-crisis years (1985-2011), and iii) increases internal consistency of the estimated relationships by employing a common sample of countries and time span, and a unified estimation approach.

2. This paper discusses how sizeable and interesting country-specific effects can be identified in a panel setting by conditioning the impact of individual policies on their own level or on the stance of other policies and institutions. This approach allows for the incorporation of a potentially large set of additional policy areas including institutions and policy areas with limited time-series availability (e.g. sub-components of the Product Market Regulation indicator, housing market regulations and policies, Doing Business indicators and the quality of institutions such as the rule of law indicator or the efficiency of the legal system).

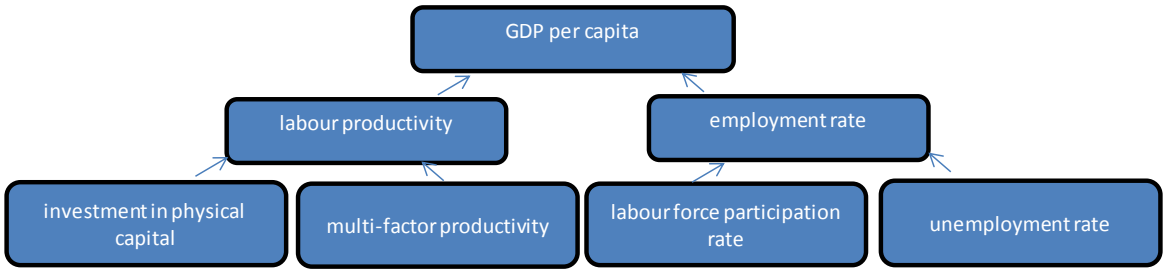
3. This document is structured in four parts. Section 2 briefly reminds the reader of the main features of the new framework. Section 3 describes in detail how country-specific policy effects can be incorporated in panel regression analysis. Section 4 presents the new estimation results. Section 5 finally demonstrates how these new coefficient estimates can be used in the new simulation framework and shows the impact of policy changes on MFP, capital and employment.

2. Main features of the new framework: a reminder

4. The new framework, like previous ones used in the OECD Economics Department (Barnes *et al.*, 2013; Bouis and Duval, 2011; Johansson *et al.*, 2013), relies on a production function approach. The influence of policies on GDP is typically assessed through their impact on supply-side components: labour productivity and employment. Each in turn can be further decomposed, into capital intensity and multi-factor productivity, and labour force participation and unemployment (Figure 1). Within the new framework, the impact of structural reforms is quantified from a range of cross-country reduced-form panel regressions on three channels: i) multi-factor productivity, ii) capital deepening, and iii) employment. The overall impact on GDP per capita is obtained by aggregating the policy effects of the various channels through a production function (see Box 1 in Égert and Gal, 2016).

[1] The authors are members of OECD Economics Department. The paper benefitted from useful comments and suggestions from Alain de Serres, colleagues from the OECD Economics Department and participants at the OECD's 2016 Spring Working Party 1 meeting.

Figure 1. Channels of transmission to per capita GDP



5. The main features of the new framework can be summarised as follows:

- **A relatively large number of time-varying policy variables are covered**. For MFP, the framework covers the OECD indicator of product market regulation (more specifically the so-called ETCR indicator)[2] and active labour market programmes (ALMPs). For capital deepening, the framework integrates both product market (ETCR) and labour market regulation (captured by the employment protection legislation, EPL indicator) and a measure of corporate taxation. Finally, for the employment rate, aside from commonly-used policy determinants (unemployment benefits, tax wedges and ALMPs) the framework includes additional labour market policies such as EPL, the length of maternity leave, the nature of the wage bargaining system, the legal retirement age, the minimum wage, and public spending on family benefits (which covers childcare spending). The framework also allows for policy effects to vary by demographic groups and skill levels.
- **The new framework's internal consistency is improved in three ways**. First, supply-side channels are used in a consistent manner: different levels of disaggregation of the supply side components are not mixed across policy areas (e.g. employment for some policies, the labour force participation and unemployment rate for others). Second, econometric estimates are obtained using the very same up-dated dataset (SPIDER) and estimation technique. Third, changes in policy measures and the horizons at which their impact is measured are standardised.

[2] The OECD economy-wide indicator of product market regulation (PMR) measures the degree to which policy settings promote or inhibit competition in areas of the product market where competition is viable. More specifically, it measures the incidence of regulatory barriers to competition via *state control of business operations* and *the protection of incumbents*, as well as through various *legal and administrative barriers to start-ups* or to *foreign trade and investment*. The economy-wide PMR indicator which is measured in four vintages (1998, 2003, 2008, 2013) is complemented by a set of indicators that summarise information by major economic sector -- instead of regulatory domain -- with a strong emphasis on non-manufacturing sectors, in particular energy (electricity and gas), transport (road, rail, air) and communications (post and telecoms), referred to as the ETCR indicator. The latter indicator is constructed from a smaller set of information but is available over a long and continuous time series going from the early 1980s to 2013. For more information, see Koske et al., 2015.

3. Country-specific policy effects: methodological considerations

3.1. Country-specific effects obtained in a linear framework

6. In the quantification framework presented in Égert and Gal (2016), the quantified impact of a given reform is, for most of the time, the same regardless of the country for which they are measured. Limited heterogeneous effects are derived through employment in two ways:

- Heterogeneous effects are introduced through the interaction of wage-setting institutions with the tax wedge. The effect of labour tax wedge on employment is found to depend on the level of excess coverage of wage bargaining (Gal and Theising, 2015, and de Serres, Hijzen and Murtin, 2014). The gains in the employment rate from lowering the average labour tax wedge can be substantially higher (up to 0.4 percentage points) for countries with higher excess coverage.
- Heterogeneous effects can be obtained through differences in policy effects depending on the demographic, gender and skill composition of employment. However, these effects are rather small in practice. For instance, using the lowest and the highest shares of the most responsive groups to policies (i.e. youth or low educated) makes only a marginal difference (0.1 to 0.2 percentage point) for the final impact on aggregate employment (these results are not reported here). Hence, differences in the relative size of these demographic groups, as well as in the skill composition of countries have only limited effects on per capita income.

3.2. More extensive country-specific effects

7. It is likely that a given reform will in practice play out differently across countries depending on the stance of other policies and the overall business and institutional environment in which it is implemented.[3] This paper presents possibilities on how to incorporate more substantial country-specific effects. The first step is to derive empirical estimates, which can make policy impact differ across countries. This is challenging as the data used for the empirical investigation do not allow for the estimation of country-specific (time series) models. Heterogeneous effects have to be derived using panel data estimates. This sub-section presents different options for introducing heterogeneous effects of policies in the context of panel data estimates.

