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The quantification of structural reforms: Extending the framework to emerging market economies

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THE QUANTIFICATION OF STRUCTURAL REFORMS: EXTENDING THE FRAMEWORK TO EMERGING MARKET ECONOMIES

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By Balázs Égert

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ABSTRACT/RÉSUMÉ

The quantification of structural reforms: extending the framework to emerging market economies

This paper estimates and quantifies the impact of structural reforms on per capita income for a large set of OECD and non-OECD countries. The findings suggest that the quality of institutions matters to a large extent for economic outcomes. More competition-friendly regulations, as measured by the OECDs' Product Market Regulation (PMR) indicator improve economic outcomes. Lower barriers to foreign trade and investment help MFP. Lower barriers to entry and less pervasive state control of businesses boost the capital stock and the employment rate. No robust link between labour market regulation and MFP and capital deepening could be established. But looser labour market regulation is found to go hand in hand with higher employment rates. The paper shows that countries at different level of economic development face different policy impacts. Furthermore, PMR effects depend on the level of labour market regulations.

Keywords: structural reforms, product markets, labour markets, regulation, institutions, simulation, multi-factor productivity, investment, employment, per capita impact, OECD, emerging market economies, developing countries

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

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Quantification des réformes structurelles : étendre le cadre aux économies de marché émergentes

Le présent document procède à une évaluation et à une quantification de l'impact des réformes des réformes structurelles sur le revenu par habitant pour un large éventail de pays membres et non membres de l'OCDE. Il ressort des conclusions de cette étude que la qualité des institutions influe grandement sur les résultats économiques. Des règlements plus propices à la concurrence, tels que mesurés par les indicateurs de réglementation des marchés de produits (RMP) de l'OCDE, améliorent les résultats économiques. L'abaissement des obstacles aux échanges avec l'étranger et à l'investissement a un effet positif sur la PMF. La réduction des obstacles à l'entrée et la moindre omniprésence du contrôle exercé par l'État sur les activités des entreprises dynamisent le stock de capital et le taux d'emploi. Aucun lien robuste n'a pu être établi entre réglementation du marché du travail, PMF et augmentation de l'intensité capitalistique. Cependant, on constate qu'une réglementation du marché moins stricte va de pair avec des taux d'emploi plus élevés. L'étude montre que l'impact de l'action publique diffère selon le niveau de développement économique des pays. En outre, les effets de la RMP dépendent du niveau de réglementation du marché du travail.

Mots-clés : réformes structurelles, marchés des produits, marchés du travail, réglementation, institutions, simulation, productivité multifactorielle, investissement, emploi, revenu par habitant, OCDE, économies de marché émergentes, pays en développement

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

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THE QUANTIFICATION OF STRUCTURAL REFORMS: EXTENDING THE FRAMEWORK TO EMERGING MARKET ECONOMIES

By Balázs Égert[1]

1. Introduction

1. A new framework aimed at quantifying the effect of structural reforms on per capita income was presented at the Working Party 1 meetings in Spring and Autumn 2016. Among the main features, the framework 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), iii) increases internal consistency of the estimated relationships by employing a common sample of countries and time span, and a unified estimation approach; and iv.) evaluates policy impacts depending on the level of other policies (OECD, 2016a,b).

2. This document presents a further improvement of the new framework by extending it to emerging market economies. The previous documents presented i.) *average* policy effects obtained on an OECD sample (Spring 2016), and ii.) country-specific effects for a panel of OECD countries by conditioning the impact of individual policies on their own level or on the stance of other policies and institutions. In this document, we re-estimate the policy impacts on a panel dataset covering a larger number of countries including emerging market economies.

3. The purpose of this document is to figure out the extent to which emerging market economies may differ from advanced OECD countries. More specifically, this study will ask the question whether policy effects differ for countries at different levels of economic development, whether the quality of institutions play a role in economic outcomes and whether the quality of institutions and the stance of specific policies generate heterogeneity in the way individual countries react to specific policy changes. The use of data for emerging market economies warrants caution because *de jure* policy indicators developed by the OECD, the World Bank and other institutions, used in this document might be further away from *de facto* policies in emerging market economies than in advanced economies. Another reason for caution is the fact that informality, widespread in less developed countries, is not captured by our outcome variables, especially for the employment rate but also for multi-factor productivity and the capital stock.

4. Going beyond heterogeneity and the extended country coverage, parallel work is on-going to reconcile results from macroeconomic estimates with results obtained on the basis of sector and firm-level datasets. Sectoral and micro data studies are attractive for at least two reasons. First, the effects of country-

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wide policies can be better identified econometrically with disaggregated data. Second, using sector or firm-level data allows for a better understanding of the channels through which policies affect aggregate outcomes and how these may differ according to sector and firm characteristics. For example, a firm-level analysis is required to determine whether the impact of a given policy change on aggregate productivity comes mostly from stronger business dynamism (entry and exit), smoother resource reallocation across firms or within-firm productivity gains.

5. But these studies also have some drawbacks. First, aggregating the policy effects that come through different channels is far from straightforward, especially that the channel-specific impacts often come from different studies and samples. They typically cover a small group of advanced OECD countries. Second, sector or firm-level studies often use the difference-in-difference approach, which helps pin down whether some sectors or firms react differently to a given policy change than others. However, the difference-in-difference methodology typically allows for testing policy variables one at a time, implying that estimated policy effects are unconditional on the effect of other policies. Furthermore, to estimate macroeconomic effects, specific assumptions are needed.[2]

6. Estimation results derived from aggregate macroeconomic data have the straightforward advantage that they can be used directly to obtain macroeconomic policy effects. Another appeal of macroeconomic regressions over sector- and firm-level studies is that they make possible the estimation of policy effects by including a larger number of policies in the analysis, thus producing policy effects that are conditional on a number of other policy areas. Overall, a careful balancing is needed to find a way how to link macro- and micro-based approaches.

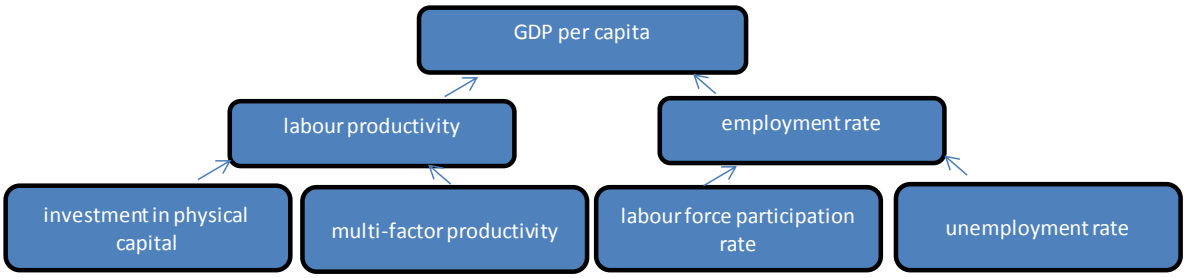
7. This document is structured in six parts. Section 2 briefly reminds the reader of the main features of the new framework. Section 3 discusses challenges related to the inclusion of emerging-market economies and describes the dataset used. Section 4 presents some stylised facts. Section 5 reports and analyses the estimation results. Finally, section 6 demonstrates how the coefficient estimates can be used in the new simulation framework and shows the impact of policy changes on MFP, capital, employment and per capita income.

2. A brief reminder of the framework

8. 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.

2. The identification of policy effects is obtained though the differences across industries with respect to their exposure to a specific policy. One implication is that the policy impact is only estimated in relative terms across industries. A typical assumption made to derive an economy-wide estimate in absolute terms is that the policy has no impact on the least exposed industries.

Figure 1. Channels of transmission to per capita GDP



9. 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)[3] 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.

- **The new framework includes policy interactions**, estimated on a sample of OECD countries. For example, the positive impact on MFP of an increase in business R&D spending is stronger in an environment characterised by lower barriers to firm entry and exit as well as by better-quality institutions, notably with respect to the legal system, contract enforcement and the protection of property rights. Also, the MFP gains from reducing regulatory barriers to competition are stronger in countries characterised by less strict employment protection legislation. Next, a

3. 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).

loosening of employment protection legislation will have a smaller positive impact on capital deepening (and thus labour productivity) in countries where product markets are more competitive and legal institutions are of better quality. Finally, A strengthening of active labour market policies (ALMPs) will yield bigger employment gains in countries with lower tax wedges or with less stringent housing market regulation.

3. Challenges of extending the framework to emerging market economies

3.1 Challenges related to data availability

10. The major challenge for including more countries into the framework is mainly related to data availability.[4] The main indicators of regulation used currently in the quantification framework are either not available for emerging market economies or they are available only for a very recent period (usually as one single observation), making their use impossible for regression analysis drawing on the time series dimension of the data (panels including country and time fixed effects). There are, however, two possible remedies to this problem:

- **Using the cross-section dimension** of the variables which offer only one or two observations per country. Two OECD indicators have been recently expanded to cover non-OECD countries: i.) the overall PMR indicator and its sub-components are available for more than 60 countries. For the countries recently added to the database, only one observation is available for a recent period (usually 2013 or 2014). ii.) the EPL indicator has also become available for additional countries. A similar number of countries is covered by PMR and EPL but they do not cover exactly the same countries (Table 1).

- **Finding alternative indicators covering more countries**. Measures of product and labour market regulations from non-OECD databases could be potentially used to investigate policy impacts for a larger set of countries. Three major datasets could be of use here:

    - The World Bank's Doing Business indicators. They cover the cost and time of starting a business, insolvency procedures and contract enforcement.

    - The Fraser Institute's Economic Freedom of the World (EFW) database that offers a measure of business regulation and a measure of labour market regulation (each broken down into six sub-categories). The headline business and labour market regulation indicators are used in the following regression analysis.[5]

    - The very comprehensive dataset of the Cambridge Labour Regulation Indicator (CBR LRI) covers annually labour market-related legal regulations in 117 countries over more than 40 years (Adams et al., 2016). The dataset includes 40 categories of labour market regulations. For the purpose of quantification, the six categories concerning regular contracts are considered. Their simple arithmetic average is used as an alternative to the OECD's EPL indicator (for regular contacts).

4. Another challenge, mentioned earlier and difficult to tackle here is the widespread informality and the larger difference between *de jure* and *de facto* measures of indicators in less-developed countries

5. It would be interesting to use the sub-indicators. Nevertheless, they are strongly correlated with each other both along the within (variation over time) and between (cross-country variation) dimensions. Hence, they could not be included in the regressions at the same time.

- One question that begs for answer in this context is the extent to which OECD indicators are related to the above listed alternative measures of product and labour market regulation. A comparison can be done in the cross section (using country averages over 2002 to 2012) as the OECD's PMR and EPL indicators will be used to explain cross-country variation and not variation over time (due to data availability). Cross-section correlation shows that the correlation coefficient between the OECD's EPL and the EFW's labour market regulation indicator is around 0.7. The same figure is slightly higher than 0.6 for OECD EPL and Cambridge EPL. Correlation is weaker between the OECD's PMR indicator and the alternative measures. The figure is about 0.5 for the EFW business regulation indicator and ranges from 0.1 to 0.5 for the various Doing Business indicators

Table 1. Overview of indicators used in the regression analysis by main policy and outcome areas

	source	country coverage	time coverage
PRODUCT MARKET REGULATION			
Product Market Regulation - overall Product Market Regulation - barriers to entry Product Market Regulation - barriers to trade & investment Product Market Regulation - scope of state control	OECD Product Market Regulation Indicators database	around 60	every five years, only one observation for about 15 countries
GENERAL BUSINESS SECTOR REGULATION			
Business regulation	Fraser Institute	more than 100 countries	annual, about 10 years
cost of contract enforcement time of contract enforcement cost of insolvency procedures time of insolvency procedures cost of starting a business time of starting a business	World Bank Doing Business Indicators	more than 100 countries	annual, about 10 years
LABOUR MARKET REGULATION			
EPL regular contracts	OECD	around 60 countries, 10 countries different than for PMR	annual, 30 years, only one observation for about 15 countries
labour market regulation	Fraser Institute	more than 100 countries	annual, about 10 years
EPL regular contracts	Cambridge	117 countries	annual, 40 years
INSTITUTIONS			
legal system legal system - enforcement legal system - judicial independence	Fraser Institute	around 100 countries	annual, about 10 years
rule of law political stability corruption government effectiveness	WB's World Governance Indicators	around 100 countries	
FINANCIAL DEVELOPMENT			
financial liberalisation - EFW	Fraser Institute	around 100 countries	annual, until 2005
domestic credit % GDP domestic private credit % GDP bank branches per capita stock market capitalisation % GDP stock market turnover % GDP	World Bank's World Development Indicators database	around 100 countries	annual, about 30 years
TRADE OPENNESS			
openness log openness log openness - size adjusted	World Bank's World Development Indicators database own calculation based on WDI	around 100 countries	annual, about 30 years
trade liberalisation - EFW	Fraser Institute	around 100 countries	annual, until 2005
INNOVATION INTENSITY			
R&D spending % GDP patents / capita	World Bank's World Development Indicators database	around 100 countries	annual, about 30 years

Source: OECD

3.2 Country coverage

11. The dataset used for the empirical analysis is obtained from the OECD's SPIDER database (see Box 1). Based on that, a smaller and a larger panel are considered:

- The first smaller panel covers countries for which the OECD's PMR and EPL indicators are available. This means a total of around 60 countries.
- The second larger panel comprises around 100 countries (including countries of the first panel). The time coverage of this dataset goes from 2002 to 2012. The data coverage is largely dictated by data availability of the regulation indicators and to a lesser extent the institutional indicators. The *Doing Business* indicators covering the cost and time of starting a business, contract enforcement and insolvency procedures have a time-series of about 10 years. The same applies to the business and labour market regulation indicators by Economic Freedom of the World (EFW). In an attempt to reduce noise in the data, countries with a population less than one million people are excluded.

Box 1. The SPIDER database

The data used in this paper are obtained from the OECD's SPIDER database. SPIDER stands for Structural Policy Database for Economic Research. SPIDER contains four main types of indicators:

i.) Legal and political institutions;

ii.) Framework conditions and regulations that determine the overall business environment in which businesses operate. They determine for instance how costly it is to start, run and close a business and reallocate resources within and across firms;

iii.) Very specific regulations and intermediate outcomes. They cover policies and regulations affecting only a specific segment of a supply-side channel such as elderly or female workers. Examples are family benefits or policies aimed at influencing the effective retirement age. The frontier between framework conditions and very specific policies is not always very clear cut.

iv.) Outcome variables. They cover variables that are influenced by institutions and policies such as per capita income, various measures of productivity, investment, employment, unemployment and the participation rate.

SPIDER is a compilation of data from 43 existing data sources. It draws heavily on a large number of existing OECD databases. It includes a number of non-OECD databases such as the World Bank's Doing Business and World Development Indicators databases of the Penn World Table 8.0. The final source of data in SPIDER are individual research papers, either academically published articles or working papers (for more details, see Égert et al. 2017).

3.3 Challenges related to regression analysis

12. There are variables for which only one data point is available for a number of countries (the OECD's PMR and EPL indicators). Second, the variables coming from alternative sources are annual series but they tend to cover only 10 years (Doing Business indicators, Fraser Institute's regulation indicators). This period is considerably shorter than the time span of about 30 years of OECD indicators. There are two avenues to deal with this situation:

- For the OECD's PMR and EPL indicators, we estimate models in which the cross-section dimension of such data is exploited. These variables will be used either as constants in cross-country/time panels or as covariates in cross-section regressions.

- For variables available for roughly 10 years, panel regressions will be used. Nevertheless, these variables have more cross-country variation than they change over time. Hence, period average for these variables will be also calculated and used as constants in panel regressions or as variables in cross-section regressions.

3.4. Linear and homogeneous effects in the three supply-side channels

13. Policies and institutions are linked to the three supply-side channels: MFP, capital deepening and the employment rate.[6] They can be modelled as shown in equations (1a to 1c):

$$MFP_{j,t} = f(OPEN_{j,t}, INNOVATION_{j,t}, PMR_{j,t}, LMR_{j,t}, FMD_{j,t}, INSTITUTION_{j,t}) \quad (1a)$$

where innovation and openness foster the creation, adoption and diffusion of new technologies. PMR, LMR and FMD stand for product market regulation labour market regulation and financial market development. These policies determine how efficiently resources can be reallocation within and across firms and how easy it is to finance new and incumbent businesses. Institutions capture the overall institutional framework (see e.g. Égert, 2017a).

