

# Working Paper

## The short term effects of structural reforms and institutional improvements in OECD economies

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OCTOBER 2022

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ISSN: 2654-1912 (online) DOI: <u>https://doi.org/10.52903/wp2022306</u>

## THE SHORT TERM EFFECTS OF STRUCTURAL REFORMS AND INSTITUTIONAL IMPROVEMENTS IN OECD ECONOMIES

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#### Abstract

Using a panel of 37 OECD countries over the period 1990–2019, we examine the short to medium term effect of structural reforms and governance or institutional improvements on growth. Employing an updated OECD dataset on product and labor market regulationand governance indicators for the World Bank and after controlling for the endogeneity of reforms via the augmented inverse probability weighting (AIPW) method we find that it is governance or institutional improvements (such as on government effectiveness, regulatory quality and rule of law) that have positive growth effects on real GDP in most cases. Labor market reforms do have positive growth effects under specific conditions, i.e., at times of recession, better governance, low indebtedness, low trade openness, high employment rate and tight monetary policy. Product market reforms have negative growth effects at most times and states considered. However, we find that, countries with better governance quality and deregulated labor market can reap significant benefits from them.

JEL classification: E52, H30, J65, K10, L51

*Keywords*: governance, regulatory quality, rule of law, structural reforms, product mar- ket, labor market, growth

*Acknowledgements*: We would like to thank Hiona Balfoussia, Nikolaos Giannakopoulos, Dimitris Malliaropoulos, Athina Zervogianni, Eleftherios Goulas and the anonymous reviewer of the Working Paper Series of the Bank of Greece. The views expressed are those of the authors and do not necessarily reflect those of the Bank of Greece and the Hellenic Parliamentary Budget Office. All remaining errors are ours.

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#### **1. Introduction**

The level of regulation in various sectors of an economy can explain different growth trends across countries (Nicoletti and Scarpetta, 2003; Bassanini and Duval, 2009; Egert 2016; Aghion and Griffith, 2005; De Haan and Parlevliet, 2018), so structural reforms are high on the policy agenda in many OECD economies in the post-pandemic era as a way of boosting recovery and improving economic resilience and long term sustainability (OECD, 2021). Moreover, many scholars and policy makers recognize that good governance and better institutions is a fundamental ingredient of sustained economic development (Kauffman and Kray, 2008; Fernandez and Tamayo, 2017; Li et al., 2020). Differences in economic institutions are the primary source of cross-country differences in economic development and prosperity according to Acemoglu (2004, 2005a, 2005b).

Although the benefits arising from structural reforms are indisputable in the long term (Cacciatore and Fiori 2016; Anderson et al. 2014; Barkbu et al. 2014; Bouis and Duval 2011), there is considerable doubt as regards their growth impact in the short to medium term. There are several studies estimating the short to medium term impact of reforms. For example Bouis et al. (2012) using the local projection method (Jorda, 2005) and various OECD indicators estimate the impact of structural reforms on growth and employment while controlling for the business cycle and different macroeconomic policies. They find limited, if any, negative effects on growth following the initiation of structural reforms. Hence, Bouis et al. (2012) conclude that there is no justification for expansionary fiscal and monetary policies in order to alleviate any short-term negative effects of structural reforms. On the other hand, Bordon et al. (2018) building on Jorda (2005) and using OECD indicators from 1980 to 2013 point out that macroeconomic policies improve the impact of labor market reforms on employment rate, supporting the idea that some structural reforms are better launched in tandem with supportive fiscal or monetary policy. To address endogeneity they used the augmented inverse probability weighting (AIPW) estimator.

Duval and Furceri (2018) use a narrative database of major labor and product market reforms covering 26 advanced economies over the period 1970-2013 in order to examine the likely effects on growth. Their findings suggests that product and labor market reforms have a positive impact on growth over the medium term and that prevailing macroeconomic conditions matter when it comes to the materialization of the effects of reforms. De Haan and Wiese (2022) use the same narrative database to estimate the impact of labor and product market reforms on growth while conditioning on fiscal policy stance. Their results indicate

that accounting for reform endogeneity through the AIPW estimator is critical. In particular, they find that product market reforms entail small negative growth effects, except when they are undertaken during periods of neutral fiscal policy. Labor market reforms are detrimental to growth when fiscal policy is tight or neutral, but beneficial when fiscal policy is expansionary.

Masuch et al. (2016) study the effect of economic institutions such as governance effectiveness, regulatory quality and rule of law on per capita GDP growth for a group of European economies for the period 1995 to 2002 in cases with high public debt. They find that in the context of extremely solid institutions, initial debt levels exceeding 60% or 70% do not appear to be detrimental to long-term growth. Similar results are obtained when other OECD countries are added to the analysis and when different public debt thresholds are considered.

Nawaz (2015) using panel data for 56 countries over the period 1981–2010 find that an improvement in institutional quality accelerates growth. In addition, they show that the influence of institutions, and specifically the stability of government, on growth is stronger in developed than in developing countries. According to Fernandez-Villaverde et al. (2013), Challe et al. (2018) and Schönfelder and Wagner (2019), while some of the euro area countries rank among the top global performers for institutional quality other euro area countries have recently deteriorated in their institutional performance and this could explain their lagging behind in growth prospects. These findings highlight the importance of further research into the growth effects of institutions in OECD countries.

In this context, our main objective is to assess the impact of reforms and governance improvements on growth in the short to medium term using a dataset of 37 OECD countries from 1990 to 2019 by means of the local projection method introduced byJorda (2005). We focus on structural reforms that overcome barriers to the fundamental drivers of growth through liberalizing labor and product market, as well as improvements in government effectiveness, regulatory quality, and rule of law enforcement. We also examine whether the impact of reforms and governance improvements vary dependingon the business cycle and the stance of macroeconomic policy (fiscal or/and monetary policy).

Reforms and institutional improvements do not occur at random as several studies indicate that economic and financial crises enhance reform implementation (Pitlik and Wirth 2003;Da Silva et al. 2017;Acemoglu 2005a). To address endogeneity as in Bordon et al (2018) and De Haan and Wiese (2022), we use the double robust augmented inverse

probability weighting (AIPW) technique suggested by Jorda and Taylor (2016), which estimates reform treatment effects while accounting for potential selection bias.

The main contributions of our paper relates to the following: First, we employ the new OECD indicators of product and labor market reforms, which is available up to 2018. Both Buis et al. (2012) and Bordon et al. (2018) use the OECD indicators that were available up to 2013. Whereas, De Haan and Wiese (2021) and Duval and Furceri (2018) use the narrative database of reforms which also runs until 2013. Second, we account also for the intensity of reforms, by examining both moderate and quite sizeable reform efforts. Third, we investigate also the impact of institutional improvements (based on three Worldwide Governance Indicators -WGIs) on growth, a topic which as ECB (2015) points out is not extensively covered by the literature. Fourth, based on the above we can assess whether it is product and labor market reforms or institutional improvements that matter the most for growth.

We find that reforms in the product and labor market, when controlling for endogeneity, have slightly negative effects on growth as in De Haan and Wiese (2022) (they find negative effects for labor market reforms), while the effects of governance or institutional improvements are mostly positive. In contrast with Duval and Furceri (2018) we find positive growth effects from labor market reforms that are implemented in recessions. Moreover, labor market reforms have positive growth effects in cases of high government effectiveness, and in countries with higher employment rate and low trade openness. Despite the fact that in most cases product market reforms have a negative impact on growth, our findings show that countries with improved governance and deregulated labor markets can benefit from them when moderate regulatory changes are implemented. Improvements in governance have positive effects on growth in most cases. In particular, better government effectiveness has positive effects on growth in recessions, in countries with high trade openness and low employment rate, when monetary policy is tight and when the public debt ratio is below 80%. Improvements in regulatory quality raise growth both in good and bad times, when the public debt ratio is above 80%, in countries with high trade openness and low employment rate. Improvements in the enforcement of the rule of law have positive effects on growth in most states considered. Hence, as in Masuch et al. (2016) countries with high debt face better growth prospects when they have an improved institutional framework in terms of regulatory quality and ruleof law enforcement. Our findings have implications for the timing of reforms. In more detail, priority should be given to governance or institutional improvements, followed by labor market reforms, with moderate product market interventions being the last ones.

The rest of the paper is organized as follows: Section 2 describes the dataset, section 3 presents the methodology. In section 4 we present the empirical estimates and section 5 concludes.

#### 2. Data

We examine a panel of 37 OECD countries<sup>1</sup> from 1990-2019. We employ the new OECD indicators on product market reforms (PMR) and on the strictness of employment protection legislation (EPL) which extend the previous indicators from 1990-2013 to 1990-2018. In more detail, the PMR indicator is a comprehensive and internationally comparable indicator that measures the degree to which policies promote or inhibit competition in areas of the product market where competition is viable. It is consistent across time and countries. The EPL indicator refers to the strictness of employment protection as regards individual dismissals of regular contract workers.

In addition, building on Acemoglu et al. (2004) we examine the growth effect of economic institutions on the basis of the following three Worldwide Government performance Indicators (WGIs) from the World Bank (1990-2019): government effectiveness, rule of law, regulatory quality. In more detail : -Government effectiveness (gee) reflects assessments of the quality of public services, civil service quality and independence from political constraints, policy development and implementation quality, and the credibility of the government's adherence to such policies. -Regulatory quality (rqe) reflects perceptions of the government's capacity to design and enforce appropriate rules and regulationsthat allow and promote private sector development. -Rule of law (rle), reflects agents' perceptions of the amount to which they have faith in and follow society's laws, particularly the quality of contract enforcement, property rights, the police, and the courts, as well as the possibility of crime and violence. The choice of these particular three indicators is due to the fact that these are more related to economic growth in advanced economies.

The remaining WGIs, voice and accountability, political stability and absence of

<sup>&</sup>lt;sup>1</sup> Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Israel, Italy, Japan, South Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

violence/terrorism and control of corruption are also important factors that can influence growth, but they are more relevant when considering emerging or developing market economies. We focus on economic rather than political institutions, as they seem to have a more direct impact on growth Acemoglu et al. (2005a). WGIs take values that range from - 2.5 (poor) to +2.5 (excellent) governance performance. Henceforth, we use the normalized values of WGIs, which range from 0 to 1.