8. The estimation methods presented hereafter obtain coefficient estimates, which may differ depending on the level of the variable considered or on the level of other variables. For instance, the coefficient estimate of the ETCR indicator can potentially

[3] It is likely that a given reform will in practice play out differently across countries depending on the stance of other policies and the overall business and institutional environment in which it is implemented.[3] This paper presents possibilities on how to incorporate more substantial country-specific effects. The first step is to derive empirical estimates, which can make policy impact differ across countries. This is challenging as the data used for the empirical investigation do not allow for the estimation of country-specific (time series) models. Heterogeneous effects have to be derived using panel data estimates. This sub-section presents different options for introducing heterogeneous effects of policies in the context of panel data estimates.

vary depending on whether ETCR is low or high. The coefficient estimate could also be different depending on the level of another policy.[4]

3.3. Smooth non-linear effects

9. One of the most commonly used empirical testing strategies to model non-linear effects is the inclusion of a quadratic term in the estimations. It models increasing or decreasing effects of a variable depending on its own level. Another advantage is that the effect will be different for every value of the variable considered. For instance, a negative policy impact can increase or decrease as the value of the policy increases.

$$OUTCOME_{j,t} = f(POLICY_{j,t}, POLICY_{j.t}^2) \quad (1)$$

3.4. Asymmetric effects

10. The impact of a given policy could be different depending on the direction of the change in the very same reform or in another policy. For instance, a change in product market regulation (PMR) could have a different impact on productivity depending on whether it is being tightened or relaxed (asymmetric effect) or whether another policy area such as labour market regulations (LMR) become more stringent or liberalised. Equations (2) and (3) help test for these non-linear effects. One would conclude in favour of an asymmetric effect if the null hypothesis of $\beta_1 = \beta_2$ can be rejected against the alternative hypothesis of $\beta_1 \neq \beta_2$.

$$OUTCOME_{j,t} = \begin{cases} \alpha_1 + \beta_1 PMR_{j,t} + \varepsilon_t & if \quad \Delta PMR < 0 \\ \alpha_1 + \beta_2 PMR_{j,t} + \varepsilon_t & if \quad \Delta PMR \geq 0 \end{cases} \quad (2)$$

$$OUTCOME_{j,t} = \begin{cases} \alpha_1 + \beta_1 PMR_{j,t} + \varepsilon_t & if \quad \Delta LMR < 0 \\ \alpha_1 + \beta_2 PMR_{j,t} + \varepsilon_t & if \quad \Delta LMR \geq 0 \end{cases} \quad (3)$$

3.5. Threshold non-linear effects

11. Threshold models of non-linearity offer a major improvement over the use of a quadratic term. They make it possible to analyse not only whether a policy effect depends on the policy's own level but they also help understand whether the impact of one policy depends on the level of another policy. They are also more tractable: the tipping point (or the so-called threshold value) separates the different impacts very clearly. In the case of the quadratic term, one has to work out the precise impact in a quadratic function for every value of the variable in question.

12. Non-linear effects can indeed occur more abruptly when the variable of interest has different coefficients below and above the tipping point of the threshold variable (threshold non-linearity). If the threshold variable is the same policy variable as the one that is being tested for non-linearities, this is a classical 'univariate' non-linear effect (like the cases of a quadratic term). If the threshold variable is another policy variable, the approach gets closer to the case of policy interactions (see below). For instance, the

[4] The definition and description of the variables used in this document are given in OECD (2016).

impact of product market regulations (PMR) could depend on the stance of labour market regulations (LMR), and the other way around (equation 4).

13. In threshold regressions, the tipping point is determined endogenously through a grid search (Hansen, 1999): A grid search with steps of 1% of the distribution is carried out to identify the value of the threshold variable that minimises the sum of squared residuals of the estimated two-regime model. The threshold is not necessarily close to the mean or median. The grid search starts at 15% of the distribution and stops at 85% to ensure that a sufficient number of observations falls into each regime. There is evidence for nonlinearity if the null hypothesis of $\beta_1 = \beta_2$ can be rejected against the alternative hypothesis of .

$$OUTCOME_{j,t} = \begin{cases} \alpha_1 + \beta_1 PMR_{j,t} + \varepsilon_t & if \quad LMR_{j,t} < T \\ \alpha_1 + \beta_2 PMR_{j,t} + \varepsilon_t & if \quad LMR_{j,t} \geq T \end{cases} \tag{4}$$

where T is the so-called threshold value of the threshold variable (LMR in this case).

14. The threshold variables can be policy indicators with cross-country and time series dimensions, typically used in panel regressions (as indicated in equation 4). Their threshold value shows whether a country below or above it will face a different policy impact. A country can move from above to below the threshold value over time. For a pure cross-country comparison in which one would be interested to learn if a country is in a 'bad' or 'good' regime, the country averages of the initial threshold variable could be used as the threshold variable, transforming (4) into (5):

$$OUTCOME_{j,t} = \begin{cases} \alpha_1 + \beta_1 PMR_{j,t} + \varepsilon_t & if \quad \overline{LMR}_j < T \\ \alpha_1 + \beta_2 PMR_{j,t} + \varepsilon_t & if \quad \overline{LMR}_j \geq T \end{cases} \tag{5}$$

where is constant over time and changes only across countries.

3.6. Non-linear effects through interactions between policy variables

15. Threshold regressions allow for the impact of one policy to depend on the level of another policy across two (or more) regimes. Yet the heterogeneity imbedded into the two (or more) regimes remains limited. Countries are either in one or the other regime or move from one regime to another over time. Using interactions in the regressions allows for a smoother dependence on the threshold variable. Indeed, every value of the threshold variable will be associated with a different policy impact. Therefore, interactions provide truly country-specific estimates.

16. For instance, one can estimate whether the overall impact of a reform of product market regulations (as measured by a change in the time-varying ETCR indicator) in a given country is conditioned on the level of employment protection legislation in that country (relative to the cross-country average). For the purpose of such estimation, and for ease of interpretation, the level of employment protection would in this example be used in the interaction as the average over time in each country (equation 6). For every different EPL observation, there will be a different effect of ETCR on the outcome variable. If EPL is different for each country, there will be a unique country-specific effect for each individual country.

$$OUTCOME_{j,t} = f(POLICY_{j,t}, POLICY_{j,t} * \overline{POLICY2_j}) \quad (6)$$

17. This type of analysis can be extended to variables that measure the quality of institutions such as the rule of law or quality of the legal system (see below) and which are either time-invariant or slow-moving (equation 7).

$$OUTCOME_{j,t} = f(POLICY_{j,t}, POLICY_{j,t} * \overline{INSTITUTIONS_j}) \quad (7)$$

18. The drawback of interactions such as in equations (6) or (7) compared to the threshold non-linear approach (equations 4 or 5) is that the estimated impact of a policy change is not immediately visible since it depends in part on the very specific level of another variable. Also, if the magnitude of the coefficient estimate on the interaction term is close to the 'base effect' (the policy effect without interaction), but with an opposing sign, the overall policy effect (the base effect plus the effect coming from the interaction term) can be negative for some countries and positive for others. For instance, the negative effect of EPL on productivity could be attenuated by another policy to the point where the overall impact turns from negative to positive. Such outcomes may be difficult to interpret in some cases. However, they also provide a coherent way to highlight if "corner solutions" (i.e. the lowest or highest values in policy indicator) do not deliver the best outcomes.

3.7. The role of time-invariant variables: regulations and institutions

19. Many policy indicators covering a broad range of areas and countries are only available for one or few observations in time or by nature are very slow-moving over time. Such indicators include measures of the OECD's product market regulations, measures taken from the World Bank *Doing Business* survey, and indicators capturing the quality of institutions such as the rule of law and the functioning of the judicial system. It may well be that the impact of product and labour market policies would depend on how easy it is to start a business, or on how strong the rule of law is or how well the judicial system functions. Variables measuring these framework conditions can be observed only infrequently or only few observations are available for them. These variables, which are constants from a purely statistical point of view, can serve as threshold variables or interaction terms.

20. These variables have cross-section information but do not have a long time-series dimension. Hence, they cannot be used as explanatory variables in MFP, investment or employment regressions with country fixed effects (because country fixed effects capture the effect of these variables among others) but could be interacted with the time varying variables. In this case, the interaction term would tell whether the impact of a specific product or labour market policy would depend on the level of these institutions or other policies. This allows for expanding the set of policy channels that can be captured in the framework.

21. In the analysis carried out in this document, four groups of variables are used in their cross-section dimension, i.e. they are introduced in the regressions as constants:

- The first group contains variables, which are calculated as the country averages of the time varying policy variables.
- The second group relates to product market regulation. The headline PMR indicator and its sub-components (State control, barriers to entrepreneurship, and

barriers to trade and investment) are used. These series are available from 1998 to 2013 at five year intervals. For each country, the average of the available observations is employed.