14. Capital deepening can be written as in equation (1b):

$$(K/Y)_{j,t} = f(UCC_{j,t}, PMR_{j,t}, LMR_{j,t}, FMD_{j,t}, INSTITUTION_{j,t}) \quad (1b)$$

where UCC denotes the user cost of capital. For reasons of data availability, we use the real interest rate for the large panel (see e.g. Égert, 2017b).

15. The employment rate equation is given by equation (1c):

$$L_{j,t} = f(\ PMR_{j,t}, LMR_{j,t}) \quad (1c)$$

Where LMR denote a variety of labour market regulations and policies (see e.g. Gal and Theising, 2015). Regressions will be also estimated for per capita income levels. The double objective is to see i.) whether the variables driving the three supply-side channels can be estimated directly for per capita income levels and ii.) whether the results obtained for (1a) to (1c) are consistent with overall per capita income equations

3.5 Heterogeneous effects

16. This section describes the approach employed to investigate heterogeneity between emerging-market economies and more advanced countries

3.5.1. Threshold models

17. Threshold models aim to capture non-linear effects that can occur abruptly when the variable of interest has different coefficients below and above a given value of the threshold variable (threshold non-linearity). For instance, the impact of product market regulation could depend on the level of another policy.[7]

6. These variables are based on data sourced from the Penn World Table 8.0.

7. The threshold value is determined endogenously through a grid search. In this paper, a grid search with steps of 1% of the distribution is carried out to identify the value of the threshold variable that minimises

$$Y_{j,t} = \begin{cases} \alpha_1 + \beta_1 non-linear_variable_{j,t} + \varepsilon_t & if \quad threshold_variable < T \\ \alpha_1 + \beta_2 non-linear_variable_{j,t} + \varepsilon_t & if \quad threshold_variable \geq T \end{cases} \quad (2a)$$

where T is the threshold value of the threshold variable. Explanatory variables included in equations (1a) to (1d) are not shown but will be employed systematically in the empirical analysis relying on regressions 2(a) to 2(d)

3.5.2. Does economic development matter?

18. One question addressed in this document is whether various product and labour market policies have the same impact in all countries or whether different countries may face different policy impacts. One obvious source of heterogeneity which could lead to different policy impacts across group of countries is the level of development. Per capita income will be used in this paper to measure economic development. Adjusting equation (2a) to per capita income levels as the threshold variable gives equation (2b):

$$Y_{j,t} = \begin{cases} \alpha_1 + \beta_1 policy_variable_{j,t} + \varepsilon_t & if \quad per_capita_income < T \\ \alpha_1 + \beta_2 policy_variable_{j,t} + \varepsilon_t & if \quad per_capita_income \geq T \end{cases} \quad (2b)$$

where T is the tipping point of the per capita income variable.

3.5.3 Does the quality of institutions matter?

19. Another question addressed in this study is the extent to which institutions matter. Institutions could enter the country-time panel regressions as a time-varying variable. If country fixed effects are included into the regressions, the impact will be identified through the within dimension, that is through the time variation in these variables. However, institutions tend to change very slowly over time. It would therefore be interesting to investigate the extent to which the cross-country variation in institutions is correlated with cross-country differences in economic outcomes. One way to look at this issue is to replace country fixed effects with constants capturing institutions. In such a setting, institutions would be measured as their period averages. Obviously, such an approach runs the risk of an omitted variables bias. But if the overall fit (adjusted R-squared) of the regressions excluding country-fixed effects and including institutional constants come close to that of regressions including country-fixed effects, such a bias is possibly small.

3.5.4 Does the quality of institutions matter for the impact of regulation?

20. Institutions may matter for economic outcomes not only on their own right but also through the way they influence the impact of other policies. For instance, better institutions could increase the negative impact of more restrictive regulations via better enforcement. But better institutions could also decrease the negative impact of more binding regulations via reducing regulatory uncertainty. This hypothesis could be tested as follows:

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the sum of squared residuals of the estimated two-regime model. 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 non-linearity if the null hypothesis of $\beta_1 = \beta_2$ can be rejected against the alternative hypothesis of $\beta_1 \neq \beta_2$ (Hansen, 1996, 1999). In practice, this test shows whether coefficient estimates are significantly different for different country groups (eg emerging vs. developed countries).

$$Y_{j,t} = \begin{cases} \alpha_1 + \beta_1 policy_variable_{j,t} + \varepsilon_t & if \quad institutions < T \\ \alpha_1 + \beta_2 policy_variable_{j,t} + \varepsilon_t & if \quad institutions \geq T \end{cases} \qquad (2c)$$

3.5.5 Do labour market regulations matter for the impact of product market regulation (and vice versa)?

21. Threshold regressions are well suited to provide with insights for the last question to be answered in this paper: do different policies interact with each other? More specifically, we would be interested to figure out whether the level of labour market policies amplify or attenuate the effect of product market regulations on output levels and vice versa. Equation (2d) will be employed to test for this hypothesis:

$$Y_{j,t} = \begin{cases} \alpha_1 + \beta_1 product_market_regulation_{j,t} + \varepsilon_t & if \quad labour_market_regulation < T \\ \alpha_1 + \beta_2 product_market_regulation_{j,t} + \varepsilon_t & if \quad labour_market_regulation \geq T \end{cases} \qquad (2d)$$

3.5.6 Time series versus cross-country dimensions

22. Three types of regressions are used in the analysis in order to fully exploit the dataset. The first consists in estimating panel regressions including country- and time-fixed effects. The estimated coefficients will reflect how (panel wide) average changes in outcome variables (MFP, capital deepening and employment) correlate with average changes in regulation and institutions. The second set of regressions includes variables, which vary over time and a number of variables, which are time invariant and which replace the country fixed effects. The latter will show how cross-country differences in economic outcomes are associated with cross-country differences in policies and institutions. Finally, pure cross-country regressions will link outcomes and their covariates using only cross-country differences and no time variation in the data. For this purpose, equations 1(a) to 2(d) are estimated without the time dimension of the data.

4. Stylised facts

23. This section gives some stylised facts on economies outcomes, regulation and institutions for a set of countries including advanced, emerging and developing countries. Scatterplots suggest that better institutions and competition-friendly product market regulation correlate with better economic outcomes, in particular with higher MFP levels. At the same time, it is difficult to see a firm and clear pattern between outcomes and labour market regulation.

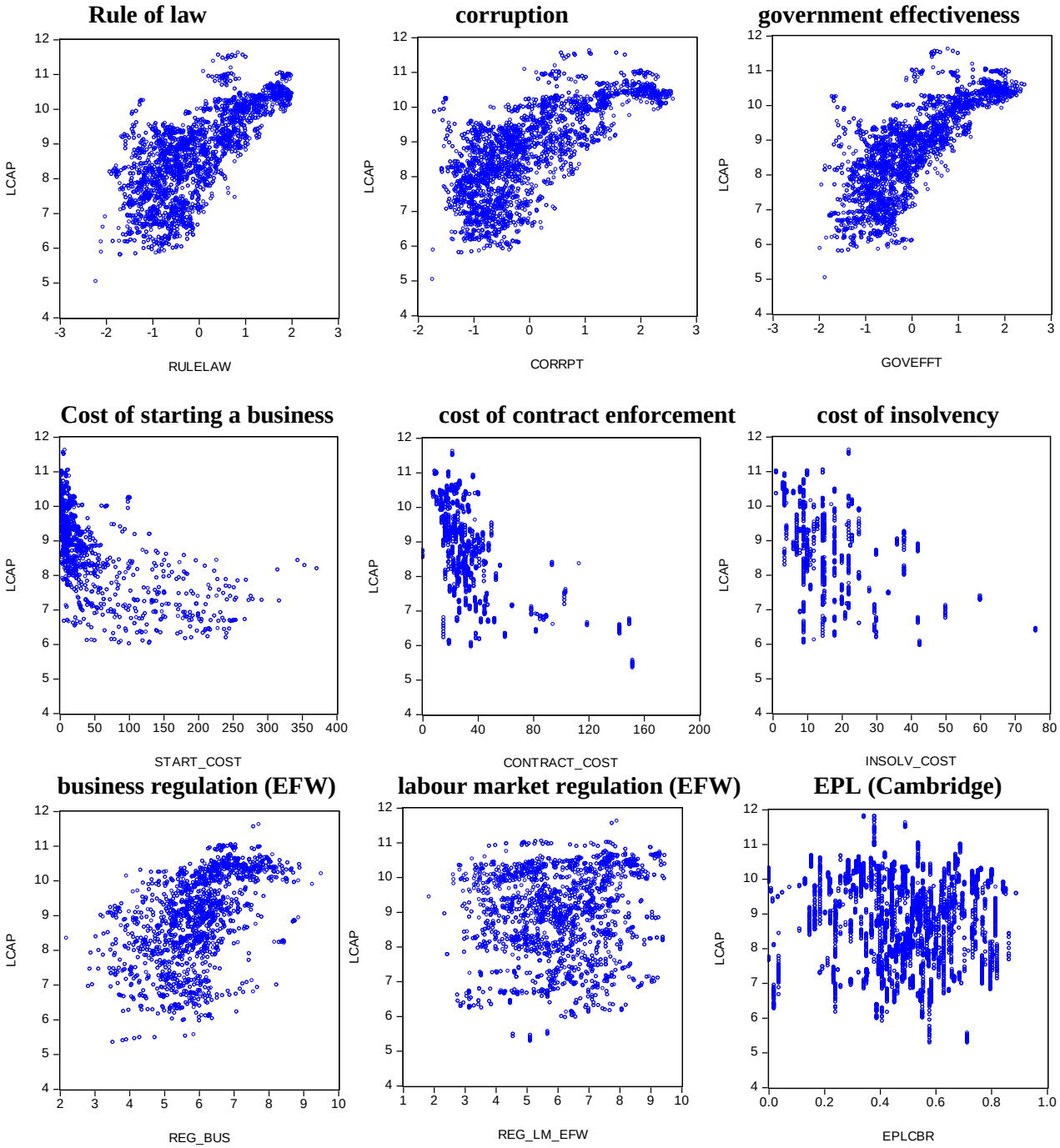
24. Some strong and some very weak (or inexistent) relationships can be read from Figures 1 and 2. Starting with the strong relationships, better institutions (measured by the rule of law, corruption or government effectiveness) are clearly associated with higher per capita income levels. This relationship, confirmed by annual and cross-section data (Figures 1 and 2), is unlikely to be monotonic. Looking at the three supply side channels, the data reveal a similarly positive link to institutions in the case of MFP (Figure A1 in Annex A), but much less so for the capital stock and employment rates.

25. Turning to product market and general business regulations, the simple correlations with economic outcomes provide a somewhat less clear-cut picture. Using cross-section data for the OECD's PMR indicator and its sub-components suggests that more stringent regulation is associated with lower per capita income levels (Figure 2). This pattern is clearly present for MFP and, to a lesser extent, for the employment rate, but not for the capital stock (Figure A3 in Annex A). Alternative indicators of the ease of starting and operating a business (World Bank's Doing Business and the Fraser Institute's EFW business regulation) show signs of a positive correlation with per capita income levels (Figure 1). Again, this

relation reflects a similar correlation between different indicators of regulations and MFP whereas there is no apparent correlation with the capital stock and employment (Figure A2 in Annex A).

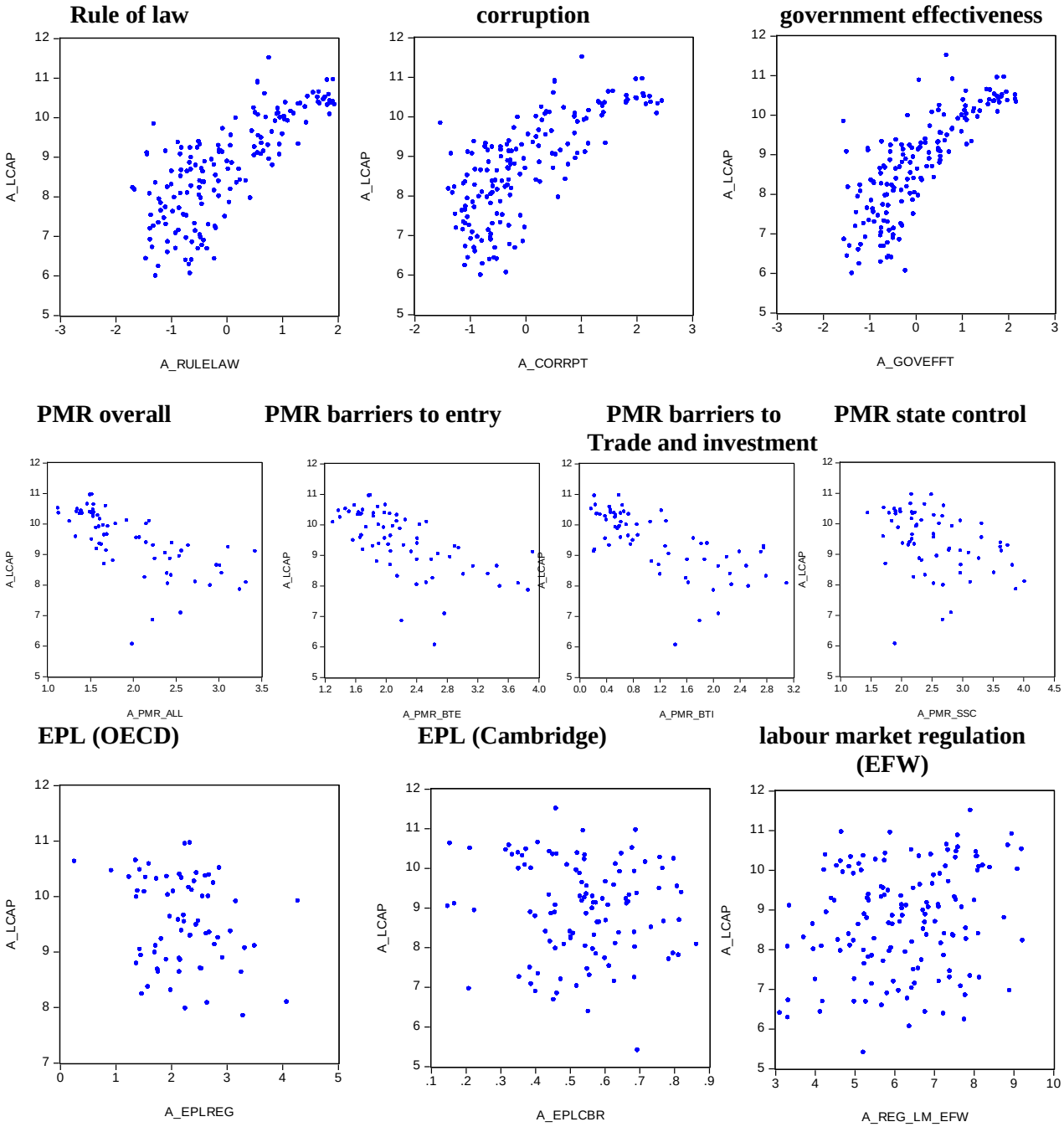
26. A look at labour market regulations suggests that there is no straightforward correlation between labour market regulations and per capita income levels. At most, only a weak negative link between the OECD's EPL indicator and outcomes can be detected (especially with per capita income and MFP). But the scatterplots shown in Figures 1 and 2 and in Annex A do not reveal any apparent link between the two other indicators and economic outcomes.

Figure 2. Stylised facts - per capita income, regulation and institutions, annual data



Note: LCAP, on the vertical axis, denotes log per capita income (USD, constant PPP). On the horizontal axes are displayed the policies and institutions. For the rule of law, corruption and government effectiveness, higher numbers show a stronger rule of low, less corruption and a more effective government. START_COST, CONTRACT_COST and INSOLV_COST refer to the cost of starting a business, the time required for contract enforcement and insolvency procedures. REG_BUS and REG_LM_EFW are the EFW's business regulation and labour market regulation indicators: higher values indicate more business-friendly regulation. EPL_CBR is the Cambridge Labour Regulation Indicator relating to regular contract: higher numbers indicate more stringent regulation.