As in Bouis et al. (2012a, b) and in Ebeke et al. (2018) a reform (governance) shock is identified as a drop (increase) in the relevant OECD (WGI) index. The reform variable is defined as a dummy variable that takes the value of one when a reform shock is observed and zero otherwise. This way we only consider the differences (of the relevant indicators) over time and not the specific levels of the indicators. We create two different reform (or governance) shocks based on the intensity of the policy change. First, when the drop (increase) in the OECD (WGI) indicator is greater than the average change of the indicator over the whole sample a reform dummy variable takes the value 1 indicating a reform (or a governance change), we call this a moderate reform or policy change. Second, we consider a more intense reform (or governance) shock when the drop (increase) in the OECD (WGI) indicator is greater than the average change of the indicator over the wholesample plus one standard deviation, we call this a major reform or policy change..

The macroeconomic variables used are the following: gross domestic product in constant local currency, public debt ratio, trade openness, employment rate, short-term interest rate, output gap, inflation rate, cyclical adjusted primary balance as % of potential GDP. The macroeconomic data are obtained from the World Bank and the OECD and cover the period 1990-2019.

#### 3. Methodology

We use the local projection method introduced by Jorda (2005) to estimate the shortterm effects of reforms and governance improvements on growth. The basic concept of this method is to estimate local projections at each period of interest rather than projecting onto progressively distant horizons from a given model, as vector auto-regressions (VAR)do. Local projections have many advantages: first, they can be estimated using basic regression approaches with conventional regression packages, and second, they are more resilient to misspecification. Three, joint or point-wise analytic inference is easy, and four, they conveniently permit experimentation with highly nonlinear and flexible specificationsthat would be difficult in a multivariate setting.

The baseline specification we use is:

$$y_{i,t+h} - y_{i,t-1} = \alpha_{i,h} + \gamma_{t,h} + \beta_{1kh} \sum_{k=1}^{4} (y_{i,t-k} - y_{i,t-1-k}) + \beta_{2jh} \sum_{j=0}^{2} I_{i,t-j} + \beta_{3h} \sum_{h=1}^{h} I_{i,t+h} + \beta_{4h} X_{i,t-1} + \varepsilon_{i,t+h}$$
(1)

Where h = 0, 1, 2, 3, 4, 5, y is the logarithm of real GDP, hence the left hand side variable  $y_{i,t+h}-y_{i,t-1}$  denotes the cumulative response of real GDP growth from t-1 to t+h to an exogenous policy change in the OECD or the WGI indicator which is represented by  $I_{i,t}$  at time t, where i indexes the countries in our sample. Therefore, we examine the cumulative impact on the dependent variables from t to t+1, t+2 ... t+5 following a policy change (reform or institutional improvement) in period 0. By using this method, we avoid endogeneity issues between reforms and institutional improvements and GDP growth realizations. In equation (1)  $\beta_{2jh}$  when j = 0 denotes the response of the variable of interest (OECD or WGI indicators) in each h year after the policy change,  $\alpha_{i,h}$  are country fixed effects,  $\gamma_{t,h}$  are time fixed effects.

The term  $\sum_{k=1}^{4} (y_{i,t-k}-y_{i,t-1-k})$  is an AR(4) term for growth rate between t - k and t - 1 - k.  $\sum_{j=0}^{2} I_{i,t-j}$  when j = 1,2 are two lags of the treatment variable and  $\sum_{h=1}^{h} I_{i,t+h}$  is the Teulings and Zubanov (2014) correction, it is included to avoid the bias that results from overlapping forecast horizons.  $X_{i,t-1}$  is a vector of control variables including two lags of reform shocks and a global financial crisis dummy variable. The selection of lags was made with the Acaike criterion, taking into account the value of the index and the size of the sample.

Next, we want to examine whether the effect of reforms in the labor and product market institutions and the quality of the governance framework vary depending on the state of the business cycle, the level of public debt, EPL (PMR) regulation for product market reforms (labor market reforms), governance effectiveness for product market and labor market reforms, the employment rate, trade openness and monetary policy stance. Local projections offer a very convenient way to account for state dependence.

To this end, we estimate:

$$y_{i,t+h} - y_{i,t-1} = \alpha_{i,h} + \gamma_{t,h} + \beta_{\alpha,h} F(z_{i,t}) I_{i,t} + \beta_{\beta,h} (1 - F(z_{i,t})) I_{i,t} + \beta_{1kh} \sum_{k=1}^{n} (y_{i,t-k} - y_{i,t-1-k}) + \beta_{2jh} \sum_{j=1}^{2} I_{i,t-j} + \beta_{3h} \sum_{h=1}^{h} I_{i,t+h} + \beta_{4h} X_{i,t-1} + \varepsilon_{i,t+h}$$
(2)

Δ

With

$$F(z_{i,t}) = \frac{\exp(-\gamma z_{i,t})}{1 + \exp(-\gamma z_{i,t})}, \gamma > 0 \quad (3)$$

As in Duval et al. (2022) we use F(.) which is a smooth transition function (with  $\gamma = 1.5$ ) introduced by Auerbach and Gorodnichenko (2012) this term is essentially the probability of being in a recession depending on the state of the economy  $z_{i,t}$  which in our case is the 2-year moving average of GDP growth rate (standardized). So when  $F(z_{i,t}) = 1$  the economy is in extreme recession, whereas when  $F(z_{i,t}) = 0$  the economy is in extreme expansion.  $X_{i,t-1}$  contains the same set of control variables as with the baseline model. The collection of  $\beta_{\alpha,h}$  and  $\beta_{\beta,h}$  coefficients directly provide the state dependent responses of variable  $y_{i,t+h}-y_{i,t-1}$  at time t + h to the shock at time t. Given our specification,  $\beta_{\alpha,h}$  indicates the response of  $y_{i,t+h}-y_{i,t-1}$  to periods when there is a reduction in real GDP from one year to another whereas  $\beta_{\beta,h}$  shows the effect in times where real GDP is increased from one year to the next.

Furthermore, as in Duval and Furceri (2018), we calculated whether the impact of reforms in one area is affected by the level of regulation in another. This is done by reestimating equation (3) above but replacing in  $z_{i,t}$  the level of regulation.

Alternatively, to estimate the state-dependent local projections we use dummy variables.

$$y_{i,t+h} - y_{i,t-1} = \alpha_{i,h} + \gamma_{t,h} + \beta_{\alpha,h} D_{r,i,t} I_{i,t} + \beta_{\beta,h} (1 - D_{r,i,t}) I_{i,t} + \beta_{1kh} \sum_{k=1}^{r} (y_{i,t-k} - y_{i,t-1-k}) + \beta_{2jh} \sum_{j=1}^{2} I_{i,t-j} + \beta_{3h} \sum_{h=1}^{h} I_{i,t+h} + \beta_{4h} X_{i,t-1} + \varepsilon_{i,t+h}$$
(4)

 $D_{r,i,t}$  is a dummy variables indicating the various states we are examine. We use dummy variables to study the GDP growth response to reforms when the public debtratio is above or below 80% of GDP in line with Banerjee and Zampolli (2019), above or below the sample average of governance effectiveness, employment rate, trade openness, and at times of tight or loose monetary policy. These various states are taken into accountbecause they might be important for the direction of the growth effect of reforms. For example, more closed economies might have to first improve their institutional setting and liberalize their market before they can be able to reap benefits from opening up to international competitions. Countries with lower employment rate face a serious structural challenge, which lowers their potential growth, so the liberalization of labor and product markers could be only way forward for them. Finally, countries facing high public debt, tight monetary conditions and having a weak governance framework might benefit the most from structural

reforms and governance improvements.

To identify periods with tight or loose monetary policy we follow Banerjee and Zampolli (2019) where tight is defined with a dummy variable taking the value 1 when the policy rate is greater than what is predicted from a Taylor rule. The monetary policy rule is estimated by regressing the policy rate on the current inflation rate, the output gap and an ex-ante short-term interest rate with fixed effects and time trend.

## **3.1** Augmented inverse probability weighting method for average treatment effect of reforms

This Section presents the AIPW method for the ATE of structural reforms suggested by Jorda and Taylor (2016). Following De Haan and Wiese (2022) and Glynn and Quinn (2010) as a first step we construct propensity scores from a latent model that describes the likelihood of implementing structural reforms (and governance improvements) based on various reform predictors. Then we use the propensity scores to reweight our sample of the LP regressions, thus, correcting the selection bias and creating a quasi-random distribution of treatment and control observations. Finally, to obtain the ATE we estimate the conditional mean average from the LP regression estimates of each subpopulation (treated and control) and calculate the differences between them at each horizon (h).

As previously stated, the propensity scores employed here are based on probit models constructed for each one of the reform (and governance) variables. The probit model used to predict product market reforms includes four lags of the first differences of GDP, the unemployment rate, public debt , an election dummy and four lags of the OECD product market regulation indicator.

Labor market reform predictors consists of four lags of the first differences of GDP, three lags of the contractionary fiscal policy dummy<sup>2</sup>, elections dummy, public debt as % of GDP, three lags of the employment rate and three lags of the employment protection regulation indicator.

The identification of likely predictors of the three WGIs is more challenging. Therefore, we incorporate a wide range of possible macroeconomic and institutional predictors. In addition, we add the three remaining WGIs (control of corruption, political stability, voice and accountability) to take into account likely correlation among the WGIs. The probit

 $<sup>^{2}</sup>$  Contractionary fiscal policy periods are identified by a dummy variable taking the value 1 when the cyclical adjusted primary balance change is greater than zero.

model for governance effectiveness includes three lags of the governance effectiveness, regulatory quality, and rule of law indicators as well as two lags of fiscal residuals from a fiscal rule<sup>3</sup>, two lags of the short term interest rate, two lags of the political stability and absence of violence index, the voice and accountability index and the control of corruption index and two lags of the first differences of real GDP.

Predictors for regulatory quality reforms are three lags of the first differences of real GDP three lags of the unemployment rate, the governance effectiveness index, the regulatory quality index, the rule of law index estimate, the control of corruption political stability, and voice and accountability. We also include two lags of election dummy, two lags of short-term interest rate and a lag of fiscal residuals.