- The third group includes measures capturing the ease of doing business: the cost and time of insolvency procedures and starting a business, drawn from the World Bank's Doing Business database.
- The fourth group includes variables capturing the quality of institutions (rule of law and the quality of the legal system). The rule of law variable comes from the World Bank's World Development Indicators database. The quality of the legal system is drawn from the Fraser Institute's Economic Freedom of the World database. For each country, the mean of the available observations is calculated and used in the estimations.

Box 1. The Dynamic OLS Estimator

The long-term coefficients are estimated on the basis of the Dynamic OLS (DOLS) estimator: For instance, Cette et al (2013, 2014) use the DOLS estimator to obtain the long-term coefficients for the relation between outcomes and structural policies. Over the standard OLS estimator, it has the advantage that it corrects for the possible endogeneity of the regressors and autocorrelation in the residuals by incorporating leads and lags of the regressors in first differences (Stock and Watson, 1993):

$$Y_{j,t} = \beta_0 + \sum_{i=1}^{n} \beta_n X_{j,i,t} + \sum_{i=1}^{n} \sum_{l=-k_1}^{k_2} \gamma_{i,l} \Delta X_{j,i,t-l} + cfe_i + tfe_t + \varepsilon_t$$

where Y_t is an outcome variable (MFP, capital stock or the employment rate) and Y_t is the vector of explanatory variables (potentially including interaction terms). j stands for individual countries, i for the regressors, and k1 and k2 represent respectively leads and lags. cfe_i and tfe_t denote country and time fixed effects respectively. In the empirical analysis, one lead and one lag of the covariates will be used.

Whether or not the variables of interest are cointegrated can be tested in two ways. First, the residuals obtained from the long-term relationship (ε_t) can be used to estimate the error correction model in the second stage. Weak evidence for the presence of cointegration is if the error correction term in this second stage is statistically significant and has a negative sign. This implies an error correction mechanism to be in place. A second and more formal test of cointegration is when the estimated residuals from the long-term relationship are tested for the presence of a unit root. The rejection of the null hypothesis of a unit root can be interpreted in favour of cointegration, in the spirit of the Engle and Granger residual-based cointegration approach. Kao's residual-based panel cointegration tests (Kao, 1999) are commonly used in panel studies: they allow for country-specific intercepts but impose homogenous coefficients.

4. Empirical estimates of country-specific policy effects

22. This section presents the main results from the application of the methods mentioned above. Only the results from the threshold non-linear approach (equation 4) and the non-linear effects through interaction terms (equations 5 or 6) are presented and

discussed. These are the methods that yielded the most significant outcomes. [5,6] Table 7 at the end of this section presents a compact summary of the non-linear effects.

4.1. Multi-factor productivity

4.1.1. Threshold non-linear effects

23. In threshold regressions, the impact of one policy on MFP could depend on the level of another policy. Several interesting results emerge from this analysis (Table 1). *First*, openness and private R&D spending substitute for each other to some extent. The positive openness effect is smaller if private R&D spending is high. The positive link between R&D spending and MFP also weakens at higher levels of openness, even though this finding is sensitive to whether annual series or country averages of R&D spending is used as a threshold variable. *Second*, ETCR shows sizeable non-linear patterns with respect to the level of trade openness and ALMP spending. These results are fairly robust to both the time-varying and time-invariant use of the three aforementioned threshold variables.

24. The negative impact of ETCR increases significantly in size for high levels of trade openness: increased external competitiveness pressures may exacerbate the negative impact of regulatory barriers to competition in (upstream) network industries through the indirect effect in downstream sectors more exposed to foreign competition such as manufacturing.

25. The negative impact of ETCR on MFP is stronger if ALMP is lower, suggesting that an improved functioning of labour market matching through higher ALMP spending may offset some of the negative ETCR effects.

4.1.2 Non-linear effects through interaction terms

26. Interactions between the major MFP drivers (ETCR, openness and R&D spending) and time-invariant variables allows for exploring the extent to which cross-country differences in time-invariant variables amplify or attenuate the effect of the time-varying variables. Empirical results lend support to some of the findings from threshold regressions (Table 2):

- The negative interaction terms on openness and average R&D suggests that more R&D lowers the positive effect of openness.[7] The result may indicate that countries further away from the technological frontier benefit more from trade links.

---

[5] Generally speaking, it is difficult to identify polynomial non-linear effects (based on quadratic terms) for MFP, capital deepening and employment. This finding is confirmed by the fact that threshold regressions do not provide much support for the fact that the non-linear variable is the same as the threshold variable (when the non-linear effect of a variable depends on its own level). A similar observation can be made for asymmetric effects: estimation results do not support strong asymmetric effects for any of the three supply-side channels. Hence, these results are not reported here.

[6] Appendix 1 gives the demeaned minimum and maximum values of the interacted variables. This helps to better understand the estimation results.

[7] The result according to which R&D and openness may be substitutes suggest that technology diffusion occurs through these variables. This is in contradiction with the argument

- The non-linearity of ETCR upholds even through the interactions: higher openness exacerbates the negative ETCR impact; lower EPL levels are associated with a more pronounced negative ETCR impact; and higher ALMP dampens the negative effect of ETCR on MFP, just as in the threshold regressions.[8]

27. The coefficient estimates on the interaction terms linking the size of the impact of the major MFP drivers to the cross-country variation of the ease of doing business and the quality of institutions show that the positive effect of business R&D spending by industry on MFP hinges to a large extent on how easy it is to start a business, to enforce contracts and to resolve insolvency issues. An overall more business friendly environment goes in tandem with a higher R&D impact on MFP, most probably due the creation of new innovative firms. In addition, better rule of law and a solid legal system amplifies the beneficial effects on business R&D on MFP. This is most likely because a more predictable environment boosts R&D spending, the benefits of which can be reaped only at longer time horizons.

Table 1. MFP and policy interactions: threshold non-linearities

	Non-linear variables								
	openness			**business exp. R&D by**			**ETCR public ownership**		
Threshold variable	threshold value	threshold var low	threshold var high	threshold value	threshold var low	threshold var high	threshold value	threshold var low	threshold var high
THRESHOLD VARIABLES: TIME-VARYING VARIABLES									
General variables									
business exp on R&D by industry	**1.149**	0.010**	0.004**						
openness				**5.93**	0.066**	0.012	**5.93**	-0.024**	-0.038**
Policies									
ETCR									
ALMP							**19.08**	-0.047**	-0.024**

Note: * and ** denote statistical significance at the 10% and 5% levels, based on robust standard errors. Regressions include country and time fixed effects. Empty cells mean that no statistically or economically significant interactions could be uncovered. For coefficients reported in the table, the F-tests reject the null hypothesis of a linear model against a two-regime model. Also, the Kao test of cointegration rejects the null hypothesis of no cointegration and the error correction term is negative and statistically significant. Estimation results are obtained on the basis of equation (4). Regressions include the following linear variables (if the variable is not the linear variable): ETCR public ownership, expenditures on R&D by industry, size-adjusted openness, human capital and output gap.

Source: OECD calculations.

that returns to R&D increase if the return to R&D is a function of market size, and if trade is one way of raising market size. The literature arguing for scale effects hypothesises that such effects arise due to the number of researchers (i.e. population), rather than market size.

8 This finding could be explained by the fact that higher ALMP spending helps workers move to more productive jobs, even when weak competition does not create strong pressure to do so.