Figure 3. Stylised facts - per capita income, regulation and institutions, cross-section data (country averages)



Note: A_LCAP, on the vertical axis, denotes log per capita income (USD, constant PPP, country averages). On the horizontal axes are displayed the policies and institutions. For the rule of law, corruption and government effectiveness, higher numbers show a stronger rule of low, less corruption and a more effective government. For the OECD's PMR indicator, its sub-components and the OECD and Cambridge EPL indicators, higher figures reflect more stringent regulation. For the EFW's labour market regulation indicator, higher values indicate less stringent regulation.

5. Estimation results

27. The stylised facts presented in the previous section give a broad idea on the bivariate correlations between outcomes, product market regulation and institutions. The regression analysis, presented hereafter, provide a more formal and systematic study of the relations linking outcomes to policies and institutions.[8] This section presents the main results by policy areas, looking first at linear regressions and then going through some of the key non-linear specifications.

5.1 Linear regressions

5.1.1 Institutions

28. The quality of institutions matters to a large extent both over time and across countries. Improvements in institutional quality (government effectiveness and political stability) relate to better economic outcomes. Countries with better institutions have superior economic outcomes. These results hold for MFP and the employment rate and for all measures of institutions (Tables B2 to B4 and Tables B8 to B10). Yet, there is no empirical evidence that better institutions would be associated with a greater capital stock (Tables B5 to B7).[9] A very strong direct aggregate impact of institutions on per capita income can also be identified in growth regressions (Tables B10 to B12).

5.1.2 Product market regulations

29. Regarding the OECD's PMR indicator, results suggest that greater barriers to trade and investment harm MFP. By contrast, no significant effect can be identified for barriers to entry and there is positive correlation between state control and MFP. Regressions carried out for labour productivity (GDP per employee) and per capita income are in accordance with the results found for MFP: a negative relationship to barriers to trade and investment and a positive one to state control. This latter result needs further analysis.

30. The PMR indicator exhibits a negative link to capital deepening and the employment rate. A robust finding is that more direct state involvement in business sector activities are connected with a lower employment rate (Tables B9 and B10). There is also some evidence that higher barriers to entry are related to lower capital stock and employment rate. But this finding does not hold for all alternative specifications (Tables B6, B9 and B10).[10]

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8. Some of the explanatory variables used in the analysis are strongly correlated with each other. To avoid the problem of multi-collinearity in the regressions, the variables are grouped in the regressions in a way that strongly correlated variables are not used at the same time. The correlation analysis indicates no major problem of correlation for the variables once country and time fixed effects are purged from the data (for the country/time panel regressions). However, there is clearly a problem of correlation for the cross-section dimension. The institutional variables are strongly correlated with one another but also with the OECD's PME indicator and sub-components, and the EFW business regulation index. The three labour market regulation indicators are also correlated with each other. There is also a strong correlation between various measures of trade openness. The two measures of innovation intensity also exhibit a high correlation coefficient. Furthermore, R&D spending as a % of GDP is correlated with other covariates as well. Against this background, only variables will be included in the same regression, which are not correlated with each other. Égert (2017c) gives more details about the selection of variables exhibiting little correlation with each other.

9. Further analysis would be needed to confirm this result.

10. One question that raises here is how our results compare with those reported in ECO/CPE/WP1(2017)9 . There are differences in the estimation setup: they have a different specification (hybrid error correction

5.1.3 Business regulations

31. The stance of general business sector regulation[11] and the extent to which it undermines competition is an important driver of MFP levels. A more competition-friendly stance of the Fraser Institute's business regulation indicator is associated with higher MFP in cross-country/time series panels (Table B2). Cross-section regressions confirm this result for the large sample (Table B4). A similar but less robust relationship could be identified for the employment rate. Capital deepening does not appear to have a link with this particular indicator of business sector regulation.

32. *Doing Business* indicators have a similar impact. For instance, higher costs of setting-up a business are associated with lower MFP levels (Table B2). Increased costs of contract enforcement and longer times required for insolvency procedures also go hand in hand with lower MPF in both pooled and cross-country regressions (Table B3 and B4). The connection between business regulation and capital deepening is less robust. Yet there is some evidence that higher costs of contract enforcement go in tandem with lower capital stock (Table B7).

5.1.4 Labour market regulations

33. Estimation results show a very weak link between labour market regulation and MFP. In cross-country regressions, the OECD's EPL indicator is statistically not significant. The two alternative indicators, the Cambridge EPL and the EFW labour market regulation index turn out not to be related to MFP or they indicate that more stringent regulation is associated with better MPF outcomes.

34. Results indicate that tightening labour market regulations reduces capital deepening. Nevertheless, no such relationship can be established for the cross-section dimension.[12]

35. Findings are slightly more encouraging for the employment rate: a tightening of labour market regulations is associated with a decrease in the employment rate (EFW's labour market regulation indicator). In the cross-section dimension, stricter labour market regulation goes hand in hand with lower employment rates for the EFW's indicator and the Cambridge EPL indicator. The OECD's EPL indicator does not seem to be have a statistically significant relationship to the employment rate (Tables B8 to B10). For per capita income regressions reported in Tables B11 to B13, results do not support the view that more costly hiring procedures reduce the employment rate. This could be because the various measures of EPL on regular contracts may not be a pure measure of firms' constraints on employment. First, de jure EPL indicators for regular contracts may be far from how EPL is applied in practice (de facto). Second, other components of labour market regulations may be more binding.

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model vs. our long-run model), they have a different measure of PMR (extrapolated over time to a large number of countries), cover more countries and use different control variables. Nevertheless, results are similar in a number of aspects. First, they can also identify a statistically significant negative effect of PMR on MFP and a positive relation linking the rule of law to MFP. They also find it difficult to find a precisely estimated positive effect of innovation intensity on MFP.

11. Business sector regulation refers to the World Bank's Doing Business indicators. Product market regulation indicators refer to the OECD's PMR indicator.

12. It could be argued that more restrictive labour market regulation would lead to a greater capital deepening as businesses would reduce labour intensity. Empirical results are mixed on this effect. Égert (2017b) provides an overview of the empirical literature on this issue and reports results, using country-level data for OECD countries, according to which more stringent labour market regulation reduces capita deepening.

5.1.5 Financial development and other controls

36. Financial sector development is an important factor of MFP. A more developed financial sector and to some extent deeper capital market is found to boost MFP. Financial sector development is also crucial for capital deepening. This result is strongly supported for the overall per capita income regressions (Tables B11 to B13).

37. Regarding the other controls, human capital tends to have a positive relation to MFP, mostly when used to explain cross-country variation in MFP. By contrast, it is very difficult to establish robust relationships between the various measures of innovation intensity (R&D spending as a share of GDP and patent per capita) and alternative measures of trade openness (adjusted or not for country size, taken in level or in log level) on the one hand, and MFP on the other hand. Experimenting with country and time coverage shows that results are sensitive to data coverage. In particular, longer time series are required to identify a positive link between innovation, openness and MFP (Table B1).

5.2 Heterogeneity

38. The following sub-sections give details on possible heterogeneous effects conditional on the level of economic development, the strength of institutions and the stance of other regulations and policies.[13,14]

5.2.1 The effect of economic development

39. Countries at different level of economic development face different policy impact. Threshold regressions show that product market regulations are more binding for countries with lower per capita income levels. More specifically, stringent product market regulations will have a three time larger negative impact on MFP in countries with per capita income lower than about 8000 USD (in PPP terms).[15] These effects also hold true for barriers to entry, barriers to trade and investment and the scope of state control. A very similar pattern can be observed for doing business indicators even though the estimated thresholds can vary between about 3000 to 9000 USD for the cost of contract enforcement, the time of insolvency procedures and the time of starting a business (Tables C1 and C2).

40. An opposite set of patterns emerge for the employment rate: negative policy effects tend to be higher for more developed countries. To start with cross-country regressions, negative PMR effects are larger for countries having per capita income above 6000 USD. Such threshold effects can be identified for barriers to entry and for the scope of state control (but not for barriers to trade and investment) (Tables C5 and C6).

41. Non-linear effects can be established along the within (time series) dimension for labour market indicators. The Cambridge EPL indicator has an estimated negative sign for per capita income levels

13. For MFP, the non-linear regressions contain the following linear control variables: human capital, openness, innovation intensity (patents per capita) and financial development (banking sector and stock markets). PMR, labour market regulations and institutions were included if these variables were not the non-linear variables in the regressions.

14. Table C10 provides descriptive statistics of the threshold variables.

15. We also experimented by imposing per capita income threshold of 5000 and 10000 USD. Coefficient estimates are less precisely estimated in these cases (suggesting that it is better to estimate the thresholds rather than to impose them).

exceeding around 6000 USD. The Fraser Institute's labour market regulation indicator shows that more regulation will harm employment if per capita income exceeds approximatively 12000 USD.[16]

42. Policy effects on the capital stock are found not to be conditional on per capita income levels.

43. At the aggregate level, non-linear effects obtained for MFP dominate non-linear effects on the employment rate: threshold regressions run for per capita income are in line with those for MFP. Larger negative effects of PMR and doing business indicators can be observed for less developed countries, both when using the PMR indicator and the World Bank's Doing Business indicators. The regime switches are also estimated to happen around very similar tipping points (Tables C7 and C8).

5.2.2 The effect of institutions on other policies

44. The quality of institutions has a strong impact on how policies correlate with outcomes. Regarding MFP, weaker institutions are associated with a substantially larger negative effect of overall product market regulation. The negative effect on MFP of higher barriers to entry, trade and investment and more state involvement is more significant if the quality of institutions is low (Table C1). Similarly, doing business indicators, in particular longer insolvency procedures are over-proportionately more impactful if the rule of law is weak. Employment and capital stock also have a non-linear relationship to product market regulations conditional on the quality of institutions. In contrast to MFP, the negative impacts of regulations on investment and employment are larger if institutions are stronger. For instance, if institutions are stronger, more stringent labour market regulations (Cambridge EPL) hurt employment to a larger extent (Tables C4 to C6). Again, negative PMR effects on MFP seem to outweigh the negative effects on capital deepening and employment. Threshold regressions for per capita income produce very similar regimes than for MFP: a larger negative impact of regulations at lower levels of institutions. The threshold value that separates the two regimes (the value of institutions below and above which the impact of regulations is different) are also very similar (Tables C7 and C8).

5.2.3 The interaction between product and labour market policies

45. Estimation results strongly suggest that PMR effects are conditional on the level of labour market regulations for MFP and the employment rate. A surprisingly robust result for MFP, holding for all three alternative measure of labour market regulation is that the negative PMR impact is larger if labour market regulation is looser (Table C9).

16. Regression were also run to see whether the coefficient estimates on trade openness, innovation intensity and human capital differ as a function of per capita income levels. Results indicate, especially when only these three variables are used as explanatory variables that openness starts to have a positive coefficient if per capita income is higher than USD 10000 for time series panel regressions and above USD 6000 for cross-section regressions. Similarly, the coefficient estimate on human capital is more positive above comparable thresholds. No non-linear effect can be identified for innovation intensity.

Table 2. Summary of estimation results

	MFP	capital deepening	employment rate	per capita income
Linear relationships				
within dimension				
institutions	YES	NO	YES	YES
business regulation	YES	NO	NO	NO
product market regulation	--	--	--	--
labour market regulation	--	YES	YES	--
financial system development	YES	NO	--	YES
between dimension				
institutions	YES	NO	YES	YES
business regulation	?	NO	NO	NO
product market regulation	BTI	BTE, SSC	BTE, SSC	BTI
labour market regulation	YES??	NO	YES??	NO
financial system development	YES	YES	--	YES
Non-linear relationships - between dimension				
non-linear variables	**conditional on per capita income**			
business regulation	YES	NO	YES	YES
product market regulation	BTE,BTI,SSC	NO	BTE, SSC	BTE,BTI,SSC
labour market regulation	NO	NO	YES	NO
	conditional on institutions			
business regulation	YES	NO	YES	YES
product market regulation	BTE,BTI,SSC	BTE, SSC	BTE, SSC	BTE,BTI,SSC
labour market regulation	NO	NO	YES	NO
	conditional on labour market regulations			
business regulation	NO	NO	NO	NO
product market regulation	BTE,BTI,SSC	NO	BTE,SSC	BTE,BTI,SSC
labour market regulation	NO	NO	NO	NO

Notes: Results on the linear relationship are split into two main parts: within dimension (coefficient estimates identified from the time variation in the data); and between dimension (coefficient estimates obtained on cross-sectional data). Non-linear relationships are estimated only on cross-section data (because no time series are available for PMR). The column 'non-linear variables' lists the variables, which take different coefficients, depending on the level of other variables. These 'other variables' are named in the rows "conditional on …" and are per capita income, institutions and labour market regulations. 'YES' implies a statistically significant relationship. '?' implies that the estimated relationship is not very robust. 'NO' indicates the absence of a statistically significant relationship. '--' indicates that the variable could not be included in the regressions. BTE, BTI and SSC indicate that there is a statistically significant relationship between the PMR sub-components barriers to entry (BTE), barriers to trade and investment (BTI) and the scope of state control (SSC) on the one hand and economic outcomes (MFP, capital deepening, the employment rate and per capita income) on the other hand.

Source: OECD

6. Simulation results

6.1. Measuring the effect of reforms

46. The simulation results presented here differ in two important ways to those reported in OECD (2016a, b). First, the changes in the policy indicators used for illustrative purposes are larger. Second, the time horizon over which policy impacts are calculated are longer. This implies that the overall impacts will be greater. Nevertheless, the simulation results presented hereafter can be used to calculate the impact of policy changes of different size (smaller or larger).

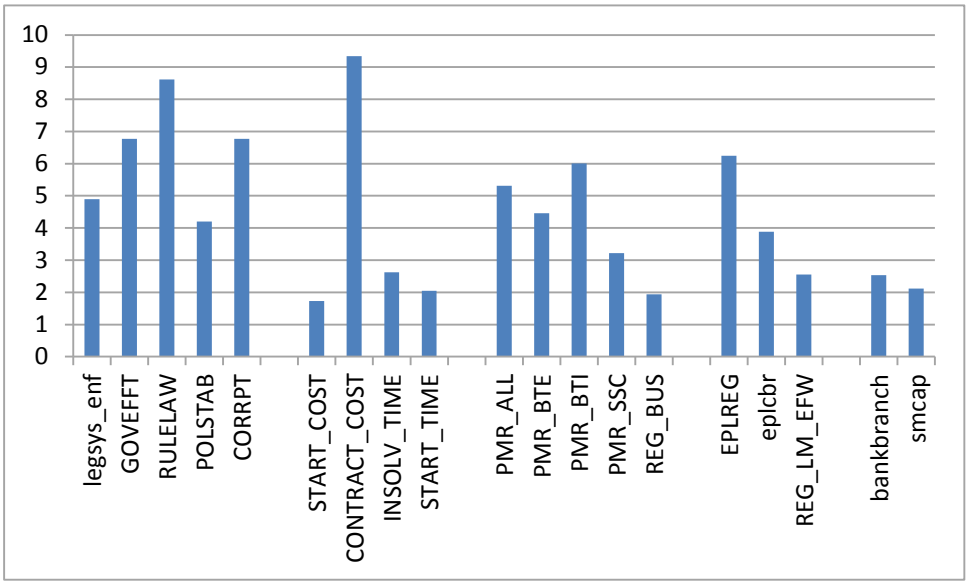
6.1.1 Measuring reforms

47. The measure of reform used here is different from the measure used earlier. In OECD (2016a,b), reform was defined as the average improvements in the policy indicator in a two-year window. Only those episodes were considered during which the policy indicator improved every year. The dataset used in this document has limited time series dimension. Most of the policy effects are derived from the cross-country variation in the data. This makes the application of the earlier reform definition difficult. Therefore, two measures are used here:

- one standard deviation in the time series purged of country and year fixed effects.
- one standard deviation of the cross-country differences.