Finally, the variables used to predict rule of law are four lags of the first differences of GDP, three lags of unemployment rate, governance effectiveness, regulatory quality, rule of law, control of corruption, political stability, voice and accountability, election dummy and a contractionary fiscal policy dummy. The marginal effects of the probit models are presented in Appendix A.

The ROC Area value obtained from the models above for each of the reform variables are 0.80 (0.83) for moderate (major) product market reforms, 0.80 (0.84) for moderate (major) labor market reforms, 0.74 (0.78) for moderate (major) governance effectiveness changes, 0.71 (0.73) for moderate (major) regulatory quality changes and 0.69 (0.85) for moderate (major) rule of law reforms. These values are considerably high, implying that the models can predict reform shocks satisfactorily. Mandrekar (2010) points out that in general, an AUC of 0.5 suggests no discrimination, 0.7 to 0.8 is considered acceptable, 0.8 to 0.9 is considered excellent, and more than 0.9 is considered outstanding. Hence, we will not examine the minor reform shock which based on the rule of law index as the ROC area is not satisfactory.

Figure 1 shows estimates of the smooth kernel density for the propensity score distribution for the treatment and control groups to check for overlap. Despite the high ROC Area, there is considerable overlap between the distributions, which indicates that we have a satisfactory first-stage.

<sup>&</sup>lt;sup>3</sup> Residuals are obtained from a fiscal rule as suggested by Galí and Perotti (2003) the change of cyclical adjusted primary balance (as a % of potential GDP) on its first lag, the first lag of ouput-gapand public debt with fixed effects and a time trend.



Figure 1: Overlap of propensity scores of reforms for minor reforms

Figure 1 shows that some observations are likely to receive very high weights. Specifically, in (a) and (b) there are control units whose propensity score almost zero and as Jorda and Taylor (2015) point out it is recommended to truncate<sup>43</sup> the maximum weights (Imbens, 2004;Cole and Hernan, 2008).



(a) Product market regulation



(c) Governance effectiveness



(b) Employment protection legislation

Figure 2: Overlap of propensity scores of reforms for major reform shocks

The same stands for bigger shocks as shown in Figure 2. For this reason, we truncate propensity scores for all major reforms.

<sup>&</sup>lt;sup>4</sup> As Jorda and Taylor (2015) we truncate the values of propensity scores that are below 0.1 and above 0.9

#### 4. Results

Tables 1-8 report the cumulative impulse responses over a six years horizon. Year 0 refers to the year prior to the policy change while year 1 is the year of the policy change. Years 2, 3, 4 and 5 refer to the five-year horizon after the policy change.

In Table 1, we present the ATE effects of reforms for both moderate and intense or major reforms. Moderate product market reforms have an insignificant effect on growth. On the other hand, a major product market reform decreases real GDP cumulatively by 3.8% over a five-year horizon. These negative short-term effects of product market reformscould be explained on the basis of a creative destruction argument (Schumpeter, 1942). They facilitate firm entry and exit from industries and the reallocation of resources and employment from less to more productive firms and consequently create reallocation costs and frictional unemployment leading, thus, to temporarily negative growth (see Dachs et al., 2017). Both moderate and intense labor market reforms have a negative effect on growth in line with de Haan and Wiese (2022).

On the other hand, reforms that aim to improve the standards of public and economic institutions ensure the efficient functioning of the economy and consequently have an immediate positive effect on growth. Specifically, major regulatory quality improvements increase output by 1.4% over five years. A major improvement in the rule of law index increases real GDP by 1.4% cumulatively over a five-year horizon. While major improvements in government effectiveness have a positive growth effect, which is statistically significant only for 2 years after the shock.

Major product market reforms lower growth both in periods of expansion and recession (Table 2). In particular, a sizeable product market reform decreases real GDP by 2.6% over a five-year horizon in periods of expansion while in periods of recession real GDP de-clines by 5.1%. In contrast with Duval and Furceri (2018) we find positive growth effects from labor market reforms in periods of recession; specifically, labor market reforms increase real GDP by 1.1% over a five year horizon in periods of recession. Governance effectiveness improvements can help countries in a recession. Specifically, a major reformin governance effectiveness increases real GDP by 1.7%. A sizeable policy changes in regulatory quality increases real GDP by 2.1% in recessions. While, rule of law improvements raise real GDP by 3% in recessions.

As Masuch et al., (2018) point out the benefits of efficient deregulation is heavily dependent on the effectiveness of the reform implementation – and thus on the qualityof institutions. Although major product market reform shocks have a negative effecton real GDP both in cases of high and low governance effectiveness (Table 3), in casesof moderate product market reforms, there are real GDP gains in countries with high government effectiveness. Countries with better governance enjoy positive growth effects following both moderate and intense labor market reforms. Specifically a moderate labor market reform increases real GDP by 6% in a five-year horizon, whereas a major labor market reform raises real GDP by 2.9% until the end of the forecast horizon.

The implementation of moderate product market reforms have substantial positive growth effects in countries with less strict employment protection legislation i.e., product market reforms increase real GDP by 3.13% cumulatively over a five year horizon when countries have implemented labor market reforms in advance. There are negative effectson growth in case of major product market reforms that are implemented in a highly regulated labor market. This finding could be associated with the increased reallocation costs incurred in the context of a highly regulated labor market that inhibits the efficient allocation of resources. On the contrary, labor market reforms have negative growth effects (as in Table 1), independently of the product market regulation. The findingsof Table 4 imply that the sequencing of major reforms is irrelevant for growth, because the negative implication of the policy change are very sizeable. However, in case of moderate policy changes, contrary to Blanchard and Giavazzi (2003), it is preferable to first liberalize the labor market and then to open up product markets to competition. Combining these findings with those reported in Table 3 we conclude that priority should be given first to governance or institutional improvements and then to labor market reforms, with moderate product market interventions being the last ones.

Table 5 shows the impact of reforms and WGI improvements on real GDP when public debt is above or below 80% of GDP. Product market reforms have negative effects on real GDP for both countries with high and low government debt, however, the effect is more pronounced in high debt countries. Real GDP decreases by 3.3% in moderate reforms and by 5.9% in major reforms. Labor market reforms have a slightly negative effect for countries with high government debt both in moderate and major reforms. On the other hand, labor market reform increase real GDP by 1.1% for moderate and by 1.8% for major policy changes in countries with low public debt. Major governance effectiveness improvements increase output by 1.7% cumulatively over a five-year horizon when the government debt

is low; whereas, in all other cases changes in government effectiveness have a negative effect on growth. Regulatory quality improvements can help countries with high indebtedness, raising real GDP by 3.3% in case of moderate policy changes and by 8.0% in case of major policy changes. Rule of law improvements are beneficial for all countries. Real GDP increases by 2.6% and by 1.7%, respectively, in high and low public debt countries. Economic institution improvements may alleviate the indebtedness problems with better use of government expenditures and improvements of the regulatory, justice and tax administration systems, thereby lowering the economic and social costs associated with high debt and boosting economic performance (see also Masuch et al., 2016). Intense or major product market reforms have negative growth effects independently of the level of trade openness (Table 6). Labor market reforms can substantially help countries with low trade openness; real GDP increases by 2.4% in case of moderate policychanges and by 3.8% in case of major policy changes. On the contrary, both moderate and major labor market reforms exert a negative effect on real GDP in high trade openness countries. Additionally, major governance improvements have positive effects on real GDP for countries with high trade openness, which cumulatively adds to 1.5% over a five-year horizon. Moderate regulatory quality improvements increase real GDP by 1.5% cumulatively over a five-year horizon while major improvements in regulatory quality increase real GDP by 4.3% in countries with high trade openness. On the contrary, the growth effect is negative in case of major regulatory changes in countries with low trade openness. Rule of law improvements increase real GDP by 1.1% by the end of the forecasthorizon in countries with low trade openness.

Product market reforms have negative growth effects independently of the level of employment rate (Table 7). On the contrary, labor market reforms have positive growth effects in countries with high employment rate. In particular, a labor market reform shock increases GDP by 4.1% over a five-year horizon in case of moderate policy changes and by 3% in case of major policy changes. Labor market reforms adjust regulations to allow workers and firms having a better access and fit to employment opportunities. High employment rate and deregulated labor markets imply less frictional unemployment and faster recruiting. On the other hand, better economic institutions help countries with low employment rate as they improve public administration and law enforcement. Hence, major governance improvements in countries with low employment rate raise real GDP by 1.7% cumulatively over a five-year forecast horizon. Countries with low employment rate can benefit also from regulatory quality improvements as real GDP increases by 3.2% in

case of moderate policy interventions (4.6% in case of major reforms). Policy changes that enhance the enforcement of the rule of law help countries in both low and high employment rate states, real GDP increases by 3.8% and by 1.1%, respectively, in low and high employment rate states.

Major product and labor market reforms have negative effects on output for both tight and loose monetary policy (Table 8). Major governance effectiveness improvements increase real GDP cumulatively by 1.6% over a five-year horizon in states with tight monetary policy but decreases real GDP by 1.1% in states with loose monetary policy. Regulatory quality changes decrease GDP in both states. Rule of law improvements have positive growth effects, in particular they increase real GDP by 2.4% in states with loose monetary policy and by 1.3% in states with tight monetary policy.