Table 2. MFP and policy interactions: evidence from interaction terms

	time-varying variables		
	ETCR public ownership	business exp. on R&D by industry	opennnes
base effects	-0.027**	0.059**	0.008**
time-invariant variables (interacted with time-varying variables)			
General variables			
business exp. on R&D by industry (country average)	0.021**	0.014	-0.007**
openness (country average)	-0.001**	0.003*	-0.00005
Policies			
ETCR public ownership (country average)	-0.013**	0.102**	0.003**
EPL (country average)	0.019**	-0.004	-0.003**
ALMP (country average)	0.0004**	0.0005	-0.0001**
PMR & sub-indicators			
aggregate indicator		-0.078	0.0004
state control		0.097**	0.001
barriers to entrepreneurship		-0.047	0.0003
barriers to trade and investment		-0.199**	0.0001
Doing business			
contract enforcement - cost		-0.008**	0.001**
contract enforcement - time		-0.0003**	1e-05**
insolvency - costs		-0.006**	0.0003**
insolvency - time		-0.069**	0.001**
insolvency - recovery rate		0.002	0.000004
starting a business - cost		-0.01**	-0.0002
starting a business - time		-0.006**	-0.0001**
Institutions			
rule of law	-0.013	0.170**	-0.005**
legal system	-0.01*	0.077**	-0.004**

Note: * and ** denote statistical significance at the 10% and 5% levels, based on robust standard errors. Regressions include country and time fixed effects. For coefficients reported in the table, the F-tests reject the null hypothesis of a linear model against a two-regime model. Also, the Kao test of cointegration rejects the null hypothesis of no cointegration and the error correction term is negative and statistically significant. Estimation results are obtained on the basis of equations (6) and (7). Regressions include the following linear variables: ETCR public ownership, expenditures on R&D by industry, size-adjusted openness, human capital and output gap.

Source: OECD calculations.

4.2. Capital intensity

4.2.1 Threshold non-linear effects

28. The estimated threshold effects for EPL show that EPL's negative impact on capital intensity (measured by real capital stock divided by real GDP) is substantially higher if PMR is above the estimated threshold.

A straightforward pattern emerges for institutions: better rule of law and a higher quality legal system dampen the negative ETCR and EPL impacts. Looking now at threshold effects estimated for the doing business indicators, it is difficult to identify reasonably robust non-linear relationships for the impact of ETCR and EPL on the capital stock depending on the level of contract enforcement. For the various doing business indicators, whether or not the estimated effect in a particular non-linear regime is significant and

whether the impact of ETCR and EPL is higher (lower) when the particular doing business indicator is above (below) the estimated tipping point depends on how capital stock is measured. In addition, similar measures, such as the cost and time of insolvency procedures yield contradicting results.

4.2.1. Non-linear effects through interactions between policy variables

29. Looking at interactions between capital deepening and time-invariant structural characteristics provides useful insights on policy complementarities. The interactions for EPL and ETCR for which country averages of ETCR and EPL are interacted with time-varying EPL and ETCR series yield a fairly clear picture. The interaction terms are always negative. The base effects also tend to be strongly negative. This implies that higher ETCR exacerbates the negative impact of EPL. Also, higher EPL increases the negative ETCR impact.

30. Let us now turn to the interactions with the PMR indicator and its sub-components. A higher (more restrictive) overall PMR indicator and higher levels of state control, barriers to entrepreneurship and larger barriers to trade and investment are all associated with a more negative EPL impact on the capital stock.

31. Institutions matter for the ETCR and EPL impact on capital intensity. Better rule of law and better legal systems have consistently positive (and statistically significant) interaction terms: countries with better institutions will face less negative ETCR and EPL impacts on their capital stock. By contrast, in countries with weak rule of law, the negative ETCR and EPL effects will be larger (Table 4). These results are very close to those reported from threshold regressions.

32. Finally, the general business environment, captured through the World Bank's doing business indicators tend to show fuzzy patterns: one can observe both negative and positive interaction effects, with statistically non-significant results in a number of cases.

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Table 3. Capital deepening and policy interactions: threshold non-linearities

dependent variable K/Y	Non-linear variable					
	ETCR			EPL		
	Threshold value	when threshold variable is **below** the threshold value	when threshold variable is **above** the threshold value	Threshold value	when threshold variable is **below** the threshold value	when threshold variable is **above** the threshold value
Threshold variable						
Product and labour market regulations						
ETCR	5.2	-0.029**	-0.041**	5.2	-0.138**	-0.167**
EPL	2.4	-0.071**	-0.039**	2.4	-0.301**	-0.246**
PMR & sub-indicators						
aggregate indicator				1.9	-0.116**	-0.412**
state control				2.9	-0.14**	-0.83**
barriers to entrepreneurship				1.8	0.035	-0.197**
barriers to trade and investment				0.4	0.095**	-0.186**
Doing business						
contract enforcement - cost				24.2	-0.168**	0.088
contract enforcement - time				567.5	-0.164**	0.466**
insolvency costs				15.4	-0.169**	0.264**
insolvency time				2.3	-0.165**	0.463**
insolvency - recovery rate				67.9	0.374**	-0.169**
starting a business - cost				5.5	0.057*	-0.208**
starting a business - time				13.2	-0.297**	-0.112**
Institutions						
rule of law	1.5	-0.063**	-0.012	1.8	-0.198**	0.099**
legal system	7.8	-0.063**	-0.012	8.3	-0.188**	0.064**

Note: * and ** denote statistical significance at the 10% and 5% levels, based on robust standard errors. Regressions include country and time fixed effects. Each pair of coefficient (below & above) is estimated in separate equations including the controls used in previous tables. For coefficients reported in the table, the F-tests reject the null hypothesis of a linear model against a two-regime model. Also, the Kao test of cointegration rejects the null hypothesis of no cointegration and the error correction term is negative and statistically significant. Estimation results are obtained on the basis of equation (4). Regressions include the following linear variables (if the variable is not the linear variable): relative investment prices, long-term real interest rates, corporate taxes as a share of GDP, overall ETCR and output gap.Add the note here. If you do not need a note, please delete this line.

Source: OECD calculations.

Table 4. Capital intensity and policy interactions: evidence from interaction terms

dependent variable K/Y	time-varying variable	
	ETCR interaction	EPL interaction
base effect	-0.035**	-0.089**
time-invariant variable		
Product and labour market regulations		
ETCR (country average)	-0.038**	-0.2**
EPL (country average)	-0.027**	-0.196**
PMR & sub-indicators		
aggregate indicator		-0.546**
state control		-0.212**
barriers to entrepreneurship		-0.258**
barriers to trade and investment		-0.174**
Doing business		
contract enforcement - cost		0.021**
contract enforcement - time		0.0002
insolvency costs		0.012**
insolvency time		0.123**
insolvency recovery rate		-0.007**
starting a business - cost		-0.02**
starting a business - time		0.0003
Institutions		
rule of law	0.022**	0.152**
legal system	0.017**	0.073**

Note: * and ** denote statistical significance at the 10% and 5% levels, based on robust standard errors. Regressions include country and time fixed effects. For coefficients reported in the table, the F-tests reject the null hypothesis of a linear model against a two-regime model. Also, the Kao test of cointegration rejects the null hypothesis of no cointegration and the error correction term is negative and statistically significant. Estimation results are obtained on the basis of equations (6) and (7). Regressions include the following linear variables: relative investment prices, long-term real interest rates, corporate taxes as a share of GDP, overall ETCR and output gap.

Source: OECD calculations.

4.3. Employment rate

4.3.1. Threshold non-linear effects

33. Policies interact in a complex way on the employment rate.

- To start with, the ETCR indicator exhibits strong non-linear behaviour. Threshold regressions show that the negative ETCR effect is amplified by a higher ETCR itself, higher tax wedge, higher unemployment benefit replacement rate and an increased excess coverage (Table 5). At the same time, increasing ALMP spending attenuates the negative impact of ETCR on the employment rate.[9]

[9] One possibility is that more ALMPs helps workers to move to more productive jobs, even when weak competition does not create strong pressure to do so: in other words, according to this viewpoint, weak competition means that the benefits of moving to a more productive job are lower, but high, and presumably good-quality, ALMPs reduce the costs of skill upgrading.