48. Cross-country variation in the data is substantially larger than the average variation over time. Figure 3 below shows that the difference can be very large. For instance, the cross-country (between) variation of the rule of law variable is about nine time higher than the (within) variation over time. The ratio averages around 5 for other institutional variables and the OECD's PMR and EPL indicators.

Figure 4. The ratio of standard deviation of the pure cross-section to standard deviation over time



Note: The ratio displayed above is the ratio between the standard deviation calculated on cross-section observations (averages for individual countries, the pure between effect) and the standard deviation of the series stripped of country means and common time trends (pure within effect).

Source: OECD calculations

6.1.2 The horizon of the reform impact

49. The great majority of the reform elasticities used for the simulation is obtained along the cross-section dimension of our dataset. They show the overall long-term effect of policies. In OECD (2016a,b), simulations were provided for 5- and 10-years and for the long run. Error correction models estimated on panel data with long time series make it possible to calculate the adjustment towards the long-run equilibrium. Coefficient estimates on cross-section data cannot, however, be used to 'draw' the trajectory to the long-run equilibrium. They only provide the long-term effect. So does this document.

6.1.3 Moving to best practices

50. Most of the earlier literature aimed at quantifying structural reforms carried out regression analysis for a panel of OECD countries. In such regressions, country and time fixed effects are employed. The consequence of this estimation strategy is that coefficient estimates reflect the impact of a policy variable over time, average for the countries included in the panel. Yet these estimates were often used to show what would happen if a bad-performing country would align its policies with good-practice countries (Barnes et al., 2013; Bouis and Duval, 2011; Cette et al. 2016a,b). This is problematic. Indeed, this practice is tantamount to applying inference identified over the time series (within) dimension to cross-section data. We saw that the cross-country variation of most policy variables is substantially larger than the within variation.

51. The approach presented here offers a remedy to how to calculate policy impact for countries that wish to adjust their policies and regulation to 'cutting edge' countries. Most of our coefficient estimates are obtained on the basis of cross-sectional data. They can hence be safely applied to simulate policy impacts due to cross-country differences.

6.2. Simulation results

6.2.1 Simulation results from linear regressions

52. Simulation results show a number of striking features. First, as flagged earlier, the cross-country (between) variation in the data is larger than that over time (within). The simulations results reflect this observation. Second, institutions can really have a huge impact on per capita income. When cross-country differences are taken into account, reforms in institutions, captured by one standard deviation, can boost income per capita by up to 50%. This effect is channelled through MFP and to a much lesser extent by the employment rate. Capital deepening does not play a role. The overall aggregate effects are very comparable whether adding up the three supply-side channels or whether they are derived directly from per capita income regressions (Table 3a).

53. It should be noted that not all of the policy effects, reported in Table 3a, can be summed up. For instance, the results for institutions are obtained from separate equations. So the results should be taken separately. A change in the rule of law and corruption cannot be added up. The same applies to the overall PMR indicator and its sub-components.

54. Business regulation and product market regulations can also have substantial economic impacts: a one standard deviation cross-country improvement can lead raise per capita income by 20%. These effects transit through all three supply-side channels. Financial sector development is associated with higher per capita income. Both a more developed banking sector and deeper financial markets help improve economic outcomes, mostly through a boost to MFP. Labour market regulations are found to affect mainly capital deepening and the employment rate. The magnitude of these effects is, however, much smaller that the once generated by reformed institutions and more competition-friendly business and product market regulations.

55. Overall, direct estimates on per capita income deliver economic effects, which are consistent with those aggregated up from MFP, capital deepening and the employment rate. However, some caution is of order. To start with, some of the policy effects cannot be detected in per capita income regressions. In such cases, no direct comparison is possible. Also, this validates the use of the disaggregated supply-side channels. Another observation is that in some instances, direct and indirect per capita income effects can differ. In the cases of the cost of starting a business and banking sector development, the direct effects are considerably lower.

Table 3a. Simulation results - linear framework

Per capita effects due to the three supply-side channels

	IMPACT THROUGH						TOTAL IMPACT			
	MFP		K/Y		L		per capita income: aggregated from MFP, K/Y and L		per capita income: derived from estimations	
	policy measured as one standard deviation									
	within	between	within	between	within	between	within	between	within	between
INSTITUTIONS										
government effectiveness	7.4%	50.0%			0.8%	5.2%	8.2%	55.2%	7.7%	51.8%
rule of law	5.0%	42.9%			0.5%	4.5%	5.5%	47.4%	5.2%	44.7%
political stability	5.7%	24.0%			1.0%	4.3%	6.7%	28.3%	6.6%	27.6%
corruption	5.9%	39.8%			0.9%	6.0%	6.8%	45.8%	5.9%	40.2%
BUSINESS REGULATION										
cost of starting a business	0.8%	1.3%	9.0%	15.6%			9.8%	16.9%		
cost of contract enforcement	1.4%	13.5%					1.4%	13.5%	1.1%	10.3%
time of insolvency procedures	5.6%	14.6%			1.1%	2.8%	6.6%	17.4%	7.1%	18.6%
PRODUCT MARKET REGULATION										
PMR - overall	--		--	8.9%	--	1.5%	--	10.4%	--	
PMR - barriers to entry	--		--	5.2%	--	2.0%	--	7.2%	--	
PMR - barriers to trade&investment	--	15.5%	--		--		--	15.5%	--	21.3%
PMR - scope of state control	--		--	6.4%	--	4.1%	--	10.5%	--	
LABOUR MARKET REGULATION										
EPL - OECD regular contracts						0.9%		0.9%		
EPL - Cambridge indicator					0.8%	3.1%	0.8%	3.1%		
labour market regulation (EFW)			2.1%	5.5%	0.8%	2.0%	2.9%	7.5%		
FINANCIAL DEVELOPMENT										
banking sector	4.9%	12.4%	4.2%	10.7%			9.1%	23.0%	6.1%	15.4%
financial markets	8.1%	17.2%					8.1%	17.2%		

Note: MFP, K/Y and L indicate by how much per capita income would increase due to policy changes affecting the three supply-side channels. The change in the indicators is defined as one standard deviation in the data. Columns named 'within' show that the change in the policies are based on the within dimension (variation over time). Columns named 'between' show that the changes in the policies are obtained from the between (cross-section) dimension. The effects are calculated following the methodology set out in box 1 in Égert and Gal (2016). Empty cells indicate the absence of robust empirical relationships. Cells filled with "—" indicate that regression analysis was not possible for the particular variable and dimension (PMR indicator over time). The coefficient estimates used to calculate the effect are the average of the minimum and maximum coefficient estimates. Table C11 summarises from which particular regressions the coefficient estimates are used.

Source: OECD calculations

6.2.2 Simulation results from threshold regressions

56. Table 3b below demonstrates the non-linear relationship between the OECD's PMR indicator and its sub-components and MFP. Large positive effects are established for all components if per capita income is lower than about 8000 USD and if the rule of law is weak. Effects in the high per capita income and the strong rule of law regimes are economically large for barriers to trade and investment. At the same time, barriers to entry and state control have a small influence on MFP in the same regimes.

Table 3b. Simulation results - non-linear framework

	if per capita income is		**if rule of law is**		**if OECD's EPL on regular contracts is**	
	below the estimated threshold	above the estimated threshold	below the estimated threshold	above the estimated threshold	below the estimated threshold	above the estimated threshold
effects on MFP of						
PMR - overall	40.4%	17.4%	28.2%	12.6%	30.4%	25.3%
PMR - barriers to entry	24.5%	1.5%	19.4%	2.8%	19.4%	14.0%
PMR - barriers to trade&investment	53.1%	15.8%	35.5%	11.0%	27.7%	41.0%
PMR - scope of state control	27.1%	5.3%	18.1%	2.8%	16.9%	11.0%

Note: underlined numbers indicate that the calculations are based on coefficient estimates that were statistically not significant at the conventional level of 10%.

Source: OECD calculations

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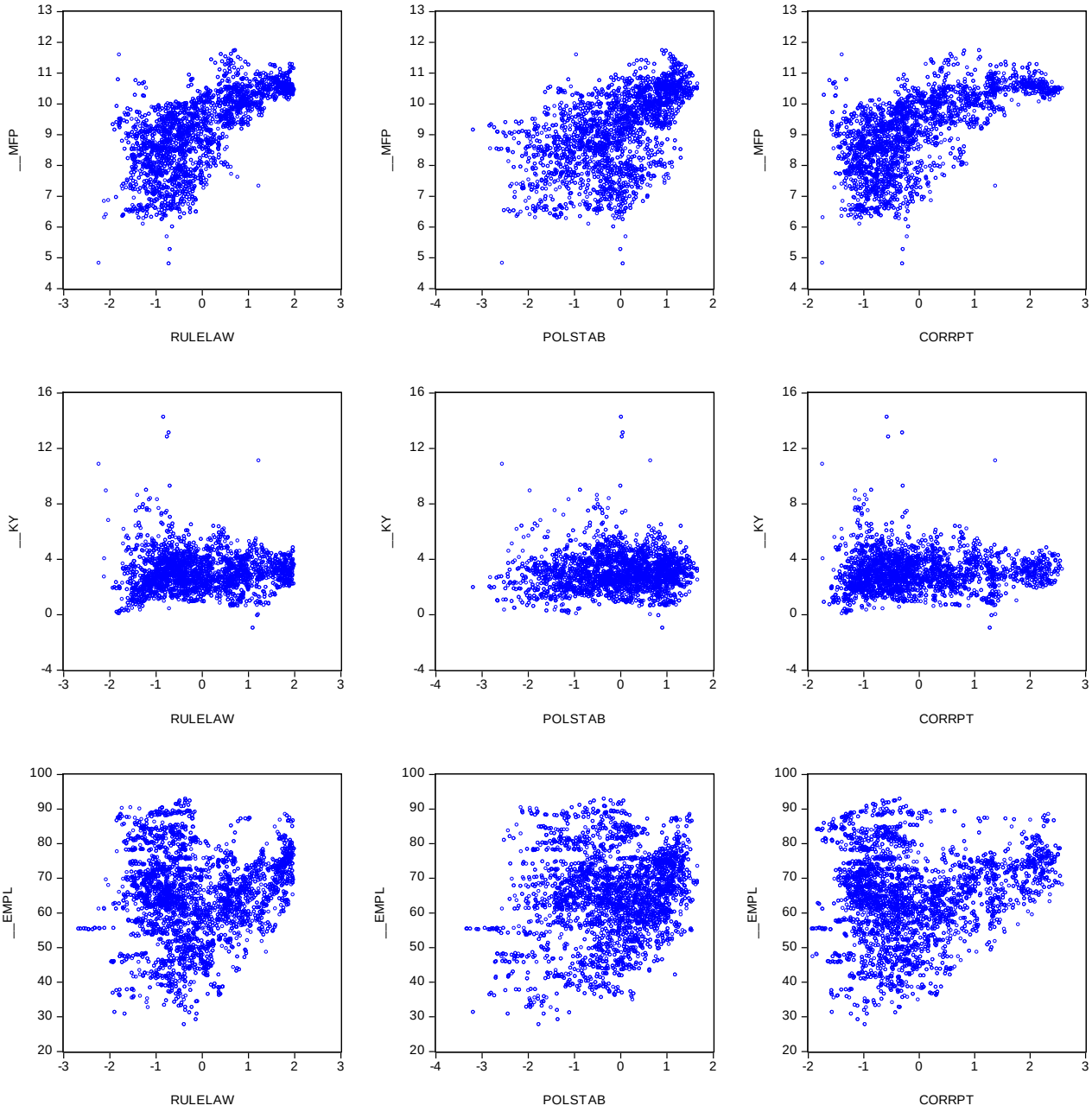
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ANNEX A. STYLISED FACTS, THREE SUPPLY SIDE CHANNELS

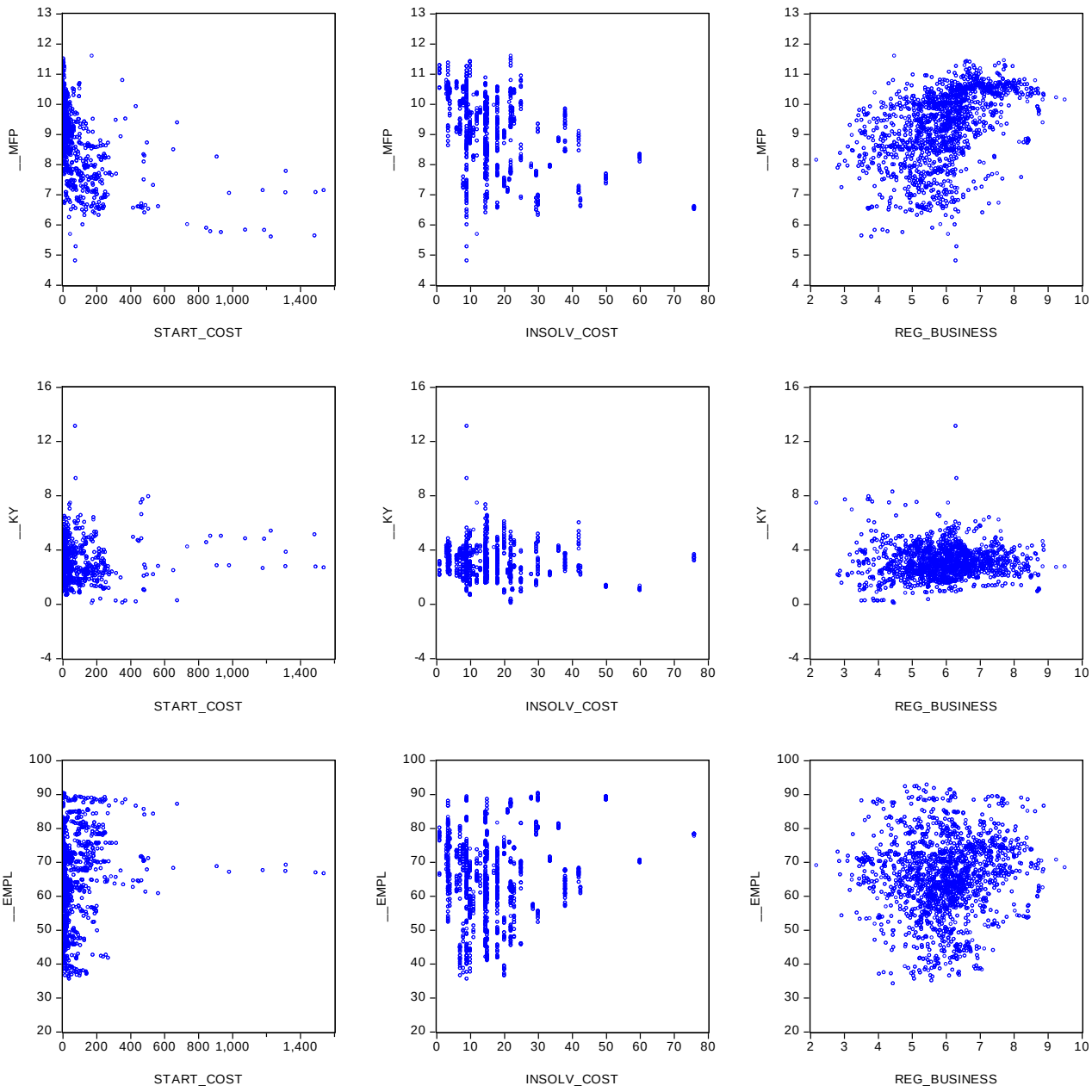
Figure A1. Institutions and the three supply side channels (MFP, capital and employment)



Note: MFP, the capital stock (KY) and the employment rate (EMPL) figure on the vertical axes. Institutions are displayed on the horizontal axes. RULELAW, POLSTAB and CORRPT refer to the rule of law, political stability and corruption, respectively. Higher figures mean stronger rule of law, more political stability and less corruption.