	(0)	(1)	(2)	(3)	(4)	(5)
	lgdp0	lgdp1	lgdp2	lgdp3	lgdp4	lgdp5
Product market regulation						
Moderate reform	0.0038	0.0044	0.0036	-0.0013	-0.0040	-0.0086
	(0.0026)	(0.0031)	(0.0038)	(0.0043)	(0.0060)	(0.0064)
Major reform	-0.0057***	-0.0161***	-0.0264***	-0.0347***	-0.0452***	-0.0380***
	(0.0013)	(0.0041)	(0.0071)	(0.0084)	(0.0085)	(0.0062)
Observations	510	510	510	483	456	429
Employment protection legislation						
Moderate reform	-0.0029**	-0.0068***	-0.0188***	-0.0160**	-0.0131	-0.0039
	(0.0012)	(0.0023)	(0.0050)	(0.0070)	(0.0084)	(0.0096)
Major reform	-0.0025***	-0.0076***	-0.0255***	-0.0148***	-0.0132***	-0.0035
	(0.0009)	(0.0016)	(0.0033)	(0.0030)	(0.0033)	(0.0036)
Observations	545	518	491	464	437	410
Governance effectiveness						
Moderate reform	0.0011	0.0023	-0.0027	-0.0073	-0.0012	0.0013
	(0.0022)	(0.0044)	(0.0076)	(0.0082)	(0.0061)	(0.0063)
Major reform	0.0043	0.0117**	$0.0090^{*}$	0.0007	0.0023	0.0021
	(0.0025)	(0.0043)	(0.0052)	(0.0045)	(0.0037)	(0.0036)
Observations	439	409	379	349	319	290
Regulatory quality						
Moderate reform	0.0019	-0.0025	-0.0063	-0.0037	0.0013	-0.0038
	(0.0018)	(0.0034)	(0.0058)	(0.0061)	(0.0051)	(0.0049)
Major reform	-0.0057**	0.0016	0.0018	0.0032	0.0108	0.0141*
	(0.0026)	(0.0038)	(0.0047)	(0.0061)	(0.0069)	(0.0080)
Observations	425	395	365	335	306	277
Rule of law						
Major reform	0.0058***	0.0068**	0.0107**	0.0130**	0.0122**	0.0144**
	(0.0016)	(0.0028)	(0.0044)	(0.0056)	(0.0060)	(0.0066)
Observations	425	395	365	335	306	277

#### Table 1. Impact estimates of ATE of structural reforms on GDP baseline

Full set of estimates are available upon request.We do not examine moderate reforms of rule of law

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

## Table 2. Impact estimates of ATE of structural reforms on GDP in recession and expansion

	(0) lad <b>a</b> 0	(1)	(2) lada2	(3) lada2	(4)	(5)
Product market regulation	Igapo	Igapi	Igdp2	1gap 5	1gap4	Igapo
I foddet market fegulation						
Moderate reform expansion	0.0015	-0.0003	0.0026	0.0041	-0.0064	0.0033
	(0.0071)	(0.0084)	(0.0115)	(0.0153)	(0.0174)	(0.0181)
Moderate reform recession	0.0083	0.0131	0.0045	-0.0035	-0.0145	-0.0094
	(0.0064)	(0.0119)	(0.0147)	(0.0163)	(0.0141)	(0.0144)
Observations	590	559	528	497	466	435
Major reform expansion	-0.0156***	-0.0256***	-0.0279***	-0.02/0***	-0.0284**	-0.0262*
Major reform recoggion	(0.0041)	(0.0008)	(0.0078)	(0.0096)	(0.0111)	(0.0132)
Major reform recession	(0.0087)	-0.0005	-0.0193	-0.0380	-0.0333	-0.0310
Observations	(0.0043)	(0.0001)	(0.0004)	(0.0080)	(0.0089)	(0.0078)
	570	557	520	477	400	433
Employment protection legislation						
Moderate reform expansion	-0.0159***	-0.0315***	-0.0410***	-0.0453***	-0.0474**	* -0.0389**
	(0.0037)	(0.0076)	(0.0120)	(0.0137)	(0.0156)	(0.0149)
Moderate reform recession	0.0107***	0.0197***	0.0174***	0.0207***	0.0154**	0.0043
	(0.0035)	(0.0061)	(0.0058)	(0.0063)	(0.0071)	(0.0070)
Observations	460	460	429	398	367	336
Major reform expansion	-0.0184	-0.0346	-0.0356	-0.0334	$-0.0308^{\circ}$	-0.0208
Major reform recordion	(0.0033)	(0.0009)	(0.0100)	(0.0111)	(0.0128)	(0.0138)
Major reform recession	(0.0049)	(0.0088)	(0.0100)	(0.0108)	(0.0143)	(0.0060)
Observations	(0.0037)	(0.0002)	(0.0008)	398	(0.0081)	(0.0009)
	400	400	427	570		330
Governance effectiveness						
Moderate reform expansion	0.0012	0.0098	0.0038	-0.0185	-0.0088	-0.0065
	(0.0063)	(0.0102)	(0.0149)	(0.0189)	(0.0163)	(0.0132)
Moderate reform recession	0.0002	-0.0080	-0.0080	0.0075	0.0029	0.0041
	(0.0069)	(0.0109)	(0.0116)	(0.0121)	(0.0110)	(0.0098)
Observations	409	409	379	349	319	290
Major reform expansion	-0.0110**	-0.0184*	-0.0285**	-0.0455***	-0.0255*	-0.0061
	(0.0053)	(0.0098)	(0.0113)	(0.0140)	(0.0133)	(0.0114)
Major reform recession	0.0144	0.0338	0.0412	0.0405	0.0318	0.0170
Observations	(0.0066)	(0.0103)	(0.0115)	(0.0097)	(0.0089)	(0.0072)
	409	409	379	549	519	290
Regulatory quality						
Moderate reform expansion	-0.0032	-0.0105	-0.0118	0.0013	0.0138	0.0067
	(0.0089)	(0.0147)	(0.0181)	(0.0214)	(0.0228)	(0.0172)
Moderate reform recession	0.0063	0.0056	0.0039	0.0045	0.0017	-0.0034
	(0.0070)	(0.0113)	(0.0136)	(0.0142)	(0.0146)	(0.0125)
Observations	401	401	371	341	311	281
Major reform expansion	-0.0116*	-0.0241*	-0.0357***	-0.0170	0.0015	0.0200
Maine auforma anna inn	(0.0065)	(0.0123)	(0.0129)	(0.0126)	(0.0130)	(0.01/5)
Major reform recession	(0.0018)	(0.0230)	(0.0539	(0.0110)	0.0248	(0.0217)
Observations	(0.0003)	(0.0100)	(0.0131)	(0.0119)	(0.0108)	(0.0119)
	402	402	572	342		
Rule of law						
Major reform expansion	-0.0175**	-0.0293**	-0.0294	-0.0192	-0.0149	-0.0013
	(0.0065)	(0.0130)	(0.0187)	(0.0209)	(0.0189)	(0.0161)
Major reform recession	0.0242***	0.0370***	0.0479***	0.0446***	0.0378***	0.0307***
	(0.0055)	(0.0105)	(0.0121)	(0.0114)	(0.0104)	(0.0089)
Observations	395	395	365	335	306	277

## Table 3. Impact estimates of ATE of structural reforms on GDP in cases with high and low governance

	(0)	(1)	(2)	(3)	(4)	(5)
	lgdp0	lgdp1	lgdp2	lgdp3	lgdp4	lgdp5
Product market regulation						
Moderate reform low governance	0.0027	$0.0051^{*}$	0.0023	-0.0003	-0.0115	-0.0005
	(0.0026)	(0.0028)	(0.0034)	(0.0053)	(0.0087)	(0.0070)
Moderate reform high governance	0.0025**	0.0041***	0.0079***	0.0052**	0.0046	$0.0082^{*}$
	(0.0011)	(0.0013)	(0.0022)	(0.0019)	(0.0035)	(0.0046)
Observations	514	483	452	421	390	359
Major reform low governance	-0.0027*	-0.0144***	-0.0330***	-0.0452***	-0.0588***	-0.0490***
5 6	(0.0015)	(0.0035)	(0.0045)	(0.0065)	(0.0067)	(0.0069)
Major reform high governance	-0.0078***	-0.0147***	-0.0208***	-0.0123***	-0.0122***	-0.0047
	(0.0004)	(0.0010)	(0.0017)	(0.0016)	(0.0018)	(0.0028)
Observations	514	483	452	421	390	359
Employment protection legislation						
Moderate reform low governance	-0.0024	-0.0067***	-0.0184***	-0.0170***	-0.0248***	-0.0323***
	(0.0015)	(0.0024)	(0.0036)	(0.0048)	(0.0058)	(0.0067)
Moderate reform high governance	0.0046***	0.0149***	0.0304***	0.0243***	0.0396***	0.0619***
	(0.0008)	(0.0011)	(0.0021)	(0.0012)	(0.0017)	(0.0022)
Observations	471	440	409	378	347	316
Major reform low governance	-0.0051***	-0.0122***	-0.0162***	-0.0063***	-0.0052*	-0.0072*
	(0.0014)	(0.0024)	(0.0024)	(0.0022)	(0.0027)	(0.0039)
Major reform high governance	-0.0101***	-0.0044***	0.0204***	0.0156***	0.0058***	0.0293***
	(0.0002)	(0.0007)	(0.0018)	(0.0013)	(0.0011)	(0.0015)
Observations	471	440	409	378	347	316

## Table 4. Impact estimates of ATE of the complementarity of PMR and EPLreforms onGDP

	(0)	(1)	(2)	(3)	(4)	(5)
	lgdp0	lgdp1	lgdp2	lgdp3	lgdp4	lgdp5
Product market regulation						
Moderate reform high EPL regulation	0.0078	0.0071	0.0054	0.0003	-0.0114	-0.0103
	(0.0046)	(0.0049)	(0.0058)	(0.0077)	(0.0107)	(0.0109)
Moderate reform low EPL regulation	-0.0092*	-0.0010	0.0063	0.0117	0.0241**	0.0313**
	(0.0051)	(0.0060)	(0.0069)	(0.0088)	(0.0110)	(0.0120)
Observations	477	454	431	408	385	362
Major reform high EPL regulation	-0.0036	-0.0130**	-0.0245***	-0.0352***	-0.0433***	-0.0430***
	(0.0021)	(0.0049)	(0.0069)	(0.0102)	(0.0105)	(0.0114)
Major reform low EPL regulation	-0.0004	-0.0001	0.0023	0.0046	0.0029	0.0102
	(0.0025)	(0.0048)	(0.0071)	(0.0100)	(0.0119)	(0.0141)
Observations	477	454	431	408	385	362
Employment protection legislation						
Moderate reform high PMR regulation	0.0000	$0.0000^{**}$	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Moderate reform low PMR regulation	-0.0016	-0.0034	-0.0113**	-0.0112*	-0.0134*	-0.0130*
	(0.0013)	(0.0023)	(0.0052)	(0.0056)	(0.0067)	(0.0077)
Observations	460	460	429	398	367	336
Major reform high PMR regulation	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***	-0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Major reform low PMR regulation	-0.0066***	-0.0125***	-0.0126***	-0.0077***	-0.0067***	-0.0025
	(0.0011)	(0.0020)	(0.0029)	(0.0021)	(0.0021)	(0.0028)
Observations	460	460	429	398	367	336