- But ETCR also interacts with other policy areas: higher ETCR exacerbates the employment-reducing effect of higher tax wedge. Higher levels of the broader measure of the aggregate PMR indicator and its sub-components (state control, barriers to entrepreneurship; and barriers to trade and investment) also go in tandem with a negative tax wedge effect.

- More ALMP spending offsets some of the negative effects of tax wedge and that of the unemployment benefit replacement rate. In turn, a higher tax wedge dampens the overall positive effect of ALMP spending on employment

34. Housing regulations can interact in important ways with product and labour market policies. Regulations reducing the supply of housing via stricter rent controls and unbalanced tenant-landlord relationships may affect labour market policies. Empirical evidence in Table 5 suggests that tighter housing regulation decreases the employment-enhancing influence of ALMP spending.

35. Difficulties of contract enforcement, costly insolvency procedures and red tape relating to starting business are all associated with employment-destroying ETCR effects. By contrast, better institutions attenuate those negative effects, probably through providing a more stable operating environment. But higher quality institutions also imply better application of tax laws, hence leadingto large negative coefficients on the tax wedge variable.

4.3.2. Non-linear effects through interactions between policy variables

36. Interacting time-varying policy variables (ETCR, tax wedge, ALMP and the unemployment benefit replacement rate) yield, in some instances, results, which are consistent with findings obtained using threshold regressions. First, countries with higher unemployment benefit replacement rate and a more extensive excess coverage will experience more pronounced harming effects of ETCR on employment. Also, the size of the negative tax wedge effect will increase as the ETCR indicator grows less competition friendly. A higher tax wedge will reduce the beneficial effect of more ALMP spending on employment (Table 6).

37. A worsening of the business environment captured by the World Bank's Doing Business indicators increases the negative correlation between the ETCR indicator and the employment rate. Finally, and similarly to the results of the threshold regressions, better institutions soften the harmful effects of a stricter ETCR indicator.

38. A strong result emerging from the interaction terms, not detected by the threshold regressions, is that housing market regulations have a powerful negative effect on employment through the ETCR indicator, tax wedge and ALMP spending. Housing regulations and policies restricting the supply of housing and reducing labour mobility augments the size of the negatively signed coefficients on ETCR and tax wedge and reduces the magnitude of the positive coefficient on ALMP spending.

Table 5. Employment rate and policy interactions: threshold non-linearities

	Non-linear variables								
	ETCR when			tax wedge when			ALMP when		
Threshold variables	threshold value	threshold var low	threshold var high	threshold value	threshold var low	threshold var high	threshold value	threshold var low	threshold var high
Time-varying variables									
ETCR	5.37	-1.193**	-1.605**	5.37	-0.16**	-0.236**	5.37	0.046**	-0.04
tax wedge	32.52	-0.75**	-1.494**	34.03	-0.01	-0.137**	32.52	0.087**	0.039**
EPL	2.37	-1.162**	-0.10	2.36	-0.212**	-0.112**	2.36	-0.05**	0.064**
ALMP	23.58	-1.801**	-1.114**	24.19	-0.203**	-0.136**	24.19	-0.03	0.05**
UBRR	28.55	-0.53	-1.076**	19.35	0.00	-0.243**	33.81	0.06**	0.128**
excess coverage	34.54	0.23	-1.82**	12.81	-0.179**	-0.235**	41.24	0.026**	0.208**
Time-invariant variables									
Housing regulations									
tenant-landlord relations	2.42	-2.31**	-0.846**	2.39	0.09	-0.429**	2.24	0.789**	0.05**
PMR & sub-components									
PMR overall				1.52	0.06	-0.304**	1.63	0.059**	0.448**
State control				2.18	0.02	-0.404**	2.33	0.052**	0.303**
barriers to entrepreneurship				1.78	-0.07	-0.295**	2.23	0.075**	0.704**
barriers to trade & investment				0.42	-0.69**	-0.06	0.62	0.051**	0.319**
Doing business									
contract enforcement - cost				15.00	-0.496**	-0.09	15.79	0.497**	0.06**
contract enforcement - time				390.83	-0.561**	-0.04	390.83	0.33**	0.059**
insolvency - costs				4.00	-0.454**	-0.02	13.04	0.045**	0.373**
insolvency - time				1.00	-0.499**	-0.05	1.78	0.224**	0.028**
insolvency - recovery rate				81.89	-0.02	-0.436**	80.40	0.033**	0.223**
starting a business - cost				7.56	-0.08	-0.889**	1.20	0.03**	0.195**
starting a business - time				15.33	0.05	-0.49**	21.28	0.052**	0.595**
Institutions									
rule of law	1.55	-1.844**	-0.03	1.76	0.00	-0.443**	**1.67**	**0.389****	**0.064****
legal system	8.14	-1.949**	-0.16	8.23	-0.07	-0.398**	**6.88**	**0.601****	**0.062****

Note: * and ** denote statistical significance at the 10% and 5% levels, based on robust standard errors. Regressions include country and time fixed effects. For coefficients reported in the table, the F-tests reject the null hypothesis of a linear model against a two-regime model. Also, the Kao test of cointegration rejects the null hypothesis of no cointegration and the error correction term is negative and statistically significant. Estimation results are obtained on the basis of equation (4). Regressions include the variables used in equation 3 of Table 8 in Gal and Theising (2015).

Source: OECD calculations.

Table 6. Employment rate and policy interactions: evidence from interaction terms

	time-varying variables		
	ETCR	tax wedge	ALMP
base effect	-1.127**	-0.194**	0.057**
time-invariant variables (interacted with time-varying variables)			
Product and labour market regulations & policies			
ETCR (country average)	-0.418	-0.366**	0.227**
EPL (country average)	-0.104	-0.345**	0.055*
tax wedge (country average)	-0.004	-0.024**	-0.004**
ALMP (country average)	-0.005	-0.009**	-0.004**
unemployment benefit repl. ratio (country average)	-0.018*	-0.014**	-0.002
excess coverage (country average)	-0.036**	-0.01	0.004**
Housing market			
tenant landlord relationships	-0.829**	-0.274**	-0.051**
Doing business			
contract enforcement - cost		0.022**	-0.014**
contract enforcement - time		0.0003	0.0001
insolvency - costs		0.023**	-0.008
insolvency - time		0.082	-0.163**
insolvency - recovery rate		-0.01**	0.006**
starting a business - cost		-0.015	0.022**
starting a business - time		-0.024**	0.01**
Institutions			
rule of law	2.271**	-0.294**	-0.25**
legal system	1.292**	-0.107	0.062

Note: * and ** denote statistical significance at the 10% and 5% levels, based on robust standard errors. Regressions include country and time fixed effects. For coefficients reported in the table, the F-tests reject the null hypothesis of a linear model against a two-regime model. Also, the Kao test of cointegration rejects the null hypothesis of no cointegration and the error correction term is negative and statistically significant. Estimation results are obtained on the basis of equations (6) and (7). Regressions include the variables used in equation 3 of Table 8 in Gal and Theising (2015).

Source: OECD calculations.