Source: OECD calculations

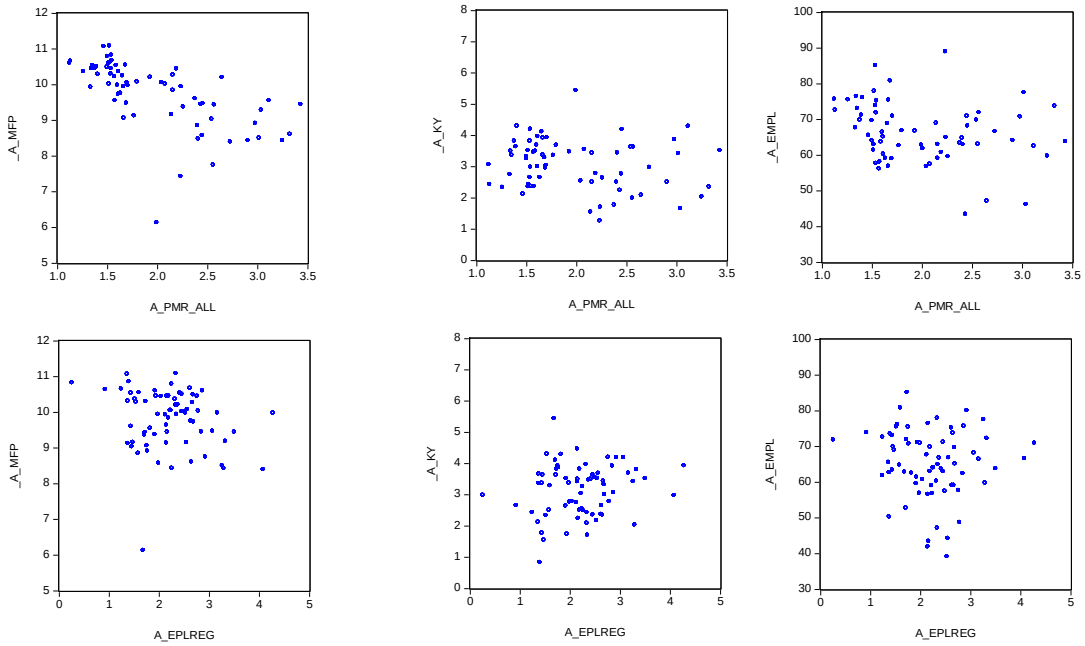
Figure A2. Doing business indicators and the three supply side channels (MFP, capital and employment)



Note: MFP, the capital stock (KY) and the employment rate (EMPL) figure on the vertical axes. Institutions are displayed on the horizontal axes. START_COST, INSOLV_COST and REG_BUSINESS refer to the cost of starting a new business, the cost of insolvency procedures (both World Bank Doing Business indicators) and the EFW's business sector regulation. Higher values in business sector regulation imply more business-friendly regulation.

Source: OECD calculations

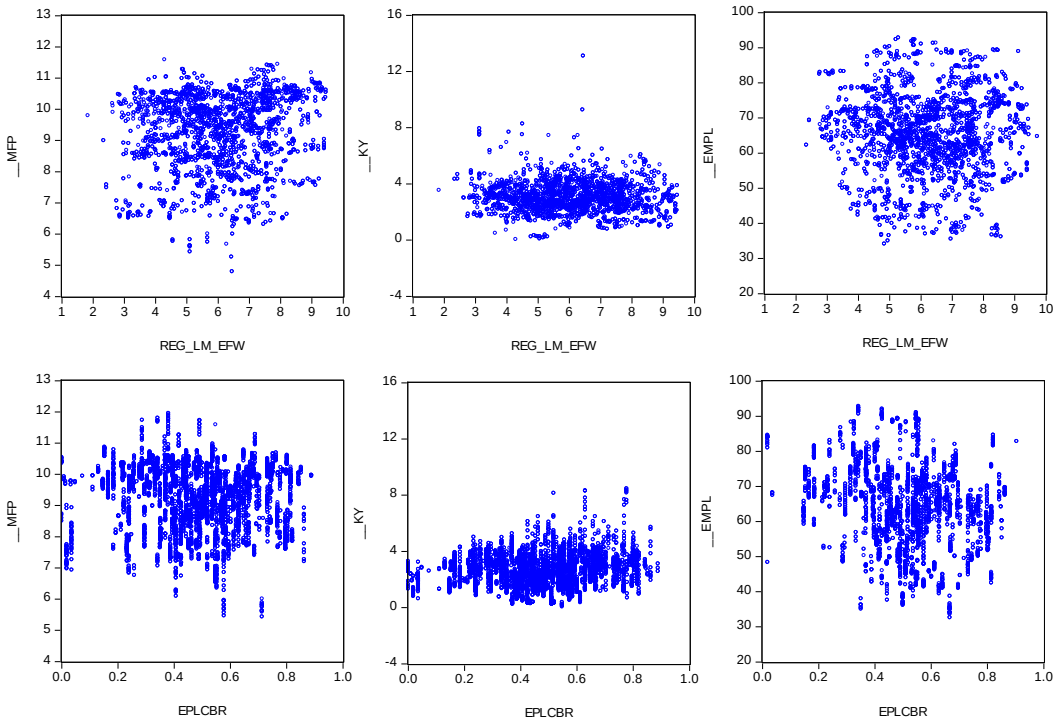
Figure A3. The OECD's PMR and EPL indicators and the three supply side channels (MFP, capital and employment)



Note: MFP (A_MFP), the capital stock (A_KY) and the employment rate (A_EMPL) figure on the vertical axes and are country averages. A_PMR_ALL and A_EPLREG refer to the OECD's overall PMR indicator and the Employment Protection Legislation (EPL) indicator on regular contracts. Higher numbers indicates more stringent PMR and EPL.

Source: OECD calculations

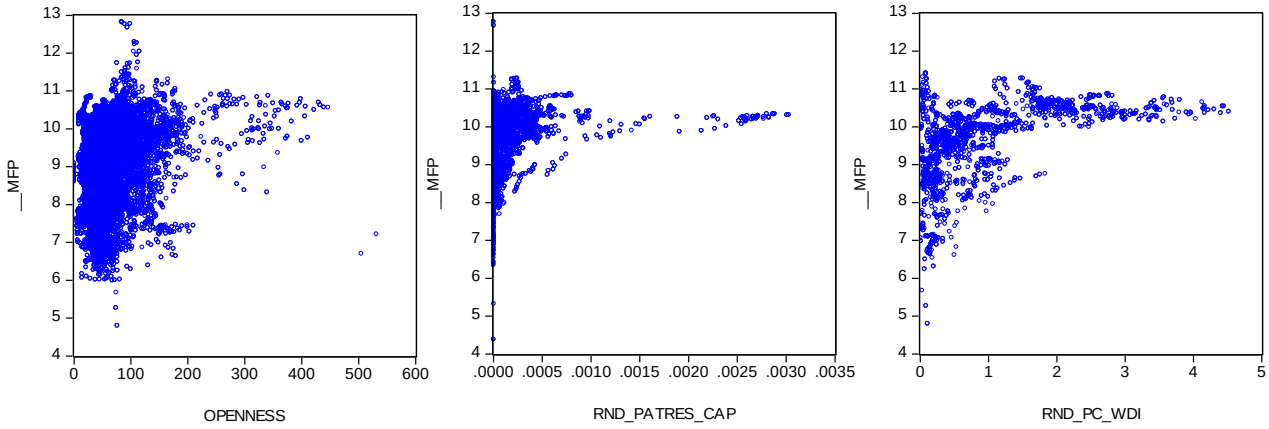
Figure A4. Labour market regulations and the three supply side channels (MFP, capital and employment)



Note: MFP (A_MFP), the capital stock (A_KY) and the employment rate (A_EMPL) figure on the vertical axes and are country averages. REG_LM_EFW and EPL_CBR are the EFW's labour market regulation indicator and the Cambridge Labour Market Regulation indicator. Higher numbers in REG_LM_EFW show less stringent regulation. Higher numbers in EPL_CBR indicate more constraining regulation.

Source: OECD calculations

Figure A5. Innovation intensity, openness and MFP



Note: Openness, RND_PATRES_CAP and RND_PC_WDI refer to trade openness (export and imports over GDP), the number of patents registered by residents and per capita, and R&D expenditures as a share of GDP (World Bank WDI database), respectively.

Source: OECD calculations

ANNEX B. ESTIMATION RESULTS – LINEAR RELATIONSHIPS

Table B1. MFP, trade openness and innovation intensity

	LARGE SAMPLE								SAMPLE FOR WHICH PMR INDICATOR IS AVAILABLE							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
human capital	-0.091**	-0.131**	-0.123**	-0.078	-0.543**	-0.526**	-0.523**	0.15	0.294**	0.321**	0.32**	0.34**	0.377**	0.387**	0.388**	0.438**
patents by resident per capita	385.195**	385.809**	384.058**	267.944**					83.882*	74.122*	74.826*	55.212				
R&D expenditures % GDP					-0.143**	-0.141**	-0.141**	-0.161**					-0.058*	-0.061**	-0.06*	-0.063**
trade openness	0.002**				-0.001**				-0.001				-0.001			
log trade openness		0.195**				-0.152**				-0.009				-0.018		
log trade openness (size adjusted)			0.135**				-0.162**				-0.017				-0.031	
trade liberalisation index (EFW)				-0.006				0.022				0.028				0.04**
error correction term	-0.053**	-0.055**	-0.054**	-0.164**	-0.211**	-0.21**	-0.209**	-0.32**	-0.142**	-0.144**	-0.143**	-0.156**	-0.359*	-0.359*	-0.359*	-0.368*
adjusted R-squared	0.911	0.912	0.911	0.936	0.968	0.968	0.968	0.98	0.981	0.981	0.981	0.981	0.976	0.976	0.976	0.976
No. of observations	3044	3041	3041	1256	1073	1073	1073	810	664	664	664	670	598	598	598	603
No. of countries	**111**	**111**	**111**	**103**	**106**	**106**	**106**	**99**	**61**	**61**	**61**	**61**	**62**	**62**	**62**	**62**
country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors. Columns 1 to 8 refer to a sample including all possible countries. Columns 9 to 16 refer to a sample for which the OECD's PMR indicator is available

Table B2. MFP, institutions and regulation – identification through the within dimension

	PMR SAMPLE												ALL COUNTRIES			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
INNOVATION CREATION&ABSORPTION																
human capital	0.208	0.2	0.332**	0.404**	0.479**	0.158	0.153	0.33**	0.17	0.235	0.193	0.282*	**-0.32**	-0.149	-0.234	-0.2
patents by resident per capita	22.191															
trade openness	-0.0002															
INSTITUTIONS																
government effectiveness	0.094**	0.103**	0.12**	0.141**	0.148**					**0.098****	0.097**	0.107**	**0.093***	0.033	0.109**	0.106**
rule of law						-0.01										
legal system - enforcement							0.021									
political stability								0.107**								
corruption									-0.015							
BUSINESS REGULATION																
business regulation	0.058**	0.053**				0.062**	0.063**	0.053**	0.063**	**0.041****	0.053**	0.049**	**0.058****	0.086**	0.063**	0.054**
cost of starting a business			-0.001**							**-0.0005***				4.E-05		
LABOUR MARKET REGULATION																
laobur market regulation (EFW)				0.01							0.008				-0.054**	
EPL Cambridge indicator					0.601**							0.562**				0.110
FINANCIAL DEVELOPMENT																
bank branches	0.002**	0.002**	0.002**	0.003**	0.003**	0.003**	0.003**	0.002**	0.003**	**0.002****	0.002**	0.002**	**0.004****	0.004**	0.004**	0.004**
error correction term	-0.36**	-0.328**	-0.366**	-0.319**	-0.329**	-0.324**	-0.322**	-0.339**	-0.321**	**-0.375****	-0.327**	-0.338**	**-0.268***	-0.251	-0.271*	-0.138
adjusted R-squared	0.991	0.991	0.993	0.991	0.991	0.991	0.991	0.991	0.991	**0.993**	0.991	0.991	**0.989**	0.988	0.989	0.984
No. of observations	433	498	375	498	479	498	487	498	498	**375**	498	479	**865**	676	865	707
No. of countries	60	64	56	64	61	64	64	64	64	**56**	64	61	**116**	**105**	**116**	**93**
country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	**YES**	YES	YES	**YES**	YES	YES	YES
year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	**YES**	YES	YES	**YES**	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors. Columns 1 to 12 refer to a sample for which the OECD's PMR indicator is available. Columns 13 to 16 refer to a sample including all possible countries.

Table B3. MFP, institutions and regulation – identification through the between and within dimensions

	PMR SAMPLE													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Time varying variables														
government effectiveness	0.02	-0.182	0.142	0.267**	0.245*	0.227	-0.02	0.484**	0.477**	0.5**	0.468**	0.417**	0.541**	0.684**
business regulation	-0.058*	-0.089*												
bank branches	0.004**	0.003*												
Time invariant variables														
INNOVATION CREATION&ABSORPTION														
human capital	0.436**	0.468**	0.538**	0.58**	0.695**	0.579**	0.558**	0.597**	0.599**	0.61**	0.568**	0.573**	0.654**	0.544**
patents by resident per capita	-27.638													
trade openness	0.0001													
INSTITUTIONS														
government effectiveness	0.442**	0.72**	0.35*	0.186	0.305**	0.274								
rule of law							0.479**							
political stability								-4E-05						
corruption									0.007					
BUSINESS REGULATION														
cost of contract enforcement	-0.006**	-0.003*	0.001	-0.005**	0.002	-0.005**	-0.004**	-0.005**	-0.005**	-0.004**	-0.005**	-0.005**	-0.005**	-0.003*
time of insolvency procedures	-0.056**	-0.037**	-0.053**	-0.062**	-0.061**	-0.079**	-0.097**	-0.083**	-0.082**	-0.082**	-0.081**	-0.087**	-0.079**	-0.099**
time of starting a business	0.002													
PMR - overall										0.037				
PMR - barriers to entry											-0.055			
PMR - barriers to trade&investment												-0.102**		
PMR - scope of state control													0.204**	
business regulation (EFW)														-0.256**
LABOUR MARKET REGULATION														
EPL - regular contracts	0.014	0.034	0.042											
EPL - Cambridge indicator				0.468**										
labour market regulation (EFW)					-0.154**									
FINANCIAL DEVELOPMENT														
bank branches	-0.001	0.001	0.007**	0.005**	0.008**									
stock market capitalisation	-0.0003	-5E-04												
error correction term	-0.28**	-0.155**	-0.389	-0.192**	-0.387	-0.384	-0.374*	-0.357	-0.358	-0.355	-0.36	-0.367	-0.347	-0.318
adjusted R-squared	0.751	0.673	0.629	0.784	0.703	0.647	0.662	0.646	0.646	0.646	0.646	0.649	0.658	0.665
No. of observations	407	418	638	682	715	726	726	726	726	726	726	726	726	726
No. of countries	52	54	58	62	65	66	66	66	66	66	66	66	66	66
country fixed effects	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors. Estimation results reported here refer to a sample for which the OECD's PMR indicator is available.