Table 5.	Impact estimates	of ATE of structura	l reforms on GDI	P in cases with high
andlow	public debt ratio			

	(0) lgdp0	(1) lødn1	(2) ladn2	(3) ladn3	(4) lgdp4	(5) Igdp5
Product market regulation	Igupo	igupi	Igup2	igup5	Igup4	igup5
Moderate reform public debt ratio>80	-0.0010	-0.0035	-0 0098**	-0 0244***	-0 0393***	-0.0337***
inodefate feforini public debi fatio/00	(0.0028)	(0.0038)	(0.0047)	(0.0065)	(0.0085)	(0.0111)
Moderate reform public debt ratio<80	0.0046**	0.0083***	0.0097***	0.0099***	0.0040	0.0086
r	(0.0020)	(0.0024)	(0.0028)	(0.0035)	(0.0055)	(0.0057)
Observations	590	559	528	497	466	435
Major reform public debt ratio>80	-0.0038**	-0.0304***	-0.0621***	-0.0875***	-0.0893***	-0.0597***
<b>5 1</b>	(0.0018)	(0.0039)	(0.0069)	(0.0097)	(0.0104)	(0.0084)
Major reform public debt ratio<80	-0.0036**	-0.0101***	-0.0167***	-0.0221***	-0.0335***	-0.0370***
	(0.0015)	(0.0034)	(0.0038)	(0.0046)	(0.0050)	(0.0052)
Observations	590	559	528	497	466	435
Employment protection legislation						
Moderate reform public debt ratio>80	-0.0039***	-0.0217***	-0.0380***	-0.0348***	-0.0489***	-0.0600***
I	(0.0010)	(0.0019)	(0.0025)	(0.0033)	(0.0035)	(0.0045)
Moderate reform public debt ratio<80	-0.0017	-0.0003	-0.0042	-0.0037	0.0001	0.0113**
	(0.0010)	(0.0017)	(0.0048)	(0.0043)	(0.0043)	(0.0047)
Observations	491	460	429	398	367	336
Major reform public debt ratio>80	-0.0094***	-0.0282***	-0.0282***	-0.0217***	-0.0361***	-0.0094***
	(0.0013)	(0.0024)	(0.0028)	(0.0020)	(0.0015)	(0.0015)
Major reform public debt ratio<80	0.0024***	0.0089**	* 0.0136**	* 0.0138***	0.0150***	0.0182***
	(0.0005)	(0.0011)	(0.0026)	(0.0023)	(0.0024)	(0.0033)
Observations	491	460	429	398	367	336
Governance effectiveness						
Moderate reform public debt ratio>80	0.0065***	0.0107	0.0013	-0.0089	-0.0222**	-0.0332***
1	(0.0020)	(0.0073)	(0.0108)	(0.0070)	(0.0092)	(0.0074)
Moderate reform public debt ratio<80	-0.0016	-0.0053	-0.0072	-0.0104*	-0.0095*	-0.0069**
	(0.0029)	(0.0043)	(0.0064)	(0.0055)	(0.0039)	(0.0033)
Observations	439	409	379	349	319	290
Major reform public debt ratio>80	-0.0026	0.0062	-0.0015	-0.0105**	0.0042	0.0016
	(0.0025)	(0.0066)	(0.0053)	(0.0047)	(0.0074)	(0.0041)
Major reform public debt ratio<80	-0.0035	-0.0166***	-0.0010	0.0114**	0.0063***	0.0170***
	(0.0038)	(0.0014)	(0.0044)	(0.0047)	(0.0019)	(0.0015)
Observations	152	143	134	126	117	108
Regulatory quality						
Moderate reform public debt ratio>80	0.0005	0.0183**	0.0388***	$0.0274^{**}$	$0.0293^{*}$	0.0336**
	(0.0024)	(0.0073)	(0.0114)	(0.0127)	(0.0144)	(0.0127)
Moderate reform public debt ratio<80	0.0027	-0.0064*	-0.0126*	-0.0034	0.0013	-0.0081**
	(0.0021)	(0.0036)	(0.0064)	(0.0063)	(0.0048)	(0.0039)
Observations	431	401	371	341	311	281
Major reform public debt ratio>80	-0.0013	0.0207*	0.0307**	0.0399**	0.0378**	0.0803***
	(0.0033)	(0.0114)	(0.0132)	(0.0146)	(0.0162)	(0.0126)
Major reform public debt ratio<80	-0.0052	-0.0045	-0.0121	-0.0122	-0.0046	0.0014
Observations	(0.0027)	(0.0034)	(0.0043)	(0.0046)	(0.0045)	(0.0061)
	432	402	512	542	512	282
Rule of law						
Major reform public debt ratio>80	0.0057**	0.0128**	0.0299***	0.0405***	0.0376***	0.0266***
	(0.0024)	(0.0047)	(0.0081)	(0.0104)	(0.0094)	(0.0089)
Major reform public debt ratio<80	0.0044**	0.0024	0.0075**	0.0074*	0.0051	0.0178***
	(0.0019)	(0.0025)	(0.0035)	(0.0042)	(0.0039)	(0.0055)
Observations	425	395	365	335	306	277

## Table 6. Impact estimates of ATE of structural reforms on GDP in cases with high andlow trade openness

	(0)	(1)	(2)	(3)	(4)	(5)
	lgdp0	lgdp1	lgdp2	lgdp3	lgdp4	lgdp5
Product market regulation						
Moderate reform openness> average	0.0053	0.0040	-0.0019	-0.0079	-0.0277**	-0.0178*
	(0.0040)	(0.0054)	(0.0063)	(0.0072)	(0.0104)	(0.0090)
Moderate reform openness< average	0.0020	$0.0052^{*}$	0.0069**	0.0037	0.0029	0.0043
	(0.0017)	(0.0026)	(0.0033)	(0.0041)	(0.0050)	(0.0056)
Observations	590	559	528	497	466	435
Major reform openness> average	-0.0029	-0.0104*	-0.0263***	-0.0405***	-0.0457***	-0.0404***
	(0.0020)	(0.0061)	(0.0079)	(0.0079)	(0.0085)	(0.0081)
Major reform openness< average	-0.0033**	-0.0100***	-0.0164**	-0.0192***	-0.0283***	-0.0293***
	(0.0012)	(0.0027)	(0.0043)	(0.0057)	(0.0066)	(0.0075)
Observations	590	559	528	497	466	435
Employment protection legislation						
Moderate reform openness> average	-0.0048**	-0.0188***	-0.0388***	-0.0495***	-0.0571***	-0.0544***
	(0.0018)	(0.0029)	(0.0043)	(0.0050)	(0.0074)	(0.0093)
Moderate reform openness< average	0.0018***	0.0079***	0.0124***	0.0193***	0.0142***	0.0238***
	(0.0006)	(0.0013)	(0.0034)	(0.0022)	(0.0027)	(0.0034)
Observations	491	460	429	398	367	336
Major reform openness> average	-0.0113***	-0.0342***	-0.0377***	-0.0240***	-0.0207**	* -0.0229***
	(0.0018)	(0.0027)	(0.0032)	(0.0033)	(0.0030)	(0.0040)
Major reform openness< average	0.0050***	0.0184***	0.0201***	0.0211***	0.0257***	0.0378***
	(0.0004)	(0.0011)	(0.0029)	(0.0014)	(0.0010)	(0.0017)
Observations	491	460	429	398	367	336
Governance effectiveness						
Moderate reform openness> average	-0.0028	-0.0023	-0.0060	-0.0026	-0.0063	-0.0022
insterate fersion spenness, average	(0.0043)	(0.0077)	(0.0098)	(0.0089)	(0.0064)	(0.0079)
Moderate reform openness< average	0.0029	0.0028	0.0024	0.0003	0.0032	-0.0004
	(0.0018)	(0.0030)	(0.0046)	(0.0042)	(0.0038)	(0.0038)
Observations	439	409	379	349	319	290
Major reform openness> average	0.0078**	0.0205***	0.0263***	0.0154**	0.0168***	0.0156***
5 I C	(0.0034)	(0.0068)	(0.0072)	(0.0074)	(0.0060)	(0.0052)
Major reform openness< average	-0.0048	-0.0030	-0.0090**	-0.0119***	-0.0082**	-0.0045
5	(0.0032)	(0.0028)	(0.0041)	(0.0040)	(0.0038)	(0.0037)
Observations	439	409	379	349	319	290
Regulatory quality						
Moderate reform openness> average	0.0070**	0.0013	0.0050	0.0126	0 0252***	0.0157**
woderate reform openness> average	(0.0070)	(0.0013)	(0.0105)	(0.0120)	(0.0252)	(0.0137)
Moderate reform openness< average	-0.00091)	(0.0003)	(0.0103)	(0.0077)	(0.0005)	(0.0070)
woderate reform openness< average	(0.0009)	(0.0040)	(0.0053)	(0.0052)	(0.0010)	(0.0054)
Observations	(0.0017)	(0.0031)	(0.0055)	(0.0037)	(0.0039)	(0.0034)
Major reform openness> average	-0.0034	0.0015	0.0048	0.0241*	0.0369**	$\frac{201}{0.0432^{***}}$
wajor reform openness> average	(0.0032)	(0.0013)	(0.0105)	(0.0136)	(0.0145)	(0.0138)
Major reform openness< average	-0.0034	-0.0011	-0.0012	-0.0043	-0.0084**	-0.0074**
high felolin openness ( uterage	(0.0028)	(0.0034)	(0.0012)	(0.0043)	(0.0031)	(0.0031)
Observations	432	402	372	342	312	282
Rule of law						
Major reform openness everage	0.0071**	0.0040	0.0102	0.0110	0.0026	0.0005
wajor rerorm openness> average	(0,0071)	0.0009	(0.0103)	0.0118	0.0030	-0.0005
Major reform onemass s average	0.0029)	0.0041)	(0.0074)	(0.0094) 0.0124***	(0.0093) 0.0112**	(0.0114) 0.0117**
wajor reform openness< average	(0.0052)	(0.0003	(0.0020)	(0.0124)	(0.00112)	(0.0011)
Observations	(0.0015)	(0.0027)	(0.0038)	(0.0044)	(0.0045)	(0.0054)
Observations	423	393	303	333	300	211