4.4. Summary of the policy impact estimates

39. Table 7 gives a compact summary of all statistically significant and economically plausible non-linear effects that are supported by both the threshold approach and the interaction approach. For instance, the + sign in the "More openness" column and "Reduction in ETCR" row indicates that when openness is higher, the reduction in ETCR brings a stronger increase in MFP. The “+” signs hence indicates that reforming policy areas highlighted in the column titles (better quality of institutions, etc.) can lead to larger impacts for reforms in the areas captured by the row titles (reduction in ETCR, etc.). The “-” signs signal that when the policy stance is less favourable in the areas indicated in the columns then reforming in the areas in the corresponding rows will bring fewer benefits (e.g. tax wedge reduction leads to less employment gains when EPL is not very stringent)

Table 7. Reform impacts from policies conditional on the level of other policies and institutions

Summary of threshold non-linear effects and non-linear effects through interaction terms

	Conditional on…										
Reform impacts from…	Better quality of institutions	Lower barriers to entry and exit	Lower barriers to trade and FDI	Less stringent housing market regulations	More openness	More R&D intensity	Higher ALMP spending	Less stringent EPL	Lower unemployment benefit replacement rate	Lower tax wedge	Lower excess coverage
	Non-linear impacts on MFP										
Reduction in ETCR					+	-	-	+			
Increase in business R&D	+	+	+								
Increase in openness		-				-	-	+			
	Non-linear impacts on capital intensity										
Reduction in ETCR	-	-									
Reduction in EPL	-										
	Non-linear impacts on employment										
Reduction in tax wedge			+	-				-			+
Increase in ALMP			-	+					-	+	-

Note: estimation results are indicated only if the threshold and interaction terms do not contradict each other and if the results are statistically significant at least at the 5% level. For instance, the + sign in the "More openness" column and "Reduction in ETCR" row indicates that when openness is higher, the reduction in ETCR brings a stronger increase in MFP. Quality of institutions covers rule of law and the legal system. Barriers to entry and exit cover the Doing Business and the PMR indicators.

Source: OECD calculations.

5. Country-specific policy effects: simulation results

40. This section illustrates how the coefficient estimates from threshold regressions and interaction terms translate into measurable policy impacts on MFP, capital deepening and employment. The methodology to obtain these results follows closely the one in OECD (2016). First, we define a reform measure for each policy, which is based on policy changes observed in the past. More specifically, reforms are determined as the average improvements in the policy indicators in two-year windows. Only those consecutive years are used during which policy indicators moved into the reform direction in both years (see Appendix B for alternative reform scenarios). Second, simulation results are derived for 5- and 10-year horizons and for the full long-term effect. The estimated speed of adjustment is low for MFP and capital deepening. Hence, the 5-year impact can be considerably lower than the full long-run effect. For employment, the speed of adjustment is quicker. Hence, the differences across different time horizons are less pronounced.

41. Selected simulation results for the 5-year horizon are reported in Figures 2 to 4. A first observation is that heterogeneous effects can be large even in threshold regressions. For instance, the simulated impact of business expenditures on R&D on MFP ranges 0.6% to 1.0%, depending on the level of openness (Figure 2, panel A). Even larger differences of the effects of EPL are identified for capital stock (Figure 3, panel A). Second, country-specific effects can be very small and very large of the same policy variable depending on the variable used to establish a tipping point. For example, a

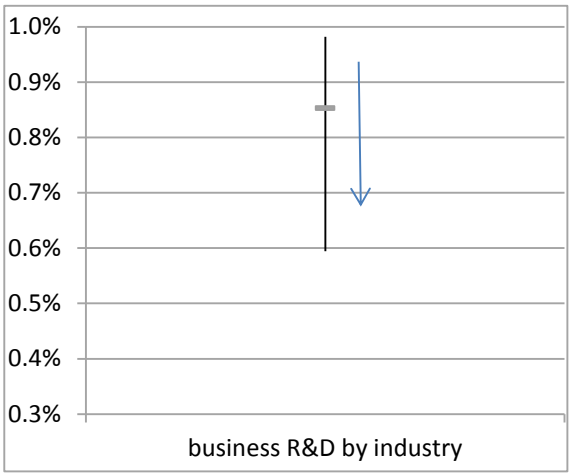
typical reform in tax wedge would have a 0.1 percentage point higher positive effect on the employment rate if ETCR is very high. But the same reform effect can be 0.4 percentage point higher conditional on being above the estimate tipping point of the unemployment benefit replacement rate (Figure 4, panel A).

42. Simulation results derived from interaction terms are more appealing given that they can potentially deliver more country-specific effects. There are some cases when moving from the minimum to the maximum value of the conditioning (time-invariant) variable can even produce simulation results on policy effects ranging from negative to positive. Typically, the impact of R&D spending on MFP, conditional on the level of doing business indicators and the rule of law can switch sign. In the cases where the indicator of the rule of law is very low or where the cost to set up a business is very high, the payoff from extra R&D spending is negative (not reported here). A more extreme example is the effect of EPL on capital intensity, conditional on barriers to entrepreneurship (i.e. costs to business start-ups): it ranges from -1.1% in the case where such barriers are highest to 0.9% in the case where they are lowest. Figures 2 to 4 report cases when the calculated impacts do not switch sign. In these cases, the ranges for the size of the impacts are comparable to those reported from threshold regressions.

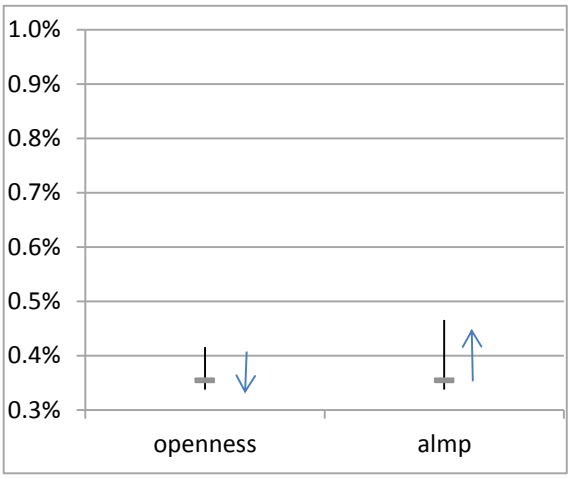
Figure 2. Non-linear effects of policies and institutions on MFP (in %)