Table B4. MFP, institutions and regulation – cross-section regressions

	ALL COUNTRIES							PMR SAMPLE											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
INNOVATION CREATION&ABSORPTION																			
human capital	0.727**	0.801**	0.744**	0.608**	0.966**	0.601**	0.776**	0.521**	0.654**	0.565**	0.459**	0.752**	0.626**	0.791**	0.648**	0.822**	0.561**	0.632**	0.492*
patents by resident per capita	-94.452	-69.981	-55.255	-95.642*	-52.468	-75.705	-111.791	-50.401	-46.477	3.117	-32.454	-29.907	-35.355	-36.877	-13.546	-45.136	-61.277	-54.465	-29.879
trade openness	-0.001	-0.001	-0.0005	-0.001	-0.001	-0.001	-0.001	0.0002	-0.0002	0.001	0.0003	0.001	0.001	0.001	0.001	0.001	0.0001	-0.0001	0.0004
INSTITUTIONS																			
rule of law	0.429**					0.47**	0.431**	0.42**									0.404**	0.445**	0.4**
political stability		0.28**							0.28**										
corruption			0.407**							0.344**									
government effectiveness				0.581**							0.515**								
BUSINESS REGULATION																			
business regulation (EFW)					0.287**							0.221							
cost of contract enforcement	-0.011**	-0.011**	-0.01**	-0.01**	-0.012**	-0.006*	-0.009*	-0.003	-0.002	-0.003	-0.004	-0.006*	-0.008**	-0.007*	-0.008*	-0.006*	-0.002	0.0005	-0.003
time of insolvency procedures	-0.042	-0.082	-0.014	-0.016	-0.064	-0.077	-0.045	-0.099*	-0.127**	-0.081	-0.079	-0.14*	-0.157**	-0.174**	-0.151**	-0.177**	-0.116**	-0.076	-0.057
time of starting a business	0.003	0.001	0.001	0.003	0.004	0.003	0.002	0.001	-0.001	-0.001	0.002	0.002	0.001	0.0001	0.001	-0.001	0.002	-0.001	0.001
PMR - overall													-0.311						
PMR - barriers to entry														-0.1					
PMR - barriers to trade&investment															-0.28**				
PMR - scope of state control																-0.062			
LABOUR MARKET REGULATION																			
EPL - Cambridge indicator						0.372											0.437		
labour market regulation (EFW)							-0.087											-0.118**	
EPL - regular contracts																			-0.02
FINANCIAL DEVELOPMENT																			
bank branches	0.005*	0.006**	0.005*	0.004*	0.008**	0.005*	0.004*	0.005**	0.005*	0.005*	0.004*	0.006*	0.003	0.005*	0.002	0.006*	0.004*	0.005**	0.004
stock market capitalisation	0.003*	0.005**	0.002	0.001	0.004**	0.002	0.003**	-0.001	0.001	-0.001	-0.001	0.001	0.002*	0.002*	0.001	0.002	-0.0001	2.00E-05	-0.001
adjusted R-squared	0.712	0.678	0.716	0.732	0.669	0.704	0.719	0.749	0.678	0.728	0.743	0.650	0.647	0.628	0.667	0.627	0.757	0.775	0.717
No. of observations	88	88	88	88	88	80	88	59	59	59	59	59	59	59	59	59	58	59	53
No. of countries	88	88	88	88	88	80	88	**59**	**59**	**59**	**59**	**59**	**59**	**59**	**59**	**59**	**58**	**59**	**53**

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors. Columns 1 to 7 refer to a sample including all possible countries. Columns 8 to 19 refer to a sample for which the OECD's PMR indicator is available.

Table B5. K/Y, institutions and regulation – identification through the within dimension

	PMR SAMPLE								ALL COUNTRIES							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
real interest rate	0.009	0.016**	0.011*	0.012**					0.004*	0.007**	0.005**	0.006**				
inflation rate	-0.009	-0.007	-0.01	-0.01					-0.001	-0.0004	-0.002	-0.007				
INSTITUTIONS																
rule of law	0.13	0.203	0.195	0.077	-0.016	0.103	-0.031	0.119	0.305**	0.369	0.274*	0.242*	0.065	0.155	-0.055	-0.106
REGULATION																
business regulation - EFW	-0.159**				-0.042				-0.206**				-0.084**			
cost of starting a business		0.003**				0.004				0.002				0.0003		
labour market regulation - EFW			0.103**				0.013				0.052				0.077**	
EPL - cambridge				-2.314**				-1.055**				6E-01				0.019
FINANCIAL DEVELOPMENT																
bank branches per capita	-0.009**	-0.008**	-0.012**	-0.011**					-0.013**	-0.013**	-0.014**	-0.014**				
stock market capitalisation % GDP	0.001	0.001	0.001	0.000	-0.001	0.001	-0.001	-0.002**	0.0010	-0.0005	0.0003	0.0005	-0.0004	-0.0004	-0.0004	-0.001*
error correction term	-0.226**	-0.322**	-0.229**	-0.21**	-0.506	-0.839**	-0.504	-0.128**	-0.32**	-0.365**	-0.29**	-0.281**	-0.455	-0.764*	-0.443	-0.181**
adjusted R-squared	0.894	0.917	0.892	0.895	0.694	0.762	0.694	0.798	0.921	0.929	0.915	0.913	0.778	0.845	0.774	0.758
No. of observations	323	222	323	318	655	350	655	639	534	381	534	469	966	566	988	1058
No. of countries	51	39	51	50	61	52	61	59	81	66	81	71	97	86	97	88
country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors. Columns 1 to 8 refer to a sample for which the OECD's PMR indicator is available. Columns 9 to 16 refer to a sample including all possible countries.

Table B6. K/Y, institutions and regulation – identification through the between and within dimensions

	PMR SAMPLE									ALL COUNTRIES										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Time varying variables																				
labour market regulation - EFW	0.015	-0.01	0.002	0.003	-0.018	-0.01	-0.002	-0.006	0.006	0.036	0.027	0.026	0.031	-0.033	-0.1**	0.036	-0.026	-0.015	-0.017	0.029
business regulation - EFW	-0.009	-0.146**	-0.105	-0.094	-0.184**	-0.146**	-0.115**	-0.171**	-0.019	0.047	-0.101**	-0.019	-0.025	-0.224**	-0.294**	-0.235**	-0.184**	-0.137**	-0.189**	-0.058
Time invariant variables																				
INSTITUTIONS																				
rule of law	-0.134									-0.23**										
political stability		0.1**									-0.001									
corruption			0.009									-0.128**								
government effectiveness				-0.008									-0.142**							
BUSINESS REGULATION																				
time of insolvency procedures	-0.007	0.014	0.008	0.006	0.018	0.02	0.008	0.013	-0.002	-0.006	0.015	-0.001	-0.002	0.026	-0.064**	0.003	0.03	0.014	0.018	0.01
PMR - overall					-0.223**									-0.273**	-0.333**	-0.396**				
PMR - barriers to entry						-0.144*											-0.196**			
PMR - barriers to trade&investment							-0.034											-0.049		
PMR - scope of state control								-0.212**											-0.218**	
business regulation (EFW)									-0.113											-0.063
LABOUR MARKET REGULATION																				
EPL - regular contracts	0.051	0.015	0.027	0.029	0.022	0.021	0.019	0.076*	0.023	0.13**	0.113**	0.103**	0.122**	0.021			0.02	0.017	0.079*	0.11**
EPL - Cambridge indicator															-0.23					
labour market regulation (EFW)																-0.141**				
FINANCIAL DEVELOPMENT																				
bank branches	0.016**	0.014**	0.015**	0.015**	0.013**	0.014**	0.015**	0.014**	0.015**	0.016**	0.013**	0.015**	0.015**	0.013**	0.012**	0.01**	0.014**	0.016**	0.015**	0.013**
stock market capitalisation	-0.002**	-0.002**	-0.002**	-0.002**	-0.001*	-0.002*	-0.002**	-0.001	-0.002**	-0.0001	-0.001	-0.0003	-0.0002	-0.001	0.001*	0.0005	-0.001	-0.001	-0.0004	-0.001
error correction term	-0.398	-0.395	-0.397	-0.397	-0.393	-0.395	-0.397	-0.394	-0.398	-0.393	-0.396	-0.395	-0.395	-0.392	-0.103**	-0.391	-0.395	-0.397	-0.395	-0.396
adjusted R-squared	0.188	0.187	0.183	0.183	0.190	0.187	0.183	0.194	0.184	0.174	0.154	0.161	0.159	0.190	0.258	0.182	0.188	0.182	0.193	0.155
No. of observations	657	657	657	657	657	657	657	657	657	696	696	696	696	634	664	688	634	634	634	696
No. of countries	55	55	55	55	55	55	55	55	55	60	60	60	60	53	56	58	53	53	53	60
country fixed effects	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors. Columns 1 to 9 refer to a sample for which the OECD's PMR indicator is available. Columns 10 to 20 refer to a sample including all possible countries.

Table B7. K/Y, institutions and regulation – cross-section regressions

PMR SAMPLE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
INSTITUTIONS											
rule of law	-0.279**	-0.044	-0.067								
political stability				-0.208							
corruption					-0.209**						
government effectiveness						-0.253*					
BUSINESS REGULATION											
cost of contract enforcement	-0.016**	-0.013	-0.002	-0.017**	-0.015**	-0.015**	-0.012*	-0.012*	-0.012*	-0.012	-0.012**
time of insolvency procedures	-0.048	-0.002	-0.017	-0.029	-0.052	-0.045	0.007	0.012	-0.003	0.007	0.015
time of starting a business	0.002	-4E-05	-0.0004	0.004	0.004	0.003	0.007	0.008*	0.005	0.006*	0.007
PMR - overall							-0.105				
PMR - barriers to entry								-0.162			
PMR - barriers to trade&investment									0.017		
PMR - scope of state control										-0.11	
business regulation (EFW)											0.088
LABOUR MARKET REGULATION											
EPL - OECD	0.142			0.156	0.12	0.151	0.092	0.092	0.082	0.115	0.175
EPL - Cambridge indicator		0.452									
labour market regulation (EFW)			0.026								
FINANCIAL DEVELOPMENT											
bank branches	0.012**	0.012**	0.014**	0.01**	0.011**	0.011**	0.01**	0.01**	0.012**	0.011**	0.009**
stock market capitalisation	-0.0003	0.0002	-0.003	-0.002	-0.001	-0.0003	-0.002	-0.002	-0.002	-0.002	-0.002
adjusted R-squared	0.122	0.077	0.000	0.089	0.099	0.094	0.094	0.100	0.090	0.097	0.061
No. of observations	64	88	101	64	64	64	55	55	55	55	64
No. of countries	64	88	101	64	64	64	55	55	55	55	64

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table B8. Employment rate, institutions and regulation – identification through the within dimension

PMR SAMPLE ALL COUNTRIES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
INSTITUTIONS																
rule of law	1.354*	1.682**	2.648**	3.691**					-1.032**	-0.524	-0.442	0.835				
legal system - enforcement					1.394**								-0.054			
political stability						1.704**								0.049		
corruption							1.737**								0.634*	
government effectiveness								2.161**								-0.268
BUSINESS REGULATION																
business regulation - EFW	0.23	0.196			0.021	0.157	0.1	0.054	0.015	0.094			0.027	0.009	-0.025	0.021
cost of starting a business			-0.007	-0.001							-0.0004	-0.0004				
LABOUR MARKET REGULATION																
labour market regulation - EP	0.184		0.532*		0.513**	0.236	0.216	0.135	0.241		0.479**		0.399**	0.196	0.188	0.206
EPL - Cambridge		0.43		11.882**						0.918		4.586				
error correction term	-0.156**	-0.162**	-0.183**	-0.172**	-0.168**	-0.172**	-0.162**	-0.164**	-0.215**	-0.211**	-0.286**	-0.25**	-0.214**	-0.216**	-0.217**	-0.214**
adjusted R-squared	0.946	0.948	0.953	0.949	0.950	0.948	0.947	0.947	0.974	0.968	0.980	0.975	0.976	0.974	0.974	0.974
No. of observations	783	747	447	478	706	783	783	783	1428	1128	926	833	1352	1428	1428	1428
No. of countries	66	63	57	55	66	66	66	66	**137**	**104**	**123**	**94**	**137**	**137**	**137**	**137**
country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors. Columns 1 to 8 refer to a sample for which the OECD's PMR indicator is available. Columns 9 to 16 refer to a sample including all possible countries.

Table B9. Employment rate, institutions and regulation – identification through the between and within dimensions, PMR sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
time varying variables																
labour market regulation - EFW	0.611**	0.472*	0.356	0.173	0.413	0.637**	0.835**	0.425	0.861**	0.451*	1.431**	1.049**	0.803**	0.232	0.871**	0.524*
legal system - enforcement	1.125**	1.199**	1.813**	1.579**	1.046**	1.103**	1.187**	1.794**	1.155**	1.777**	1.431**	1.996**	1.028**	1.673**	1.067**	1.577**
time invariant variables																
INSTITUTIONS																
rule of law	1.595**															
political stability		2.06**	2.024**	1.967**												
corruption					2.59**											
government effectiveness						1.908**										
BUSINESS REGULATION																
cost of contract enforcement	0.042**	0.067**	0.18**	0.153**	0.058**	0.038*	0.021	0.145**	0.016	0.138**	0.004	0.125**	0.025	0.153**	0.012	0.12**
time of insolvency procedures	-1.218**	-1.302**	-1.006**	-1.208**	-0.764**	-1.148**	-1.496**	-1.218**	-1.463**	-1.185**	-1.839**	-1.729**	-1.479**	-1.132**	-1.296**	-1.016**
time of starting a business	0.081**	0.071**	0.044**	0.062**	0.078**	0.085**	0.078**	0.049**	0.087**	0.06**	0.061**	0.037**	0.084**	0.049**	0.102**	0.091**
PMR - overall							-1.363**	-1.772**								
PMR - barriers to entry									-1.714**	-2.229**						
PMR - barriers to trade&investment											1.798**	1.47**				
PMR - scope of state control													-3.811**	-3.78**		
business regulation (EFW)															2.053**	2.783**
LABOUR MARKET REGULATION																
EPL - OECD	-0.664	-0.775*			-0.505	-0.651	-0.293		-0.362		0.078		0.771*		0.055	
EPL - Cambridge indicator			-11.06**					-11.826**		-11.752**		-10.079**		-10.297**		-8.602**
labour market regulation (EFW)				0.75												
error correction term	-0.157**	-0.159**	-0.17**	-0.166**	-0.158**	-0.157**	-0.156**	-0.17**	-0.156**	-0.169**	-0.151**	-0.164**	-0.155**	-0.17**	-0.155**	-0.168**
adjusted R-squared	0.183	0.187	0.259	0.209	0.225	0.185	0.169	0.245	0.174	0.252	0.183	0.249	0.227	0.29	0.184	0.268
No. of observations	645	645	675	708	645	645	645	675	645	675	645	675	645	675	645	675
No. of countries	59	59	63	66	59	59	59	63	59	63	59	63	59	63	59	63
country fixed effects	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table B10. Employment rate, institutions and regulation – cross-section regressions, PMR sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
INSTITUTIONS													
rule of law	3.811**	3.688**	2.92**										
political stability				3.932**									
corruption					4.257**								
government effectiveness						4.964**							
BUSINESS REGULATION													
cost of contract enforcement	-0.014	0.172**	0.188**	0.004	-0.006	-0.01	-0.024	-0.03	-0.04	-0.014	0.075	0.059	-0.074
time of insolvency procedures	-1.032	-0.262	-0.09	-1.377	-0.603	-0.722	-1.893*	-1.9*	-2.271**	-1.905**	-1.843**	-2.01**	-1.628
time of starting a business	0.088*	0.057	-0.015	0.069	0.076	0.103**	0.058	0.064	0.027	0.057	0.028	0.055	0.08
PMR - overall							-2.513						
PMR - barriers to entry								-2.398					
PMR - barriers to trade&investment									0.47				
PMR - scope of state control										-4.331**	-3.96*	-4.066**	
business regulation (EFW)													2.3
LABOUR MARKET REGULATION													
EPL - OECD	-0.516			-0.677	0.116	-0.58	-0.681	-0.872	-0.897	0.436			-0.232
EPL - Cambridge indicator		-14.562**									-11.132**		
labour market regulation (EFW)			-0.508									0.787	
adjusted R-squared	0.099	0.131	0.087	0.072	0.144	0.133	0.056	0.057	0.034	0.127	0.18	0.147	0.021
No. of observations	71	109	142	71	71	71	59	59	59	59	63	66	71
No. of countries	71	109	142	71	71	71	59	59	59	59	63	66	71

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table B11. Per capita income (labour productivity), institutions and regulation – identification through the within dimension