## Table 7. Impact estimates of ATE of structural reforms on GDP in cases with high andlow employment rate

	(0)	(1)	(2)	(3)	(4)	(5)
	lgdp0	lgdp1	lgdp2	lgdp3	lgdp4	lgdp5
Product market regulation						
Moderate reform employment rates average	-0.0020	0.0007	0.0016	0.0004	0.0021	0.0041
Woderate reform employment rate> average	(0.0015)	(0.0007)	(0.0010)	(0.0004)	(0.0021)	(0.0047)
Moderate reform employment rate< average	0.0067	0.0049	0.0009	-0.0058	-0.0223***	-0.0061
inoderate reform employment rate v average	(0.0007)	(0.0038)	(0.0039)	(0.0051)	(0.0072)	(0.0071)
Observations	516	485	454	423	392	361
Major reform employment rate> average	-0.0041***	* -0.0147	*** -0.0089*	-0.0050**	* -0.0109***	-0.0135***
	(0.0007)	(0.0015)	(0.0015)	(0.0018)	(0.0016)	(0.0017)
Major reform employment rate< average	-0.0014	-0.0110***	-0.0316**	-0.0456**	* -0.0514***	-0.0363***
	(0.0021)	(0.0037)	(0.0048)	(0.0073)	(0.0071)	(0.0098)
Observations	516	485	454	423	392	361
Employment protection legislation						
Moderate reform employment rate> average	0.0003	0.0061***	0.0123***	0.0230***	0.0299***	0.0412***
	(0.0005)	(0.0013)	(0.0032)	(0.0016)	(0.0021)	(0.0025)
Moderate reform employment rate< average	0.0018	0.0007	0.0005	0.0054	0.0046	-0.0107
1,5,5,6,7,6,7,7,7,7,7,7,7,7,7,7,7,7,7,7,7	(0.0024)	(0.0038)	(0.0044)	(0.0049)	(0.0061)	(0.0075)
Observations	491	460	429	398	367	336
Major reform employment rate> average	-0.0058***	0.0032***	0.0135***	0.0165***	0.0146***	0.0309***
	(0.0001)	(0.0011)	(0.0035)	(0.0016)	(0.0016)	(0.0018)
Major reform employment rate< average	-0.0023	-0.0104***	-0.0118***	-0.0081**	-0.0118***	-0.0299***
	(0.0021)	(0.0034)	(0.0033)	(0.0032)	(0.0037)	(0.0049)
Observations	491	460	429	398	367	336
Governance effectiveness						
Moderate reform employment rate> average	0.0017	0.0025	0.0061	0.0059	$0.0070^{*}$	0.0009
	(0.0017)	(0.0025)	(0.0040)	(0.0048)	(0.0038)	(0.0041)
Moderate reform employment rate< average	0.0024	0.0043	-0.0007	-0.0016	-0.0039	-0.0009
	(0.0047)	(0.0071)	(0.0104)	(0.0111)	(0.0078)	(0.0064)
Observations	439	409	379	349	319	290
Major reform employment rate> average	0.0024	0.0057	0.0118*	0.0036	0.0028	0.0008
	(0.0026)	(0.0036)	(0.0058)	(0.0060)	(0.0046)	(0.0048)
Major reform employment rate< average	0.0081***	0.0276***	0.0232***	0.0151**	0.0205**	0.0178***
	(0.0023)	(0.0046)	(0.0046)	(0.0055)	(0.0076)	(0.0051)
Observations	439	409	379	349	319	290
Regulatory quality						
Moderate reform employment rate> average	-0.0042**	-0.0113**	-0.0171**	-0.0125**	-0.0089	-0.0099*
	(0.0018)	(0.0045)	(0.0070)	(0.0057)	(0.0055)	(0.0056)
Moderate reform employment rate< average	0.0134***	0.0177**	0.0222*	0.0315**	0.0420***	0.0325***
	(0.0047)	(0.0066)	(0.0110)	(0.0123)	(0.0103)	(0.0077)
Observations	431	401	371	341	311	281
Major reform employment rate> average	-0.0071**	-0.0076***	-0.0083*	-0.0067	-0.0076	-0.0071
	(0.0026)	(0.0023)	(0.0048)	(0.0050)	(0.0046)	(0.0061)
Major reform employment rate< average	0.0022	0.0276***	0.0410***	0.0562***	0.0702***	0.0766***
	(0.0036)	(0.0081)	(0.0085)	(0.0109)	(0.0114)	(0.0111)
Observations	432	402	372	342	312	282
Rule of law						
Major reform employment rate> average	0.0023	-0.0012	0.0031	0.0097***	$0.0075^{*}$	0.0119**
	(0.0015)	(0.0029)	(0.0038) (	0.0034)	(0.0038)	(0.0053)
Major reform employment rate< average	0.0119***	0.0239***	0.0331***	0.0435***	0.0426***	0.0380***
	(0.0030)	(0.0054)	(0.0087)	(0.0085)	(0.0078)	(0.0072)
Observations	425	395	365	335	306	277

## Table 8. Impact estimates of ATE of structural reforms on GDP in cases with loose and tight monetary policy

aught monetary poney						
	(0)	(1)	(2)	(3)	(4)	(5)
Product market regulation	lgdp0	lgdp1	lgdp2	lgdp3	lgdp4	lgdp5
i loudet market legalation						
Moderate reform loose monetary policy	0.0062*	0.0067*	0.0044	0.0010	-0.0109*	-0.0099
	(0.0035)	(0.0036)	(0.0044)	(0.0049)	(0.0058)	(0.0068)
Moderate reform tight monetary policy	0.0012	0.0036	0.0039	0.0015	-0.0012	0.0072
	(0.0019)	(0.0047)	(0.0066)	(0.0081)	(0.0110)	(0.0095)
Observations	550	520	490	461	432	404
Major reform loose monetary policy	-0.0026	-0.0104	-0.0209	-0.0288	-0.0292	-0.0314
Major reform tight monotory policy	(0.0013)	(0.0032)	0.0210***	(0.0074)	0.0717***	(0.0099)
Major reform tight monetary poncy	(0.0002)	(0.0070)	(0.0016)	(0.0423)	(0.0060)	(0.0051)
Observations	(0.0011)	(0.0029)	(0.0040)	(0.0054)	(0.0009)	(0.0031)
	550	520	490	401	432	404
Employment protection legislation						
Moderate reform loose monetary policy	0.0017	-0.0040*	-0.0105**	-0.0157***	-0.0129**	-0.0094**
	(0.0011)	(0.0022)	(0.0040)	(0.0051)	(0.0052)	(0.0042)
Moderate reform tight monetary policy	-0.0034**	-0.0059**	-0.0058*	-0.0037*	0.0080***	0.0078***
	(0.0015)	(0.0023)	(0.0030)	(0.0021)	(0.0022)	(0.0022)
Observations	456	426	396	366	337	308
Major reform loose monetary policy	-0.0026*	-0.0104***	-0.0209***	-0.0288***	-0.0292***	-0.0314***
	(0.0013)	(0.0032)	(0.0050)	(0.0074)	(0.0086)	(0.0099)
Major reform tight monetary policy	-0.0002	-0.0176***	-0.0319***	-0.0425***	-0.0717***	-0.0637***
	(0.0011)	(0.0029)	(0.0046)	(0.0054)	(0.0069)	(0.0051)
Observations	550	520	490	461	432	404
Governance effectiveness						
Moderate reform tight monetary policy	-0.0006	-0.0027	-0.0046	-0.0101**	-0.0117**	-0.0153**
	(0.0035)	(0.0057)	(0.0055)	(0.0042)	(0.0052)	(0.0060)
Moderate reform loose monetary policy	-0.0010	0.0004	0.0011	0.0059	0.0033	0.0068
	(0.0028)	(0.0051)	(0.0082)	(0.0096)	(0.0074)	(0.0069)
Observations	438	408	378	348	318	289
Major reform loose monetary policy	0.0026	0.0150***	0.0122***	0.0019	-0.0026	-0.0113**
	(0.0027)	(0.0040)	(0.0037)	(0.0061)	(0.0063)	(0.0044)
Major reform tight monetary policy	0.0102***	0.0114*	0.0046	0.0674	0.0147	0.0162**
	(0.0015)	(0.0041)	(0.0042)	(0.0050)	(0.0082)	(0.0077)
Observations	438	408	378	348	318	289
Regulatory quality						
Moderate reform loose monetary policy	0.0016	-0.0027	-0.0014	0.0124	0.0171**	0.0068
, , , , , , , , , , , , , , , , , , ,	(0.0026)	(0.0043)	(0.0075)	(0.0084)	(0.0068)	(0.0057)
Moderate reform tight monetary policy	0.0032	0.0003	-0.0052	-0.0035	-0.0041	-0.0135**
	(0.0025)	(0.0044)	(0.0053)	(0.0047)	(0.0043)	(0.0055)
Observations	429	399	369	339	309	279
Major reform loose monetary policy	0.0229**	0.0161*	-0.0006	-0.0180	-0.0512	-0.0798*
	(0.0091)	(0.0086)	(0.0136)	(0.0219)	(0.0359)	(0.0433)
Major reform tight monetary policy	0.0018	-0.0099	-0.0060	-0.0170	-0.0248	-0.0196
	(0.0028)	(0.0085)	(0.0098)	(0.0132)	(0.0160)	(0.0127)
Observations	360	360	333	306	279	252
Rule of law						
Major reform loose monetary policy	0.0050**	0.0016	0.0092	0.0126	0.0123*	0 0248***
major reform toose monetary poney	(0.0050)	(0.0010)	(0.0052)	(0.0120)	(0.0123)	(0.0062)
Major reform tight monetary policy	0.0052***	0.0057**	0.0082**	0.0167***	0.0142***	0.0135**
ingor rerorm ught monoury poncy	(0.0052)	(0.0024)	(0.0035)	(0.0039)	(0.0046)	(0.0057)
Observations	425	395	365	335	306	277
	. 20	070	2.55	200	200	

#### **5.** Conclusion

Despite the widespread belief that structural reforms and governance or institutional improvements are essential for economic growth, their implementation has been poor for many OECD countries for years. It is advocated by various international institutions (ECB 2015,2018;OECD 2021) that the adoption of a more flexible and deregulated economic structures coupled with governance improvements will allow OECD countries to deal more effectively with future economic crisis, by facilitating economic resilience and adaptation to changing economic conditions. This viewpoint served as the inspirationto examine how structural reforms and better governance may impact on growth in the short to medium term.

