Southern Europe’s institutional decline*

Edouard Challe  Jose Ignacio Lopez  Eric Mengus

February 5, 2016

PRELIMINARY

Abstract

In this paper, we document the joint decline in the levels of total factor productivity and in the quality of institutions in Greece, Italy, Portugal and Spain since the adoption of the euro and we show that such a decline was a period of declining borrowing costs and large inflows of capital to these economies. We then show that this pattern can be explained by a model of soft budget constraint, where persistently cheap external capital reduces the incentives to maintain good institutions and thus reduces average productivity. Finally, we show in a larger panel of countries that persistent inflows of capital negatively affect the quality of institutions.

Keywords: TFP, institutions, current account.

JEL Classification: .

*Challe: Ecole polytechnique (CNRS) and CREST, Email: edouard.challe@gmail.com. Ecole Polytechnique, Department of Economics, Route de Saclay, 91128 Palaiseau, France. Lopez: HEC, lopex@hec.fr. Mengus: HEC, mengus@hec.fr. HEC Paris. Economics and Decision Sciences Department, 1 rue de la Liberation, 78350 Jouy-en-Josas, France. We thank Jean Barthélémy, Tomasz Michalski as well as participants to the 2016 EACBN conference (Zurich) for helpful comments. All remaining errors are ours.
1 Introduction

Institutions, broadly defined as the set of rules and constraints that shape economic behavior and incentives, is widely agreed to be a key determinant of economic development.\(^1\) The importance of the quality of institutions for development unambiguously shows up both in cross-country regressions and in case studies of comparative economic development. This body of works usually examines how variations in institutional quality across countries explain the dispersion in more proximate causes of development, abstracting from the potential evolution of institutions.\(^2\) Institutions, however, are not static and exogenous rules of the game that would merely shape economic dynamics. While slow-moving, the quality of institutions is not constant over time and is also, to some extent, an outcome of economic developments. In particular, institutions may decay if they are costly to maintain and the perceived benefits of maintaining good institutions starts falling short of the cost.

In this paper, we argue that Southern European countries (to be more specific: Italy, Spain, Portugal and Greece) experienced such a decline in domestic institutions since the late 1990s, and we explore both the causes and the consequences of this decline. Starting with the consequences, we document the statistical link between TFP and the quality of institutions across Eurozone countries since the late 1990s. This association confirms that good institutions are associated not only with the accumulation of physical and human capital but also with how efficiently those are combined to produce output. In the period under investigation, Southern European countries stand out among Eurozone (and, more generally, OECD) countries in that they were both those who experienced actual falls (i.e., negative growth) in TFP and a protracted decline in a variety of measures of institutional quality (control of corruption, efficiency of the government, rule of law etc.). Consistent with the institutional hypothesis, we document that the fall in TFP experienced by Southern European

\(^1\)Douglas North (1991) famously defined institutions as the “humanly devised constraints that structure political, economic and social interactions”, whether these constraints be formal (“constitution, laws, property rights”) or informal (“sanctions, taboos, customs, traditions and codes of conduct”). The present paper focuses on the role of economic institutions on economic outcomes.

\(^2\)See Acemoglu (2009) for an extensive discussion of the distinction between the fundamental and proximate causes of economic development. Hall and Jones (1999) provide cross-country evidence on the importance of the quality of institutions (“social infrastructure”) for three proximate causes: the accumulation of physical and human capital as well as total factor productivity; among the considered proximate causes, TFP is found to account for about half of the differences in GDP per worker. Acemoglu and Robinson (2012) provide numerous examples of the role or institution in comparative economic development. Acemoglu and Ucer (2015) provide an example of institutional reversal leading to a sudden worsening of economic prospects, namely that which occurred in Turkey after the collapse of the Turkey-EU relations in the mid-2000s.
countries is not concentrated in some sectors (e.g., non-tradeables) but essentially shows up in almost all sectors.

What are the roots of this institutional decay? Uncovering the general determinants of the quality of institutions looks like a formidable challenge. Moreover, there are several reasons – reverse causality, omitted variable bias and measurement errors – why the relationship between economic outcomes, such as TFP, and measures of the quality of institutions, cannot be interpreted as casual or accurate. However, in the case that we are investing, the timing of the decline of institutional quality and TFP in South Europe, which coincides with the run-up to (and creation of) the Euro, provides a quasi-natural experiment that usefully guide our search for the likely causes and factors shaping their dynamics. Indeed, the decline in the quality of institutions observed in Southern Europe was coincident with both the decline in TFP and the large inflows of capital that accompanied the run up to the euro. This experience contrasts with the rest of the Eurozone, which experienced neither a drastic change in the pattern of capital flows, nor a decay in the quality of institutions, nor a decline in TFP since the late 1990s.