	PMR SAMPLE												ALL COUNTRIES			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	dependent variable = log per capita income															
INNOVATION CREATION&ABSORPTION																
human capital	-0.21**	-0.155*	-0.123	-0.013	0.014	-0.116	-0.151	-0.073	-0.196**	-0.21**	-0.158*	-0.135	0.016	0.022	0.032	0.017
patents by resident per capita	83.603**															
trade openness	0.0001															
INSTITUTIONS																
government effectiveness	0.087**	0.088**	0.066**	0.116**	0.123**					0.046*	0.086**	0.092**	0.075**	0.048**	0.078**	0.082**
rule of law						0.084**										
legal system - enforcement							0.048**									
political stability								0.073**								
corruption									0.05**							
BUSINESS REGULATION																
business regulation	0.038**	0.036**				0.044**	0.042**	0.038**	0.041**	0.037**	0.036**	0.037**	0.022**	0.026**	0.023**	0.025**
cost of starting a business			-0.001**							-0.001**				-1.00E-05		
LABOUR MARKET REGULATION																
laobur market regulation (EFW)				0.004							0.003				-0.01*	
EPL Cambridge indicator					0.319**							0.29**				0.244**
FINANCIAL DEVELOPMENT																
bank branches	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**
error correction term	-0.141**	-0.179**	-0.21**	-0.162**	-0.167**	-0.166**	-0.186**	-0.19**	-0.184**	-0.219**	-0.175**	-0.182**	-0.242**	-0.277**	-0.245**	-0.24**
adjusted R-squared	0.998	0.998	0.998	0.998	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.999	0.999	0.998
No. of observations	433	498	375	498	479	498	487	498	498	375	498	479	865	676	865	707
No. of countries	60	64	56	64	61	64	64	64	64	56	64	61	116	105	116	93
	dependent variable = log labour productivity															
INNOVATION CREATION&ABSORPTION																
human capital	0.006	0.001	-0.028	0.103	0.159*	0.022	-0.026	0.047	-0.021	-0.089	-0.008	0.043	0.009	-0.003	0.025	0.076
patents by resident per capita	25.12															
trade openness	0.001															
INSTITUTIONS																
government effectiveness	0.055**	0.062**	0.042*	0.078**	0.088**					0.028	0.055**	0.064**	0.082**	0.052**	0.086**	0.087**
rule of law						0.05*										
legal system - enforcement							0.006									
political stability								0.043**								
corruption									0.01							
BUSINESS REGULATION																
business regulation	0.033**	0.028**				0.034**	0.037**	0.03**	0.033**	0.026**	0.028**	0.029**	0.022**	0.027**	0.023**	0.02**
cost of starting a business			-0.001**							-0.001**				-1.00E-05		
LABOUR MARKET REGULATION																
laobur market regulation (EFW)				0.012**							0.011**				-0.01*	
EPL Cambridge indicator					0.164**							0.141*				0.161**
FINANCIAL DEVELOPMENT																
bank branches	0.001**	0.001**	0.001*	0.001**	0.002**	0.001**	0.001**	0.001**	0.001**	0.001*	0.001**	0.001**	0.002**	0.001**	0.002**	0.002**
error correction term	-0.295**	-0.261**	-0.392**	-0.246**	-0.25**	-0.263**	-0.26**	-0.263**	-0.255**	-0.402**	-0.253**	-0.26**	-0.275**	-0.342**	-0.274**	-0.276**
adjusted R-squared	0.998	0.998	0.998	0.998	0.997	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.998	0.999	0.998	0.998
No. of observations	433	498	375	498	479	498	487	498	498	375	498	479	865	676	865	707
No. of countries	60	64	56	64	61	64	64	64	64	56	64	61	116	105	116	93

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors. Country and year fixed effects are included in all equations. Columns 1 to 12 refer to a sample for which the OECD's PMR indicator is available. Columns 13 to 16 refer to a sample including all possible countries.

Table B12-1. Per capita income, institutions and regulation – identification through the between and within dimensions, PMR sample

	dependent variable = log per capita income													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Time varying variables														
government effectiveness	0.153	0.233	0.227	0.267**	0.272*	0.249	0.132	0.535**	0.5**	0.571**	0.534**	0.496**	0.616**	0.808**
business regulation	-0.111**													
bank branches	0.002													
Time invariant variables														
INNOVATION CREATION&ABSORPTION														
human capital	0.525**	0.737**	0.675**	0.68**	0.832**	0.692**	0.681**	0.705**	0.725**	0.726**	0.671**	0.692**	0.772**	0.647**
patents by resident per capita	81.513**													
trade openness	0.0005													
INSTITUTIONS														
government effectiveness	0.436**	0.322*	0.312*	0.232*	0.343**	0.329**								
rule of law							0.404**							
political stability								0.037						
corruption									0.051					
BUSINESS REGULATION														
cost of contract enforcement	-0.006**	-0.001	-0.001	-0.005**	0.002	-0.006**	-0.006**	-0.006**	-0.006**	-0.006**	-0.007**	-0.006**	-0.006**	-0.004**
time of insolvency procedures	-0.07**	-0.06**	-0.061**	-0.086**	-0.07**	-0.09**	-0.107**	-0.095**	-0.093**	-0.094**	-0.092**	-0.099**	-0.091**	-0.115**
time of starting a business	0.003**													
PMR - overall										0.033				
PMR - barriers to entry											-0.082			
PMR - barriers to trade&investment												-0.094**		
PMR - scope of state control													0.207**	
business regulation (EFW)														-0.32**
LABOUR MARKET REGULATION														
EPL - regular contracts	0.041*	0.131**	0.106**											
EPL - Cambridge indicator				0.392**										
labour market regulation (EFW)					-0.168**									
FINANCIAL DEVELOPMENT														
bank branches	0.004**	0.011**	0.01**	0.008**	0.01**									
stock market capitalisation	-0.0003	-0.0003												
error correction term	-0.109**	-0.072**	-0.071**	-0.088**	-0.084**	-0.089**	-0.081**	-0.075**	-0.078**	-0.072**	-0.075**	-0.079**	-0.068**	-0.053**
adjusted R-squared	0.862	0.758	0.769	0.857	0.822	0.755	0.762	0.753	0.753	0.753	0.754	0.755	0.764	0.778
No. of observations	407	605	638	682	715	726	726	726	726	726	726	726	726	726
No. of countries	52	55	58	62	65	66	66	66	66	66	66	66	66	66
country fixed effects	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
time fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table B12-2. Labour productivity, institutions and regulation – identification through the between and within dimensions, PMR sample

	dependent variable = log labour productivity													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Time varying variables														
government effectiveness	0.036	0.177	0.164	0.234*	0.245	0.224	0.1	0.474**	0.504**	0.49**	0.456**	0.413**	0.524**	0.741**
business regulation	-0.116**													
bank branches	0.002													
Time invariant variables														
INNOVATION CREATION&ABSORPTION														
human capital	0.446**	0.661**	0.61**	0.656**	0.802**	0.658**	0.647**	0.678**	0.669**	0.694**	0.653**	0.656**	0.731**	0.603**
patents by resident per capita	41.336**													
trade openness	-0.0002													
INSTITUTIONS														
government effectiveness	0.486**	0.321*	0.293	0.188	0.289*	0.26								
rule of law							0.35**							
political stability								-0.009						
corruption									-0.031					
BUSINESS REGULATION														
cost of contract enforcement	-0.006**	-0.0002	-0.001	-0.006**	0.001	-0.007**	-0.006**	-0.007**	-0.007**	-0.007**	-0.007**	-0.007**	-0.007**	-0.005**
time of insolvency procedures	-0.067**	-0.051**	-0.053**	-0.072**	-0.06**	-0.081**	-0.095**	-0.084**	-0.085**	-0.084**	-0.083**	-0.088**	-0.081**	-0.107**
time of starting a business	0.002													
PMR - overall										0.053				
PMR - barriers to entry											-0.042			
PMR - barriers to trade&investment												-0.085**		
PMR - scope of state control													0.199**	
business regulation (EFW)														-0.349**
LABOUR MARKET REGULATION														
EPL - regular contracts	0.025	0.091**	0.074**											
EPL - Cambridge indicator				0.508**										
labour market regulation (EFW)					-0.177**									
FINANCIAL DEVELOPMENT														
bank branches	0.003*	0.009**	0.009**	0.006**	0.009**									
stock market capitalisation	-0.001**	-0.001**												
error correction term	-0.154**	-0.137**	-0.13**	-0.134**	-0.129**	-0.136**	-0.134**	-0.103**	-0.098**	-0.1**	-0.106**	-0.113**	-0.095**	-0.065**
adjusted R-squared	0.793	0.683	0.692	0.799	0.767	0.695	0.702	0.694	0.694	0.694	0.694	0.696	0.705	0.728
No. of observations	407	605	638	682	715	726	726	726	726	726	726	726	726	726
No. of countries	52	55	58	62	65	66	66	66	66	66	66	66	66	66
country fixed effects	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
time fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table B13-1. Per capita income, institutions and regulation – cross-section regressions, PMR sample

	dependent variable = log per capita income											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
INNOVATION CREATION&ABSORPTION												
human capital	0.669**	0.788**	0.7**	0.583**	0.927**	0.777**	0.895**	0.828**	0.987**	0.647**	0.714**	0.794**
patents by resident per capita	49.06	52.549	107.593*	68.346	69.328	64.956	65.694	84.918	54.713	71.118	35.758	44.483
trade openness	0.0002	-0.0003	0.001	0.0003	0.001	0.001	0.001	0.001	0.001	0.0002	0.0002	-0.0001
INSTITUTIONS												
rule of law	0.442**									0.415**	0.421**	0.471**
political stability		0.322**										
corruption			0.379**									
government effectiveness				0.568**								
BUSINESS REGULATION												
cost of contract enforcement	-0.005**	-0.004	-0.004*	-0.005**	-0.008**	-0.009**	-0.009**	-0.009**	-0.008**	-0.005**	-0.004*	-0.001
time of insolvency procedures	-0.136**	-0.159**	-0.112*	-0.109*	-0.184**	-0.197**	-0.209**	-0.194**	-0.218**	-0.085	-0.155**	-0.11**
time of starting a business	0.005	0.002	0.003	0.005	0.005	0.004	0.004	0.004	0.003	0.003	0.005	0.002
PMR - overall						-0.331*						
PMR - barriers to entry							-0.18					
PMR - barriers to trade&investment								-0.263**				
PMR - scope of state control									-0.064			
business regulation (EFW)					0.204							
LABOUR MARKET REGULATION												
EPL - regular contracts										0.059		
EPL - Cambridge indicator											0.435	
labour market regulation (EFW)												-0.132**
FINANCIAL DEVELOPMENT												
bank branches	0.007**	0.008**	0.007**	0.007**	0.009**	0.006	0.007**	0.005	0.008**	0.007**	0.007**	0.008**
stock market capitalisation	0.0002	0.002*	-0.0001	-0.001	0.002	0.003*	0.003*	0.002	0.003*	0.0005	0.001	0.001
adjusted R-squared	0.831	0.779	0.821	0.836	0.741	0.744	0.731	0.753	0.726	0.819	0.841	0.858
No. of observations	59	59	59	59	59	59	59	59	59	53	58	59
No. of countries	59	59	59	59	59	59	59	59	59	53	58	59

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table B13-2. Labour productivity, institutions and regulation – cross-section regressions, PMR sample

	dependent variable = log labour productivity											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
INNOVATION CREATION&ABSORPTION												
human capital	0.611**	0.729**	0.646**	0.531**	0.851**	0.706**	0.84**	0.743**	0.89**	0.587**	0.653**	0.739**
patents by resident per capita	1.257	4.749	52.575	18.577	18.646	15.508	15.04	34.556	5.809	26.393	-9.062	-3.425
trade openness	-0.0003	-0.001	0.0004	-0.0002	0.001	0.0005	0.001	0.0005	0.001	-0.0003	-0.0004	-0.001
INSTITUTIONS												
rule of law	0.396**									0.361**	0.383**	0.425**
political stability		0.273**										
corruption			0.331**									
government effectiveness				0.512**								
BUSINESS REGULATION												
cost of contract enforcement	-0.004	-0.004	-0.004	-0.005	-0.007**	-0.009**	-0.008**	-0.009**	-0.007**	-0.004	-0.004	-0.0004
time of insolvency procedures	-0.118**	-0.142**	-0.099	-0.094	-0.165**	-0.173**	-0.186**	-0.169**	-0.191**	-0.07	-0.135**	-0.092*
time of starting a business	0.004	0.002	0.002	0.004	0.004	0.003	0.003	0.003	0.002	0.002	0.004	0.001
PMR - overall						-0.298						
PMR - barriers to entry							-0.126					
PMR - barriers to trade&investment								-0.248**				
PMR - scope of state control									-0.064			
business regulation (EFW)					0.167							
LABOUR MARKET REGULATION												
EPL - regular contracts										0.021		
EPL - Cambridge indicator											0.52*	
labour market regulation (EFW)												-0.135**
FINANCIAL DEVELOPMENT												
bank branches	0.006**	0.007**	0.006**	0.006**	0.007**	0.005	0.006*	0.004	0.007**	0.006**	0.005**	0.007**
stock market capitalisation	-0.0005	0.001	-0.001	-0.001	0.001	0.002	0.002	0.001	0.002	-0.0004	0.00004	0.0002
adjusted R-squared	0.753	0.696	0.739	0.76	0.662	0.668	0.653	0.68	0.651	0.722	0.765	0.787
No. of observations	59	59	59	59	59	59	59	59	59	53	58	59
No. of countries	59	59	59	59	59	59	59	59	59	53	58	59

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

ANNEX C. ESTIMATION RESULTS – NON-LINEAR RELATIONSHIPS, PMR SAMPLE

Table C1. Non-linear effects, MFP, institutions and regulation – cross-section regressions

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
THRESHOLD VARIABLE		PER CAPITA INCOME (USD, PPP)						RULE OF LAW					
THRESHOLD VALUE		8120	8120	8120	8120	8120	8120	-0.23	-0.23	-0.23	-0.23	-0.21	-0.23
test of non0linearity (p-value), H0: linear model, H1: non-linear model		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PMR OVERALL	when below threshold value	-0.694**						-0.484**					
	when above threshold value	-0.298**						-0.216					
PMR barriers to entry	when below threshold value		-0.397**						-0.315*				
	when above threshold value		-0.024						-0.046				
PMR barriers to trade &	when below threshold value			-0.655**						-0.438**			
	when above threshold value			-0.195**						-0.136			
PMR scope of state control	when below threshold value				-0.447**						-0.298**		
	when above threshold value				-0.087						-0.046		
business regulation - EFW	when below threshold value					0.111	0.043					0.124	0.042
	when above threshold value					0.299**	0.226**					0.259**	0.178**
adjusted R-squared		0.803	0.768	0.793	0.779	0.829	0.827	0.730	0.709	0.716	0.724	0.755	0.764
No. of observations		59	59	59	59	89	59	59	59	59	59	89	59
No. of countries		59	59	59	59	89	59	59	59	59	59	89	59

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table C2. Non-linear effects, MFP, institutions and regulation – cross-section regressions, PMR sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
THRESHOLD VARIABLE		PER CAPITA INCOME (USD, PPP)						RULE OF LAW					
THRESHOLD VALUE		9029	8120	8120	4351	3251	8120	-0.21	0.06	-0.21	0.06	-0.78	-0.78
test of non0linearity (p-value), H0: linear model,		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
cost of contract	when below threshold value	-0.013**	-0.006*					-0.011**	-0.003				
enforcement	when above threshold value	0.016**	0.014**					0.003	0.007				
time of insolvency	when below threshold value			-0.168**	-0.235**					-0.11*	-0.154**		
procedures	when above threshold value			0.111*	-0.039					0.028	-0.054		
time of starting a	when below threshold value					-0.032**	-0.01**					0.006*	0.002
business	when above threshold value					-0.001	0.002					-0.003	-0.005
adjusted R-squared		0.819	0.827	0.787	0.822	0.762	0.802	0.734	0.751	0.708	0.768	0.706	0.757
No. of observations		88	59	88	59	88	59	88	59	88	59	88	59
No. of countries		88	59	88	59	88	59	88	59	88	59	88	59

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table C3. Non-linear effects, MFP, institutions and regulation – cross-section regressions, PMR sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
THRESHOLD VARIABLE		labour market regulation - EFW						EPL - OECD						EPL - Cambridge					
THRESHOLD VALUE		5.43	7.34	5.72	7.34	6.85	6.18	2.18	2.18	2.50	2.18	2.50	2.18	0.64	0.53	0.64	0.53	0.64	0.64
test of non0linearity (p-value), H0: linear model, H1: non-linear model		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PMR OVERALL	when below threshold value	-0.466**						-0.522**						-0.523**					
	when above threshold value	-0.596**						-0.435**						-0.412**					
PMR barriers to	when below threshold value		-0.216						-0.314**						-0.097				
entry	when above threshold value		-0.361**						-0.227						-0.217				
PMR barriers to	when below threshold value			-0.302**						-0.342**						-0.395**			
trade & investment	when above threshold value			-0.555**						-0.505**						-0.262			
PMR scope of state	when below threshold value				-0.161						-0.276*						-0.015		
control	when above threshold value				-0.323						-0.181						-0.122		
business regulation	when below threshold value					0.355**	0.333**					0.317**	0.35**					0.436**	0.341**
- EFW	when above threshold value					0.441**	0.382**					0.284**	0.389**					0.463**	0.379**
adjusted R-squared		0.640	0.596	0.676	0.593	0.699	0.659	0.629	0.586	0.642	0.580	0.606	0.671	0.648	0.613	0.670	0.613	0.679	0.667
No. of observations		59	59	59	59	89	59	53	53	53	53	60	53	58	58	58	58	80	58
No. of countries		59	59	59	59	89	59	53	53	53	53	60	53	58	58	58	58	80	58