Building on an updated OECD product and labor market regulation database and on the World Bank worldwide governance indicators we find that changes in economic institutions and in labor market regulation (in some cases) primarily have positive effects on real GDP, while product market reforms, have modestly negative effects as in De Haanand Wiese (2022). In contrast to Duval and Furceri (2018) we found that labor market reforms have positive effects on growth when implemented during recession. Regulatory quality and rule of law improvements have positive effects on growth in countries with high indebtedness as in Masuch et al., (2016). Major rule of law improvements have a positive effect on growth. This finding is explained by the fact that ensuring the security of private contracts and property rights has a direct positive impact on economic growth as explained by Rodrick et al. (2004) and Acemoglu and Johnson (2005). Moderate product market reforms raise output when implemented in low employment protection legislation framework. Countries can benefit the most from the initiation of moderate labor and product market reforms in the context of an improved governance framework as this can help towards an effective implementation of reforms and ensure that they yield their full potential (as in Masuch et al., 2018).

Our findings have implications for the timing of reforms. Priority should be given to governance or institutional improvements, then to labor market reforms, while moderate product market reforms should be the last ones. Given that major labor and product market reforms are usually associated with lower output in the short to medium termit is worth considering a step-by-step approach and avoid drastic policy changes. Onthe other hand, big policy changes are preferable when considering improvements in the institutional setting (government effectiveness, regulatory quality and rule of law).

### References

Acemoglu, D., S. Johnson and J. Robinson (2004), "Institutions as the fundamental cause of long-term growth", NBER Working Paper No. 10481, National Bureau of Eco- nomic Research, Cambridge, MA.

Acemoglu, D., S. Johnson and J. Robinson (2005a), "The rise of Europe: Atlantic Trade, Institutional Change and Economic Growth", American Economic Review, Vol- ume 95, Issue 2, May, Pages 546-579.

Acemoglu, D. and Johnson, S. (2005b), "Unbundling institutions", Journal of Political Economy, Vol. 113, No 5, pp. 949-995.

Aghion P., Bloom N., Blundell R., Griffith R., Howitt P., (2009), "Competition and Innovation: an Inverted-U Relationship", The Quarterly Journal of Economics, Volume 120, Issue 2, May, Pages 701–728

Barkbu, B., Lusinyan, L. and Muir, D., (2014) "Assessing the Gains from Structural Reforms for Jobs and Growth", Chapter 7 in IMF, Jobs and Growth: Supporting the European Recovery.

Bassanini A., Duval R., (2009), "Unemployment, institutions, and reform complementarities: re-assessing the aggregate evidence for OECD countries", Oxford Review of Economic Policy, Volume 25, Issue 1, Spring, Pages 40–59

Blanchard, O., & Giavazzi, F. (2003). Macroeconomic effects of regulation and dereg- ulation in goods and labor markets. The Quarterly journal of economics, Volume 118, Issue 3, Pages 879-907.

Bordon A.R., Ebeke C., Shirono K. (2018). "When Do Structural Reforms Work? On the Role of the Business Cycle and Macroeconomic Policies." In: de Haan J., Parlevliet J. (eds) Structural Reforms. Springer, Cham.

Bouis, R., et al. (2012a), "The Short-Term Effects of Structural Reforms: An Empir- ical Analysis", OECD Economics Department Working Papers, No. 949, OECD Publish- ing, Paris, https://doi.org/10.1787/5k9csvk4d56d-en.

Bouis R, Causa O, Demmou L, Duval R, Zdzienicka A (2012b) How quickly does structural reform pay off? An empirical analysis of the short-term effects of unemploy- ment benefit reform. IZA J Labor Policy 1:1–12

Bouis, R., Causa, O., Demmou, L., Duval, R., & Zdzienicka, A. (2012), "The Short- Term Effects of Structural Reforms: An Empirical Analysis", OECD Economics Depart- ment Working Papers, No. 949, OECD Publishing, Paris.

Cacciatore M., Fiori G., (2016) "The macroeconomic effects of goods and labor mar-kets deregulation, Review of Economic Dynamics", Volume 20, Pages 1-24, Pages 1-24

Challe, E., Lopez, J. I., & Mengus, E. (2018). Institutional Quality and Capital In- flows: Evidence and Theory. HEC Paris Research Paper No. ECO/SCD-2018-1247.

Cole R. Stephen, Hernán A. Miguel (2008), "Constructing Inverse Probability Weightsfor Marginal Structural Models", American Journal of Epidemiology, Volume 168, Issue 6, Pages 656–664, September

Da Silva, A. D., Givone, A., & Sondermann, D. (2017). "When do countries implement structural reforms?" ECB Working Paper No. 2078.

Dachs, B., Hud, M., Koehler, C., & Peters, B. (2017). Innovation, creative destruction and structural change: firm-level evidence from European countries. Industry and Innovation, Volume 24, Issue 4, Pages 346-381.

de Haan, J., & Wiese, R. (2022). The impact of product and labor market reformon growth: Evidence for OECD countries based on local projections. Journal of Applied Econometrics, 1–25.

De Haan J., Parlevliet J. (2018) Structural Reforms: An Introduction. In: de Haan J., Parlevliet J. (eds) Structural Reforms. Springer, Cham.

Duval, R., & Furceri, D. (2018). "The effects of labor and product market reforms: The role of macroeconomic conditions and policies." IMF Economic Review, Vol. 66, No.1, pp. 31-69, March.

Duval, R., Furceri, D., & Jalles, J. T. (2022). Labor and product market reforms and external Imbalances: Evidence from advanced economies, Journal of International Money and Finance, 102513, ISSN 0261-5606.

ECB (2015), "Real convergence in the euro area: evidence, theory and policy implica-tions", ECB Economic Bulletin (5/2015), July, 30-45.

Égert, Balázs (2016). "Regulation, Institutions, and Productivity: New Macroeco- nomic Evidence from OECD Countries." American Economic Review, Vol. 106, No 5, pp.109-13.

Eggertsson, G., Ferrero, A., & Raffo, A. (2014). "Can structural reforms help Eu- rope?." Journal of Monetary Economics, Vol. 61, pp. 2-22, January.

Farber, H. S., & Valletta, R. G. (2015). "Do extended unemployment benefits lengthen unemployment spells? Evidence from recent cycles in the US labor market." Journal of Human Resources, Vol. 50, No. 4, pp. 873-909, July.

Fernández, A., & Tamayo, C. E. (2017). From institutions to financial development and growth: What are the links?. Journal of Economic Surveys, Vol.31, No. 1, pp. 17-57.

Fernández-Villaverde, J., Garicano, L., & Santos, T. (2013). Political credit cycles: the case of the Eurozone. Journal of Economic perspectives, 27(3), 145-66.

Galí, J., & Perotti, R. (2003). Fiscal policy and monetary integration in Europe.

Economic policy, Vol. 18, No. 37, pp. 533-572.

Giudice, G., Hanson, J., & Kontolemis, Z. (2018). Economic Resilience in EMU. Quarterly Report on the Euro Area (QREA), Vol. 17, No. 2, pp. 9-15, July.

Glynn N. Adam and Quinn M. Kevin ,(2010),"An Introduction to the Augmented In- verse Propensity Weighted Estimator", Political Analysis , Volume 18 , Issue 1 , pp. 36 - 56, Winter

Guido W. Imbens (2004). "Nonparametric Estimation of Average Treatment Effects Under Exogeneity: A Review." The Review of Economics and Statistics, Volume 86, Issue1, pp. 4–29

Jordà, Ò. (2005). "Estimation and inference of impulse responses by local projections." American economic review, Vol. 95, No. 1, pp. 161-182, March

Jordà, Ò., & Taylor, A. M. (2016). The time for austerity: estimating the average treatment effect of fiscal policy. The Economic Journal, Vol. 126, No. 590, pp. 219-255.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). "The worldwide governance indi- cators: Methodology and analytical issues." World Bank policy research working paper No 5430.

Li, Z., Chu, Y., & Gao, T. (2020). Economic growth with endogenous economic insti- tutions. Macroeconomic Dynamics, Vol. 24, No. 4, pp. 920-934.

Mandrekar, J. N. (2010). "Receiver operating characteristic curve in diagnostic test assessment". Journal of Thoracic Oncology, Vol. 5, No. 9, pp. 1315-1316.

Masuch K., Moshammer E., Pierluigi B., (2016). "Institutions, public debt and growthin Europe", ECB working papers, Institutions, No 1963, September

Masuch K., Anderton R., Setzer R., Benalal N., (2018), "Structural policies in the euro area", ECB occasional paper series, No 210, June

Nawaz, S. (2015). Growth effects of institutions: A disaggregated analysis. Economic Modelling, Vol. 45, pp. 118-126.

Nicoletti, G., & Scarpetta, S. (2005). Product market reforms and employment in OECD countries. OECD Economics Department Working Papers No. 472, OECD Pub- lishing, Paris.

OECD (2021). Economic Policy Reforms 2021. Going for Growth: Shaping a Vibrant Recovery, OECD, Paris.

Pitlik, H., & Wirth, S. (2003). "Do crises promote the extent of economic liberaliza- tion?: an empirical test." European Journal of Political Economy, Vol. 19, No. 3, pp. 565-581, Issue 3.

Rodrik, D., Subramanian, A. and Trebbi, F. (2004), "Institutions rule: The primacyof institutions over geography and integration in economic development", Journal of Economic Growth, Vol. 9, No 2, pp. 131–165.

Ryan B., Fabrizio Z., (2019), "What drives the short-run costs of fiscal consolidation? Evidence from OECD countries." Economic Modelling, Volume 82, Pages 420-436

Schumpeter, J. A. 1942. Capitalism, Socialism and Democracy. New York: Routledge.

Schönfelder, N., & Wagner, H. (2019). Institutional convergence in Europe. Economics, Vol. 13, No 1.