We show theoretically how cheap borrowing may undermine the incentives to maintain good institutions, and how this ultimately leads to low average productivity and high productivity dispersion across firms. Our formal analysis builds on the “soft budget constraint” literature, which emphasizes the distortions in private investment decisions resulting from the inability of the government to commit to future policies. In our model economy, domestic investors provide funding to domestic entrepreneurs out of their own cash and also using money borrowed from abroad – up to a borrowing constraint that is tied to investors’ pledgeable income. Efficient and inefficient entrepreneurs (projects) compete for funding but are indistinguishable by investors. Efficient projects have positive net present value (NPV) and require no reinvestment ex post. In contrast, inefficient projects requires some reinvestment to pay out and, while they have negative NPV ex ante, it may be worthwhile reinvesting in them ex post once the initial start-up cost has been sunk. In this situation, a government that is benevolent, but unable to commit not to refinance inefficient projects, cannot help

\[3\] Maskin (1996) succinctly defines the “soft budget constraint syndrome” as a situation in which a “funding source” e.g. a bank or government finds it impossible to keep an enterprise to a fixed budget, i.e., whenever the enterprise can extract ex post a bigger subsidy or loan than would have been considered efficient \textit{ex ante}. The syndrome was initially identify by Kornai (1979), who argued that even profit-maximizing state-owned firms in socialist economies could safely anticipated to be bailed out \textit{ex post} which led to inefficient investment ex ante. Dewatripont and Maskin (1995) showed that the same syndrome could arise in capitalist economies whenever some centralization of credit provision is at work. See Kornai et al. (2003) for an exhaustive survey of the literature on the soft budget constraint problem.
supporting them *ex post*, provided that the cost of doing so (that is, the interest rate on public debt), is sufficiently low. Anticipating this makes inefficient entrepreneurs willing to start up their projects in the first place, which leads to low average productivity and high productivity dispersion.

Within this framework, we model the quality of institution as the relative ability of the government to commit not to refinance inefficient projects *ex post*. Maintaining the quality of institutions, however, is costly, and hence must be weighed against the benefits associated with limiting the extent of inefficient investment. We think of the costs of institutional quality as not only pecuniary costs (e.g., the cost of implementing an effective legal and judicial system, of maintaining efficient regulatory and supervisory authorities in competition, banking, etc.) but also less direct, non-pecuniary costs such as the political cost of reducing future politicians’ discretion.\(^4\) In this context, low interest rates reduces the social cost of inefficient projects and, hence, the relative benefits of commitment. In equilibrium, the lower the interest rate on public debt, the lower the quality of institutions and the greater the number of inefficient projects being undertaken.\(^5\)

Whilst guided by the experience of Southern Europe, for which the run-up to the euro provides a quasi-experiment on the link between capital inflows, the quality of institutions and productivity, our theoretical results are suggestive of a more systematic connection between the three. We confirm this association in large panel of countries since the mid-1990s: first, capital inflows, as measured by the current account (scaled by GDP) are systematically related to changes in the quality of institutions; and second, the latter is systematically associated to variations in TFP.

Our paper belongs to the growing strand of the literature that seeks to identify the relatively poor economic performance of Southern European countries since the late 1990s, that is, at a time of worldwide economic expansion and well before the Great Recession. The leading explanation for the low level of TFP growth suffered by Southern European countries over this period is *factor misallocation*. In this vein, Gopinath et al. (2015) show empirically

\(^4\)This is consistent with the approach of Buera et al. (2011), who assume that there are social and political costs in adopting market-oriented policies.