Panel A. Simulations results from threshold regressions

Left-non-linear variable: openness

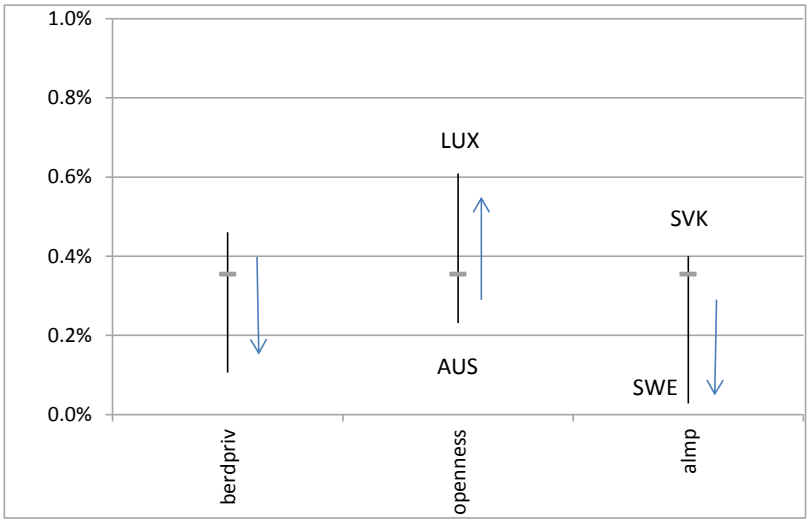


Right non-linear variable: ETCR public ownership



Panel B. Simulation results from interactions

ETCR public ownership interacted with other policies

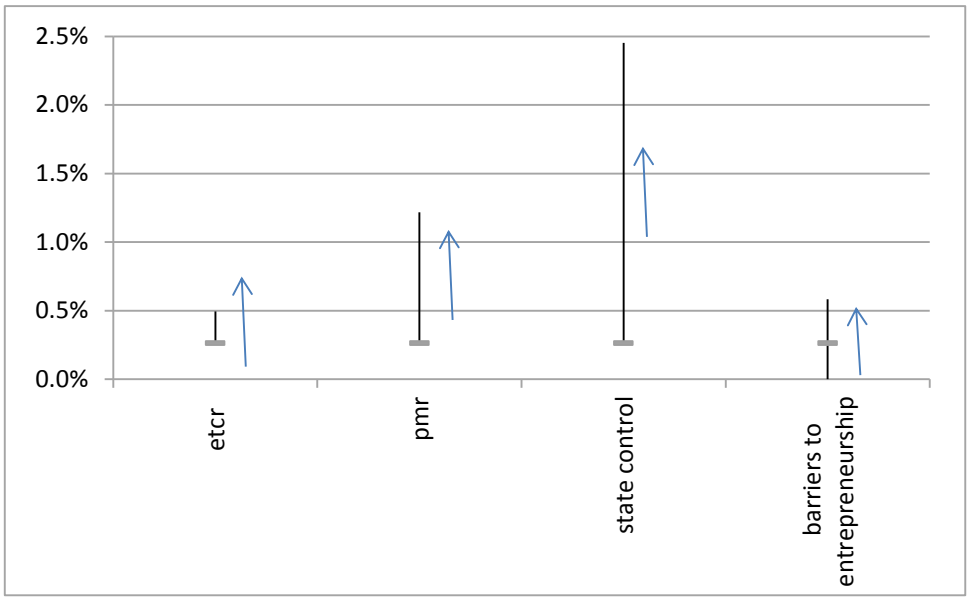


Note: For threshold regressions, the range is given for the simulation results for the two regimes of the conditioning variable. For interactions, the range is obtained by using the minimum and maximum values of the time-invariant conditioning variables. The horizontal line represents the linear effect for threshold regressions and the base effect (effect without interactions) for the regressions with interactions. Berdpriv = expenditure on R&D by industry. The arrow represents the direction of change in the policy impact when the conditioning variable (i.e. R&D, openness and ALMP in Panel B) has a higher value.

Source: OECD calculations.

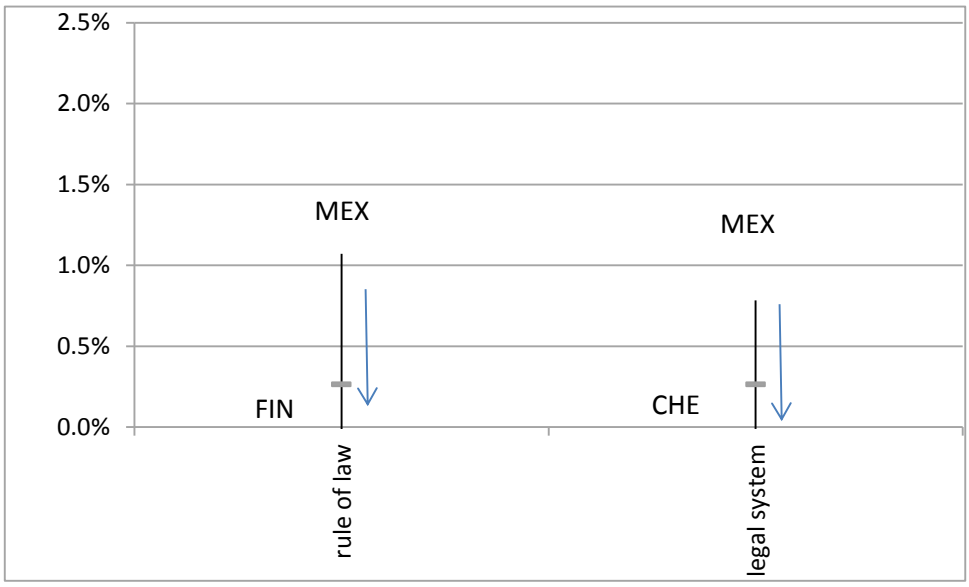
Figure 3. Non-linear effects of policies & institutions on capital deepening (in %)

Panel A. Simulation results from threshold regressions, non-linear variable: EPL



Panel B. Simulation results from interactions

EPL interacted with institutions



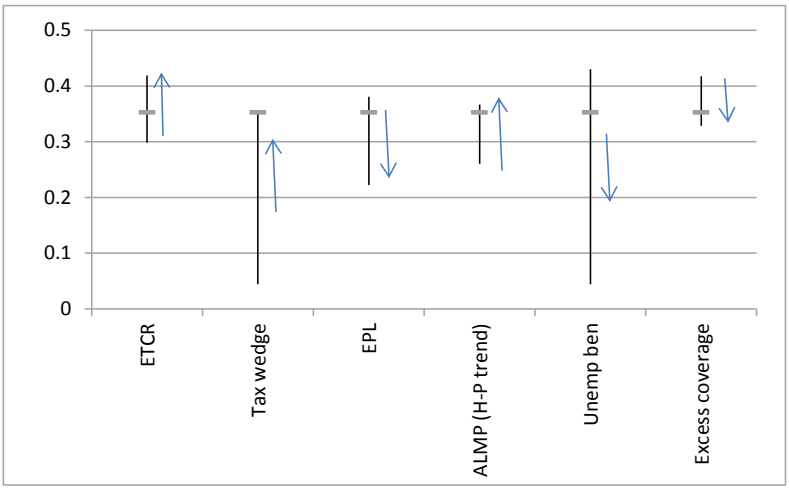
Note: For threshold regressions, the range is given for the simulation results for the two regimes. For interactions, the range is obtained by using the minimum and maximum values of the time-invariant variables. The horizontal line represents the linear effect for threshold regressions and the base effect (effect without interactions) for the regressions with interactions. The arrow represents the direction of change in the policy impact when the conditioning variable (i.e. rule of law or the legal system in Panel B) has a higher value.

Source: OECD calculations

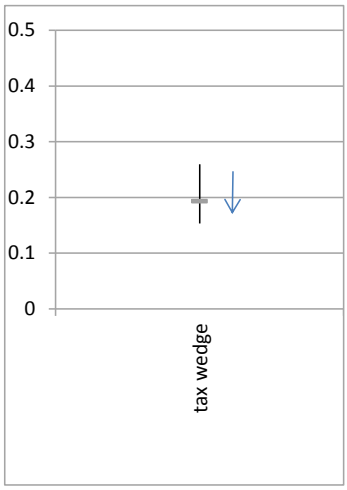
Figure 4. Non-linear effects of policies & institutions on employment (in p.p.)