## Appendix A

## Probit models for propensity scores

	PMR	PMR	EPL	EPL
	Moderate reform	Major reform	Moderate reform	Major reform
GDP growth (t-1)	1.0519*	1.5143***	-0.7025	-0.2635
U ()	(0.5944)	(0.5501)	(0.5332)	(0.3630)
GDP growth (t-2)	-0.7192	-0.8331***	0.3260	-0.0228
	(0.6732)	(0.3140)	(0.5091)	(0.3719)
GDP growth (t-3)	0.5816	-0.2433	-0.1617	-0.2762
	(0.6856)	(0.5391)	(0.3982)	(0.2845)
GDP growth (t-4)	1.2415*	0.2542	-0.6315*	-0.1481
	(0.6524)	(0.5306)	(0.3305)	(0.2451)
Unemployment rate (t-1)	0.4299	0.0102		
	(0.4398)	(0.1964)		
Public debt ratio (t-1)	0.0007	0.0002	-0.0001	0.0000
	(0.0005)	(0.0003)	(0.0003)	(0.0002)
Elections (t-1)	0.0035	-0.0223	0.0190	0.0245
	(0.0364)	(0.0279)	(0.0274)	(0.0214)
Elections (t-2)			0.0477*	0.0411*
			(0.0271)	(0.0236)
Elections (t-3)			0.0333	0.0423*
			(0.0262)	(0.0219)
PMR (t-1)	-0.1491	-0.1389**		
	(0.1002)	(0.0618)		
PMR (t-2)	0.1633	0.1307		
	(0.1437)	(0.1202)		
PMR (t-3)	-0.2501*	-0.0209		
	(0.1377)	(0.1108)		
PMR (t-4)	0.3668***	$0.1104^{*}$		
	(0.0899)	(0.0612)	0.1057	0 (102
Employment rate (t-1)			-0.10//	-0.6182
			(1.3330)	(0.9280)
Employment rate (t-2)			-1.7339	1.1182 (1.5700)
$\mathbf{E}_{\mathbf{m}}$			(2.2021)	(1.5700)
Employment rate (t-3)			(1, 3225)	-0.3304
EDI (t 1)			0.0618	0.1046
EFL (I-1)			(0.1053)	(0.1040)
EDI (t, 2)			0.0523	0.1275
LFL(t-2)			(0.1343)	(0.1273)
EDI (t 3)			0.1456	0.1042
$\Box \Box (\Gamma J)$			(0.1438)	(0.1042)
<b>FPI</b> $(t-4)$			_0 1150	-0.0573
			(0.1211)	(0.0973)
Observations	667	667	524	524
	002	002	527	527

## **Table 9.** PMR and EPL probit for propensity scores

Standard errors in parentheses \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

	GOV	GOV
	Moderate reform	Major reform
GDP growth (t-1)	-1.8190**	0.1090
	(0.7545)	(0.6040)
GDP growth (t-2)	0.5586	0.5677
	(0.7809)	(0.5901)
Government Effectiveness (t-1)	-1.8782***	-0.7328***
	(0.2360)	(0.1810)
Government Effectiveness (t-2)	0.7197***	0.4955***
	(0.2694)	(0.1787)
Government Effectiveness (t-3)	0.2508	0.1660
	(0.2234)	(0.1549)
Regulatory Quality (t-1)	0.0633	0.0205
	(0.2640)	(0.1830)
Regulatory Quality (t-2)	0.0685	-0.3882*
	(0.3280)	(0.1654)
Regulatory Quality (t-3)	-0.1192	0.3274*
	(0.2498)	(0.1894)
Rule of Law (t-1)	1.0708***	0.5596**
	(0.2466)	(0.3856)
Rule of Law (t-2)	-0.3543	-0.2954
	(0.4761)	(0.3155)
Rule of Law (t-3)	-0.6280*	-0.3487
	(0.3467)	(0.2351)
Fiscal residuals (t-1)	-0.0003	-0.0087
	(0.0090)	(0.0066)
Fiscal residuals (t-2)	0.0183**	0.0285***
	(0.0086)	(0.0076)
Short term interest rate (t-1)	-0.0028	-0.0191
	(0.0210)	(0.0170)
Short term interest rate (t-2)	-0.0184	0.0048
	(0.0206)	(0.0160)
Political Stability and Absence of Violence (t-1)	0.1031	0.0140
	(0.1812)	(0.1236)
Political Stability and Absence of Violence (t-2)	-0.0647	0.0011
	(0.1780)	(0.1205)
Voice and Accountability (t-1)	-0.4873	-0.3668
	(0.3806)	(0.2594)
Voice and Accountability (t-2)	0.0760	0.1818
	(0.3840)	(0.2609)
Control of Corruption (t-1)	-0.1396	0.0325
	(0.2641)	(0.1841)
Control of Corruption (t-2)	0.7300***	0.1180
	(0.2635)	(0.1840)
Observations	439	439

Table 10. Governance effectiveness	s probit for	propensity scor	es
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Standard errors in parentheses ${}^{*}p < 0.10, {}^{**}p < 0.05, {}^{***}p < 0.01$ 

	REGQ	REGQ
	Moderate reform	Major reform
GDP growth (t-1)	-0.6211	-1.5768*
	(1.0869)	(0.8552)
GDP growth (t-2)	-0.3442	0.3443
	(1.1286)	(0.6884)
GDP growth (t-3)	-0.1292	-0.0082
	(2.465)	(0.846)
Unemployment rate (t-1)	-7.0046**	-8.0339***
	(2.9974)	(2.3293)
Unemployment rate (t-2)	2.4596	6.8069**
	(4.9794)	(3.4273)
Unemployment rate (t-3)	4.3323	0.2986
	(2.9318)	(1.9309)
Government Effectiveness (t-1)	-0.3979	-0.0862
	(0.2596)	(0.1545)
Government Effectiveness (t-2)	0.4201	0.2842
	(0.2867)	(0.1755)
Government Effectiveness (t-3)	-0.1586	-0.1524
	(0.2363)	(0.1570)
Elections (t-1)	-0.0219	
	(0.0541)	
Election (t-2)	-0.0392	
	(0.0541)	
Regulatory Quality (t-1)	-1.2433***	-0.5648***
	(0.2632)	(0.1742)
Regulatory Quality (t-2)	0.5121	-0.1073
	(0.3405)	(0.2107)
Regulatory Quality (t-3)	0.2004	0.4323**
	(0.1803)	(04567)
Rule of Law (t-1)	1.1436***	0.0048
	(0.3667)	(0.2219)
Rule of Law (t-2)	-0.7420	0.2672
	(0.4772)	(0.2905)
Rule of Law (t-3)	-0.1548	-0.2361
	(0.3558)	(0.2226)
Control of Corruption (t-1)	0.1885	0.3039*
	(0.1308)	(0.1609)
Control of Corruption (t-2)	-0.3262	0.2353
	(0.1537)	(0.2007)
Control of Corruption (t-3)	0.2456	0.0829
	(0.2344)	(0.1570)
Political Stability and Absence of Violence (t-1)	-0.1343**	-0.0574
	(0.0603)	(0.1127)
Political Stability and Absence of Violence Estimate (t-2)	0.5473	0.0646
	(0.2485)	(0.1443)
Political Stability and Absence of Violence Estimate (t-3)	-0.0435	-0.0543
		(0.1097)
Voice and Accountability (t-1)	0.0512	-0.0833
• • •	(0.1986)	(0.2345)
Voice and Accountability (t-2)		0.5885*
• • •		(0.3061)
Voice and Accountability (t-3)		-0.4220*
		(0.2188)
Short term interest rate (t-1)	0.0039	0.0085
	(0.0111)	(0.0168)
Short term interest rate (t-2)		-0.0349
		(0.0246)
Fiscal residuals (t-1)	0.0239**	
	(0.0101)	
Observations	432	511

Table 11. Regulatory	quality probit for	propensity scores
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Standard errors in parentheses \* *p* < 0.10, \*\* *p* < 0.05, \*\*\* *p* < 0.01

	RLE Major reform
GDP growth (t-1)	0.3537
	(1.0536)
GDP growth (t-2)	1.0184
	(1.0271)
GDP growth (t-3)	0.8959
University of the second sector (1, 1)	(0.9248)
Unemployment rate (t-1)	(2.8467)
Unemployment rate (t-2)	1.6047
	(4.6673)
Unemployment rate (t-3)	-0.8816
Government Effectiveness (t-1)	(2.7779)
	-0.2539
Government Effectiveness (t-2)	(0.2600)
	0.0403
	(0.2931)
Government Effectiveness (1-5)	(0.2456)
Elections (t-1)	-0.0820
	(0.0567)
Elections (t-2)	-0.0722
	(0.0594)
Elections (t-3)	-0.0201
Deculatory Quality (t 1)	(0.0569)
Regulatory Quality (t-1)	-0.1233
Regulatory Quality (t-2)	0.0870
Regulatory Quality (t 2)	(0.3423)
Regulatory Quality (t-3)	0.2632
	(0.2640)
Rule of Law (t-1)	-0.9637***
	(0.3647)
Rule of Law (t-2)	0.6043
	(0.4/63)
tule of Law (I-5)	-0.3033
Control of Corruption (t-1)	0.0845
	(0.2662)
Control of Corruption (t-2)	0.5240
-	(0.3341)
Control of Corruption (t-3)	-0.2217
	(0.2631)
Political Stability and Absence of Violence (t-1)	0.3853**
Political Stability and Absonce of Violance (t 2)	(0.1811)
Fortical Stability and Absence of Violence (I-2)	(0.2287)
Political Stability and Absence of Violence (t-3)	-0.3687**
	(0.1661)
Voice and Accountability (t-1)	0.2796
Voice and Accountability (t-2)	(0.3858)
	0.4034
	(0.5124)
Voice and Accountability (t-3)	-0.7520**
Contractionary freed ration (t 1)	(0.3764)
Contractionary fiscal policy (t-1)	0.03/5.
Contractionary fiscal policy (t-2)	0.0204
Contractionary fiscar policy (t-2)	(0.0468)
Contractionary fiscal policy (t-3)	-0.0132
	(0.0468)
Observations	470

 Table 12. Rule of law probit for propensity scores

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Standard errors in parentheses \*p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01

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