\(^5\)Farhi and Tirole (2012) also establish, in a different context, a connection between excess borrowing and the inability of the government to commit to optimal bail-out policies. In their model, *ex post* bail-outs concern financial intermediaries rather than firms and occur due to a strategic complementarity between the balance-sheet exposures of individual banks. The difference between the soft budget syndrome in their model and in ours fundamentally lies in the direction of causality. In their model, the risk exposure decisions of individual banks create incentives for the government to manipulate banks’ refinancing rate down, while in our model it is low world interest rates that make it optimal to start up inefficient projects.
that the low interest rates enjoyed by Southern European countries led to a widening in the
dispersion of marginal returns to capital across firms and a fall in TFP; they then illustrate
theoretically that this is the natural outcome of a model economy plagued by financing con-
straints directing capital towards the larger, rather than most productive, firms. From a
quantitative point of view, their model accounts for a quarter to a third of the observed short-
fall in aggregate TFP in Spain when the model is calibrated to match the observed dispersion
of marginal returns to capital across Spanish firms.\footnote{Gopinath et al. (2015) document a TFP shortfall of 12\% in Spain (Figure 4) and their model is able to explain a decline up to 3 to 4\% when matching the cross-sectional distribution of marginal productivity of capital (Figure 11).} This suggests that capital inflow and misallocation is unlikely to be the only cause of low TFP in Southern Europe in the 2000s;
our paper emphasizes a different link between capital inflows to low TFP growth, working
through the deterioration of institutions. Another type of capital misallocation that can arise
after the opening to external capital flows is that occurring between sectors rather than across
firms within the same sector. Benigno et al. (2015) study a large number of credit booms
and show that they are systematically followed by a reallocation of factors away from the
manufacturing sector and a protracted fall in GDP (Benigno et al., 2015). Kalantzis (2014)
provides a quantitative model of the sectorial structure of a small open economy and uses
it to study several credit booms leading to the over-expansion of non-tradables production.
We note that in the case of Southern Europe almost all sectors experienced low TFP growth
in the period under consideration, so that sectorial misallocation cannot be the full story.
Focusing on country-specific experiences, Reis (2013) and Dias et al. (2015) also point out
to factor misallocation as the key explanation for the low TFP growth in Portugal, whether
this misallocation occurs between (Reis, 2013) or within (Dias et al., 2015) sectors. Similarly,
Garcia-Santana et al. (2015) and Calligaris (2015) point out to within-industry factor misal-
location in Spain and Italy, respectively, over the period under scrutiny. Cette et al. (2015)
investigate the causal link between low interest rates and low (labor) productivity in the Euro
area between 1995 and 2007 using an identified VAR, and conclude that low interest rates
deter productivity. While they interpret their evidence as supporting explanations based on
capital misallocation, it is equally consistent with an indirect causal effect working through
the lower quality of economic institutions.
2 Productivity losses and institutional decay in the euro area.

In this section, we investigate productivity and institutional quality in Europe and, in particular, in the south of Europe since the introduction of the euro. Our main finding is that the south of Europe (Greece, Italy, Portugal and Spain) has experienced a joint decrease in productivity and the quality of its economic institution, while these two variables were stable or increasing in the rest of Europe. Finally, we correlate these evolutions with capital flows in Europe and show that the countries that have experienced an institutional decay were also important capital receivers during the first decade of the euro.

2.1 A decline in productivity.

In this subsection, we document a reduction in the growth, if not a decline, of TFP for the south of Europe after the creation of the Euro and well before the beginning of the Great Recession. These results suggest that growth prospects in Europe were in decline long before the shock originated in the financial crisis in the US and that spilled over to Europe in the form of sovereign crises across the periphery.

We document this decline in aggregate productivity in the South of Europe by running a OLS fixed-effect regression testing whether there has been a change in the dynamics of TFP in European countries since the introduction of the Euro. More specifically, we estimate equation (1) using data from the Penn World Tables.

$$\gamma_{i,t}^{\text{TFP}} = \alpha_i + \alpha_t + \delta_{\text{euromember}} + \delta_{\text{euro}} + \delta_{\text{eurocrisis}} + \delta_{\text{euro}} \times \delta_{\text{south}} + \delta_{\text{eurocrisis}} \times \delta_{\text{south}} + \epsilon_{i,t},$$

(1)

where $\gamma_{i,t}^{\text{TFP}}$ denotes country i’s TFP growth rate in period t, $\alpha_i$ and $\alpha_t$ are country and year fixed-effects and the $\delta$s are dummies. We use a dummy for Euro members that equals 1 for all countries that , a dummy for the period after the creation of the Euro up to 2007 for all European countries and only the South, and a dummy since the 2007 crisis for all European countries and only the North of Europe.

Table 1 reports the estimates for the TFP level of a balanced panel of 24 OECD countries. All variables, with the exception of the dummy for Euro members are significant at the 10% level. The average TFP growth rate for the sample is 0.5%. For the whole sample of European countries the growth rate of TFP after the introduction of the Euro and before the crisis in 2007 increased by 0.2%, but fell by 0.3% for the southern European countries. This decline in the TFP growth rate in South Europe is bigger than the fall in the same variable since
Table 1 – OLS Fixed-Effects Regressions of TFP in OECD Countries

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Errors</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.854</td>
<td>0.017</td>
<td>0.000</td>
</tr>
<tr>
<td>Euro Member</td>
<td>-0.002</td>
<td>0.002</td>
<td>0.196</td>
</tr>
<tr>
<td>Europe before Crisis</td>
<td>0.002</td>
<td>0.001</td>
<td>0.052</td>
</tr>
<tr>
<td>South Europe before Crisis</td>
<td>-0.003</td>
<td>0.001</td>
<td>0.012</td>
</tr>
<tr>
<td>Crisis</td>
<td>-0.002</td>
<td>0.000</td>
<td>0.001</td>
</tr>
</tbody>
</table>

No. of observations: 1,008

$R^2$ within: 0.41

$R^2$ between: 0.21

Source: Author’s Regressions. The dependent variable is the TFP growth rate. The first column reports OLS coefficients of a balanced panel of 24 OECD countries from 1970 to 2011 at yearly frequency with country and year fixed-effects. The second column reports the robust standard errors, adjusted for clustering by country. The third column presents the respective p-values. South Europe corresponds to Spain, Portugal, Italy and Greece. North Europe is composed of Austria, Belgium, Finland, France, Germany, Luxembourg and Netherlands.