Panel A. Simulation results from threshold regression

Left non-linear variable: tax wedge

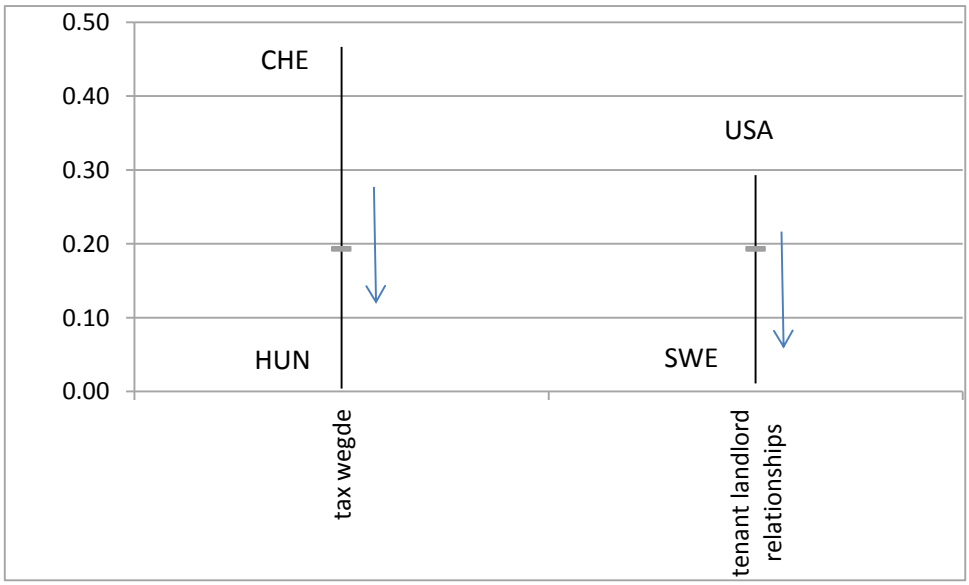


Right non-linear variable: ALMP



Panel B. Simulation results from interactions

ALMP interacted with tax wedge and housing market regulation



Note: For threshold regressions, the range is given for the simulation results for the two regimes. For interactions, the range is obtained by using the minimum and maximum values of the time-invariant variables. The horizontal line represents the linear effect for threshold regressions and the base effect (effect without interactions) for the regressions with interactions. The arrow represents the direction of change in the policy impact when the conditioning variable (i.e. tax wedge and housing market regulations in Panel B) has a higher value.

Source: OECD calculations

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Annex A. Descriptive Statistics

Table A1. Descriptive statistics: demeaned minimum and maximum values of the time-invariant variables

					demeaned	
	Min	Max	Mean	Sdev	Min	Max
PMR & sub-components						
aggregate indicator	1.18	2.80	1.73	0.35	-0.56	1.07
state control	1.51	3.92	2.41	0.54	-0.90	1.51
barriers to entrepreneurship	1.49	3.07	2.06	0.37	-0.57	1.01
barriers to trade and investment	0.20	2.09	0.74	0.41	-0.54	1.36
Doing business					0.00	0.00
contract enforcement - cost	8.31	38.63	21.46	7.81	-13.15	17.18
contract enforcement - time	216	1332	517	260	-301.34	814.32
insolvency costs	1.00	23.00	9.60	5.97	-8.60	13.40
insolvency time	0.40	5.84	1.92	1.16	-1.52	3.92
insolvency recovery rate	18.41	92.85	65.40	21.66	-47.00	27.45
starting a business - cost	0.05	20.69	6.80	6.42	-6.75	13.89
starting a business - time	2.71	61.08	16.83	11.68	-14.12	44.26
Institutions					0.00	0.00
rule of law	-0.53	1.94	1.27	0.60	-1.80	0.67
legal system	4.86	8.54	7.27	1.07	-2.41	1.27
tenant landlord relationships	1.83	4.33	2.72	0.62	-0.89	1.61

Source: OECD

Table A2. Descriptive statistics of the time-varying variables

Variable	Mean	SD	Min	Max
Average gross unemployment benefit ratio	28.06	13.58	0.35	65.21
ALMP spending	23.14	21.72	2.79	169.16
Tax wedge for one-earner married couple	29.86	10.03	-1.07	51.19
EPL, regular employment contracts	2.20	0.87	0.26	5.00
ETCR, overall indicator	3.50	1.41	0.79	6.00
ETCR, public ownership	3.79	1.43	0.83	6.00
Size-adjusted openness	2.20	13.80	-19.88	47.78
expenditure on R&D by industry	0.96	0.65	0.05	3.07

Source: OECD

Annex B. Alternative Reform Scenarios

There are two main types of reform intensity scenarios discussed below. The first captures policy changes observed in the past (within countries). The second assumes a reduction in cross-country differences in policy settings.

Typically observed policy changes in the past

Policy effects are estimated using regressions that include country-fixed effects. Country-fixed effects capture all the cross-sectional differences in policies. Hence, the coefficient estimates on policies show only policy effect over time (and averaged across countries). To reflect this nature of the estimated policy effects, within-country policy-change scenarios only consider past average changes in policies over time but not across countries.

Average improvements in the policy indicators over two or five years (Table B1, columns 2 and 3).

- For the two-year change, only those two consecutive years are used when the policy indicator moves into the "good" (reform) direction in both years.
- The definition at the 5-year horizon is more flexible: policies do not need to show improvement every year but only over five years. Assuming policy improvements in 5 consecutive years do not appear very plausible and would limit strongly our sample.
- Average changes can be further split into small and large reforms: they can be captured, for instance, by the 25th and the 75th percentile of policy indicator changes, respectively in the "favourable" directions.

Average changes in the policy indicator (measured by average within country standard deviation). This scenario reflects average policy changes (both improvements and fall-backs) for the average country over the sample period (Table B1, column 1).

Policy changes calibrated based on cross-country differences

A reduction in the gap from the best performers. This scenario shows how much a change would be needed in a given policy area to close 20% of the gap to the average of the three best performing countries. The implied policy changes are shown for the average country and for poor performers (the bottom quartile of the distribution) (Table B1, columns 4 and 5).

Favourable policy changes at a two-year horizon are typically smaller than those at five years. For instance, changes in ALMP spending, ETCR and the legal retirement age double. Also, direction-neutral policy changes (captured by standard deviations) tend to be larger than positive reforms at the five-year horizon. The few exceptions to these general observations are corporate taxes and maternity leave where short-term changes dominate the longer-term ones. For EPL, changes are broadly comparable for all three scenarios.

Closing the gap to the frontier countries implies considerably larger policy changes than scenarios reflecting average policy changes over time. Reform efforts based on assuming only a partial (20%) reduction in the gap are much closer to observed past reform efforts,

but they still tend to be somewhat larger. EPL and other labour market policies targeting specific demographic groups are the few exceptions when the two approaches give broadly similar magnitudes. For ETCR and corporate taxes, past reforms are greater than those implied by the 20% gap reduction (Table B1). Against this background, reform intensity measures derived from cross-country variation should be taken with caution in policy simulations: they are larger than changes observed in the past. Coefficient estimates obtained on the basis of historical data might not hold for these large variations.

Table B1. Alternative measures for structural reforms

Structural policy areas	Typically observed policy changes in the past			Reducing the gap with the best performers		
	Average changes over time	Average improvements over		By 100%, from the average	By 20%	
		2 year periods	5 year periods		from the average	from a poor performer
Product market regulation						
ETCR (0-6, 6 is strictest)	-1.25	-0.31	-0.70	-0.83	-0.17	-0.24
Intermediate policy channels for productivity						
Openness (perc. of GDP)	6.86	4.01	5.07	33.45	6.69	9.44
R&D (business exp.) (perc. of GDP)	0.23	0.10	0.16	1.91	0.38	0.51
Labour market policies						
Labour market regulations						
EPL (regular contr., 0-6, 6 is strictest)	-0.19	-0.30	-0.28	-1.29	-0.26	-0.33
Tax-benefit and activation policies						
Unemployment benefits (perc. of earnings)	-5.02	-1.42	-2.70	-17.19	-3.44	-5.27
ALMP spending (per unemployed, as perc. of GDP/capita)	12.51	3.18	5.85	22.50	4.50	7.00
Tax wedge (perc.points)	-3.34	-2.28	-2.96	-26.58	-5.32	-7.09

Notes: * Measured by the within-country standard deviation, averaged across countries. As the standard deviation is always positive, it is multiplied by -1 if a favourable change in the policy indicator is a negative one (ETCR, EPL). ** A poor performer is measured as the lowest 25th percentile in the distribution of policy stances in the last available year.
Source: OECD calculations.

Past policy changes are calculated for the period from 1985 to 2011-2013 (depending on data availability). Policy changes based on the gap reduction are calculated using the last available year for each indicator. The calculations are carried out for the 25 OECD countries for which the labour market indicators are available. Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom, United States.