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table C4. Non-linear effects, K/Y, institutions and regulation – cross-section regressions, PMR sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
THRESHOLD VARIABLE		rule of law				government effectiveness				corruption				bank branches		stock market capitalisation	rule of law		government effectiveness	
THRESHOLD VALUE		-0.22582	-0.22582	-0.22582	-0.22582	0.051627	0.051627	0.051627	0.051627	-0.33268	-0.33268	-0.33268	-0.33268	7.784616	4.67047	30.55519	-0.20818	-0.22582	-0.06601	-0.06601
test of non0linearity (p-value), H0: linear model, H1: non-linear model		0.0054	0.0048	0.0323	0.0079	0.0348	0.0299	0.1596	0.0467	0.0769	0.0719	0.2966	0.0574	0.0095	0	0.0447	0.0091	0.0014	0.022	0.0255
PMR OVERALL	when below threshold value	-0.209				-0.324				-0.321										
	when above threshold value	-0.54**				-0.636**				-0.618*										
PMR barriers to entry	when below threshold value		-0.133				-0.222				-0.239									
	when above threshold value		-0.408**				-0.462**				-0.471**									
PMR barriers to trade & investment	when below threshold value			0.046				0.009				0.028		-0.236*						
	when above threshold value			-0.338				-0.265				-0.163		0.116						
PMR scope of state control	when below threshold value				-0.131				-0.210				-0.249		-0.453**	-0.33*				
	when above threshold value				-0.356**				-0.396**				-0.452**		-0.131	-0.143				
cost of contract enforcement	when below threshold value																1.0E-04	-7.0E-03	3.0E-05	-0.009*
	when above threshold value																-0.023**	-0.036**	-0.019**	-0.03**
adjusted R-squared		0.203	0.183	0.156	0.189	0.157	0.133	0.100	0.145	0.134	0.114	0.077	0.143	0.132	0.130	0.137	0.063	0.250	0.050	0.197
No. of observations		61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	103	61	103	61
No. of countries		61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	103	61	103	61

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table C5. Non-linear effects, the employment rate, institutions and regulation – within identification, PMR sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
THRESHOLD VARIABLE		per capita income				rule of law		political stability		government effectivenes		corruption	
THRESHOLD VALUE		11950.96	11950.96	6011	6011	-0.64	-0.78	-0.53	-0.58	-0.31	-0.43	-0.69	-0.63
test of non0linearity (p-value), H0: linear model, H1:		0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.001	0.006	0.002
labour market regulation -	when below threshold value	-0.057	-0.2**			-0.275**	-0.824**	-0.258**	-0.487**	-0.184**	-0.811**	-0.344**	-0.868**
EFW	when above threshold value	0.171**	0.088**			0.127**	0.066*	0.116**	0.072**	0.132**	0.066*	0.098**	0.055
EPL - Cambridge	when below threshold value			1.149**	0.136								
	when above threshold value			-1.372**	-2.801**								
error correction term		-0.333	-0.399	-0.144**	-0.126**	-0.336	-0.41	-0.338	-0.412	-0.334	-0.411	-0.336	-0.41
adjusted R-squared		0.822	0.723	0.804	0.809	0.823	0.733	0.822	0.731	0.821	0.733	0.822	0.733
No. of observations		1495	780	1302	756	1485	780	1485	780	1485	780	1485	780
No. of countries		145	66	109	63	144	66	144	66	144	66	144	66
country fixed effects		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
year fixed effects		YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table C6. Non-linear effects, the employment rate, institutions and regulation – cross-section regressions, PMR sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)
THRESHOLD VARIABLE		**per capita income**				**rule of law**				**labour market regulation - EFW**				**EPL - OECD**				**EPL - Cambridge**				**per capita income**		**rule of law**		**PMR barriers to entry**	
THRESHOLD VALUE		6097	6097	16917	6097	-0.15	-0.23	-0.15	-0.23	7.34	7.34	7.34	7.34	1.80	1.80	1.80	1.80	0.49	0.49	0.53	0.49	2554	2554	-0.41	-0.41	1.99	2.23
test of non0linearity (p-value), H0: linear model, H1: non-linear model		0.045	0.045	0.006	0.084	0.001	0.002	0.024	0.010	0.005	0.005	0.104	0.001	0.004	0.004	0.011	0.007	0.023	0.022	0.044	0.041	0.014	0.014	0.000	0.000	0.033	0.004
PMR OVERALL	when below threshold value	-3.632*				-4.346**				-4.309**				-0.994				-1.33									
	when above threshold value	-6.297**				-8.227**				2.813				-3.717*				-3.859*									
PMR barriers to entry	when below threshold value		-3.987**				-4.095**				-4.004**				-1.295				-2.051								
	when above threshold value		-6.533**				-7.313**				1.909				-3.77**				-4.344**								
PMR barriers to trade & investment	when below threshold value			1.634				-0.014				-1.017				2.044*				1.81							
	when above threshold value			9.423**				-4.995*				6.355				-0.828				-1.018							
PMR scope of state control	when below threshold value				-4.209**				-3.822**				-5.065**				-1.987				-2.629						
	when above threshold value				-5.949**				-6.044**				0.64				-4.082**				-4.423**						
EPL OECD	when below threshold value																									-0.404	
	when above threshold value																									-2.595**	
EPL Cambridge	when below threshold value																					1.938	1.938	-3.459	-3.459		-9.616**
	when above threshold value																					-14.369**	-14.369**	-24.416**	-24.416**		-23.184**
adjusted R-squared		0.116	0.125	0.09	0.161	0.21	0.201	0.127	0.205	0.22	0.218	0.092	0.292	0.125	0.132	0.048	0.175	0.117	0.128	0.065	0.158	0.125	0.125	0.18	0.18	0.086	0.185
No. of observations		65	65	65	65	66	66	66	66	66	66	66	66	59	59	59	59	63	63	63	63	106	106	112	112	59	63
No. of countries		65	65	65	65	66	66	66	66	66	66	66	66	59	59	59	59	63	63	63	63	106	106	112	112	59	63

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table C7. Non-linear effects, per capita income, institutions and regulation – cross-section regressions, PMR sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
		dependent variable = log per capita income								**dependent variable = log labour productivity**							
THRESHOLD VARIABLE		per capita income				rule of law				per capita income				rule of law			
THRESHOLD VALUE		8120	8120	7119	8120	-0.109	0.133	-0.226	0.063	8120	8120	8120	8120	0.063	0.063	-0.226	0.063
test of non0linearity (p-value), H0: linear model, H1:		0.000	0.000	0.000	0.000	0.002	0.000	0.074	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.015	0.000
PMR OVERALL	when below threshold value	-0.686**				-0.467**				-0.662**				-0.37**			
	when above threshold value	-0.332**				-0.27				-0.277**				-0.112			
PMR barriers to entry	when below threshold value		-0.418**				-0.295*				-0.383**				-0.217		
	when above threshold value		-0.082				-0.021				-0.021				0.056		
PMR barriers to trade & investment	when below threshold value			-0.644**				-0.395**				-0.614**				-0.387**	
	when above threshold value			-0.232**				-0.225*				-0.162*				-0.158	
PMR scope of state control	when below threshold value				-0.432**				-0.241**				-0.447**				-0.243**
	when above threshold value				-0.109				-0.021				-0.099				-0.0004
adjusted R-squared		0.829	0.804	0.818	0.807	0.762	0.753	0.745	0.758	0.815	0.785	0.801	0.797	0.725	0.715	0.705	0.732
No. of observations		59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
No. of countries		59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table C8. Non-linear effects, per capita income, institutions and regulation – cross-section regressions, PMR sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
		dependend variable = log per capita income												dependend variable = log labour productivity											
THRESHOLD VARIABLE		per capita income				rule of law		per capita income				rule of law		per capita income				rule of law		per capita income				rule of law	
THRESHOLD VALUE		7119	4654	3251	-0.49	-0.52	-0.52	3251	4507	3251	-0.647	0.063	-0.647	9029	3769	3121	-0.49	-0.11	-0.52	3251	4351	3251	0.063	0.063	-0.647
test of non0linearity (p-value), H0: linear model, H1: non-linear model		0.000	0.000	0.000	0.007	0.201	0.007	0.000	0.001	0.000	0.284	0.212	0.014	0.000	0.000	0.000	0.010	0.070	0.004	0.000	0.001	0.000	0.153	0.086	0.040
cost of contract	when below threshold value	-0.011**			-0.005			-0.032**			-0.001			-0.012**			-0.005			-0.033**			-0.004		
enforcement	when above threshold value	0.014**			-0.015**			-0.004**			-0.007			0.015**			-0.015**			-0.004			0.004		
time of insolvency	when below threshold value		-0.207**			0.038			-0.239**			-0.147**			-0.204**			-0.094			-0.246**			-0.156**	
procedures	when above threshold value		0.078			-0.044			-0.052			-0.083*			0.08			0.019			-0.041			-0.06	
time of starting a	when below threshold value			-0.031**			0.008**			-0.024**			0.005			-0.041**			0.007**			-0.025**			0.004
business	when above threshold value			0.001			-0.002			0.002			-0.003			-0.0005			-0.003			0.001			-0.003
adjusted R-squared		0.828	0.828	0.811	0.778	0.747	0.763	0.87	0.87	0.864	0.811	0.824	0.831	0.807	0.787	0.792	0.736	0.706	0.721	0.813	0.818	0.802	0.741	0.76	0.756
No. of observations		88	88	88	88	88	88	59	59	59	59	59	59	88	88	88	88	88	88	59	59	59	59	59	59
No. of countries		88	88	88	88	88	88	59	59	59	59	59	59	88	88	88	88	88	88	59	59	59	59	59	59

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table C9. Non-linear effects, per capita income, institutions and regulation – cross-section regressions, PMR sample

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		dependent variable = log per capita income															dependent variable = log labour productivity														
THRESHOLD VARIABLE		labour market regulation - EFW					EPL - OECD					EPL - Cambridge					labour market regulation - EFW					EPL - OECD					EPL - Cambridge				
THRESHOLD VALUE		5.81	6.18	5.81	5.81	6.85	2.18	2.18	2.18	2.18	1.70	0.64	0.53	0.64	0.53	0.46	7.34	7.34	5.81	7.34	6.85	2.18	2.18	2.50	2.18	2.50	0.64	0.53	0.64	0.53	0.46
test of non0linearity (p-value), H0: linear model, H1: non-linear model		0.140	0.107	0.099	0.162	0.003	0.183	0.135	0.335	0.059	0.302	0.100	0.074	0.303	0.075	0.027	0.178	0.206	0.134	0.147	0.007	0.281	0.213	0.386	0.111	0.216	0.114	0.104	0.292	0.097	0.136
PMR OVERALL	when below threshold value	-0.437**					-0.52**					-0.525**					-0.445**					-0.483**					-0.49**				
	when above threshold value	-0.617**					-0.439**					-0.428**					-0.64**					-0.409**					-0.392**				
PMR barriers to	when below threshold value		-0.407**					-0.333**					-0.138					-0.204					-0.297*					-0.099			
entry	when above threshold value		-0.24					-0.251					-0.248					-0.358*					-0.221					-0.205			
PMR barriers to	when below threshold value			-0.294**					-0.353**					-0.375**					-0.283**					-0.31**					-0.356**		
trade & investment	when above threshold value			-0.591**					-0.268**					-0.269*					-0.541**					-0.437**					-0.24		
PMR scope of	when below threshold value				-0.108					-0.282*				-0.042						-0.17					-0.259*					-0.04	
state control	when above threshold value				-0.248					-0.187				-0.136						-0.341*					-0.174					-0.134	
Business	when below threshold value					0.365**					0.355**					0.382**					0.336**					0.307**					0.359**
regulation - EFW	when above threshold value					0.47**					0.325**					0.329**					0.429**					0.285**					0.325**
adjusted R-squared		0.736	0.702	0.755	0.695	0.762	0.721	0.691	0.715	0.685	0.707	0.734	0.709	0.744	0.704	0.737	0.672	0.634	0.692	0.635	0.732	0.651	0.616	0.655	0.611	0.63	0.671	0.641	0.684	0.642	0.69
No. of observations		59	59	59	59	89	53	53	53	53	60	58	58	58	58	80	59	59	59	59	89	53	53	53	53	60	58	58	58	58	80
No. of countries		59	59	59	59	89	53	53	53	53	60	58	58	58	58	80	59	59	59	59	89	53	53	53	53	60	58	58	58	58	80

Note: * and ** denote statistical significance at the 10% and 5% levels, respectively, based on heteroscedasticity-robust standard errors.

Table C10. Descriptive statistics of the threshold variables – cross-section dimension

	MIN	25 percentile	50 percentile	MEAN	75 percentile	MAX	STDEV
per capita income (USD, PPP)	225	2357	6680	12524	20087	100019	14780
rule of law	-2.377	-0.760	-0.142	0.013	0.871	1.943	0.990
political stability	-2.876	-0.647	0.136	0.027	0.867	1.783	0.962
corruption	-1.708	-0.691	-0.270	0.008	0.765	2.455	0.980
government effectiveness	-2.187	-0.707	-0.187	0.004	0.748	2.169	0.984
EPL - OECD	0.257	1.706	2.187	2.200	2.624	4.274	0.702
EPL - Cambridge	0.148	0.443	0.541	0.535	0.642	0.863	0.155
LM regulation - EFW	3.107	5.219	6.318	6.288	7.409	9.223	1.424
bank branches per 1000 inhabitants	0.532	4.477	13.535	19.316	25.783	220.800	23.078
stock market capitalisation	0.500	18.158	35.133	52.156	73.409	411.934	55.026

Table C11. Summary table – sources of coefficients used in the simulations

	MFP	K/Y	L	direct per capita income
INSTITUTIONS				
government effectiveness	B4(4,11)		B9(6), B10(6)	
rule of law	B4(1,8)		B9(1), B10(2)	B13-1(1)
political stability	B4(2,9)		B9(3), B10(4)	B13-1(2)
corruption	B4(3,10)		B9(5), B10(5)	B13-1(3)
BUSINESS REGULATION				
cost of starting a business	B2(10)	B7(7-9,11)		
cost of contract enforcement	B3(12), B4(1-5)			B13-1(1,3,4), B13-1(8)
time of insolvency procedures	B3(12), B4(8,12,15)		B9(1-6)	B13-1(1-4), B13-1(8)
PRODUCT MARKET REGULATION				
PMR - overall		B6(5,16)	B9(7,8)	
PMR - barriers to entry		B6(6,17)	B9(9,10)	
PMR - barriers to trade&investment	B3(12),B4(15)			B13-1(8)
PMR - scope of state control		B6(8,19)	B9(13,14)	
LABOUR MARKET REGULATION				
EPL - OECD regular contracts			B9(2)	
EPL - Cambridge indicator			B9(3,8,16), B10(2,11)	
labour market regulation (EFW)		B5(3,15)	B8(5), B9(1,2,6,7,9-13,15-16)	
FINANCIAL DEVELOPMENT				
banking sector	B4(1-12)	B7(9,11)		B13-1(1,3,4)
financial markets	B4(1,2,5)			

Note: The table gives the sources of the coefficient estimates used for the simulations displayed in Table 3a. The numbers indicate the Table and the specific equation in brackets. For instance B6(2) refers to equation No. 2 in Table B6. Figures in red indicate that the coefficient are derived along the within dimension (the remaining coefficient estimates are identified along the between dimension)