The last crisis, which indicates the quantitative importance of the decline in TFP in South Europe even before the crisis. We present alternative specifications for this regression in the online appendix. They show our main result, namely the decline in the productivity trend in Southern Europe after the introduction of the Euro, is robust across specifications.

Such a decline in TFP in the periphery of Europe challenges the view that the increase in capital flows within Europe had a positive effect in the allocation of capital and overall productivity. There is a large and growing list of works devoted to study the productivity slump in southern Europe that emphasize the role of misallocation of resources within or across sectors as the cause of TFP decline in Southern Europe. In order to test for such an explanation, we run a similar regression but using TFP at the sectorial rather than economy-wide level, using the EU Klems database (O’Mahony and Timmer, 2009). Table 7 reports the estimates of an OLS fixed-effect regression of TFP of 8 different sectors of a sample of 15 OECD countries from 1980 to 2007.

These results at the sectorial level confirm our findings regarding aggregate productivity: they show a decline in productivity across all sectors in the South of Europe with the exception of Finance, thus contrasting with a pure reallocation explanation. As an illustration, Figure 1 presents the change of TFP in Spain and Italy between 1999 and 2007 in a more
disaggregated breakdown for 16 sectors. This graph shows the same pattern, a spread out decline in productivity across most of the spectrum of economic activities.

This generalized decline in productivity across sectors suggests that such sectorial explanations can only partially explain the slump in productivity in southern Europe.\textsuperscript{7} In particular, productivity losses were common to most sectors, including tradable sectors, which indicates that these economies experienced a truly aggregate productivity shock.\textsuperscript{8}

**Capital Misallocation.** In the following paragraph, we provide some further evidence that explanations based on misallocation of resources induced by capital frictions are also not necessarily directly consistent with the sectorial evidence.

Figure 3 plots the cumulative change in total factor productivity as a function of the financial dependence ratio and the average capital share for 34 disaggregated sectors in Spain and Italy.\textsuperscript{9}

As it can be seen from this graph there is no clear correlation between capital shares or financial dependence and TFP decline across industries, while, in a world with capital

\textsuperscript{7}Note that our institution-based explanation may be consistent with poor performance in specific sectors, such as construction and wholesale in Italy and Spain.

\textsuperscript{8}The same argument challenges the view that the decline in productivity in southern Europe is explained by lack of innovation in the face of stronger competition from China, as suggested by Pellegrino and Zingales (2014). Productivity in non-tradable sectors decline as much as or in some cases even more than in tradable sectors. This is the case, for example, of the hotels and restaurant sector that experience a decline in productivity of almost 20% since Spain and Italy joined the Euro and the beginning of the 2008 crises.

\textsuperscript{9}We take the financial dependence ratios for the EU Klems database from Inklaar et al. (2012) that are computed as in Inklaar and Koetter (2008). Note that we cannot directly use the Rajan and Zingales (1998)'\textsuperscript{t} computed values as the EU Klems database includes more sectors that are not in Rajan and Zingales (1998)'\textsuperscript{t} set of sectors.
Figure 2 – Sectorial TFP decline, External Finance Dependence and Capital Shares
frictions there should be a positive correlation. Such a result constrasts with Gopinath et al. (2015) who find a positive correlation, but only within the manufacturing sectors. Thus, accounting for the productivity slump in southern Europe based on misallocation of capital would require that misallocation happens exclusively within sectors and has no clear effect in the inter-sectorial allocation. These results echoes Dias et al. (2015)’s findings that financial dependence is unrelated to TFP losses in Spain.\(^\text{10}\)

\[\text{2.2 A decline in the quality of institutions.}\]

In this subsection, we document that productivity losses have been associated in Europe to a reduction in the quality of institutions, thus suggesting that productivity losses are likely to be persistent. To do so, we analyze different measures of institutional quality provided by the World Bank’s World Governance Indicators between 1996 and 2013.

This database covers 215 countries for that period and characterizes the quality of countries’ institutions using six measures of the quality of governance: Voice and Accountability and Political stability - on the selection, monitoring and replacement of governments -, Government Effectiveness and Regulatory Quality - on the quality of government’s policies - and Control of Corruption and Rule of law - on both the citizens and the state’s behavior with respect to institutions.

These measures of institutional quality aggregate data on different aspects of governance from multiple sources, privately- or publicly available, private or public sources.\(^\text{11}\) In particular, all these indexes gather data from both ”experts” (multilateral development agencies or nongovernmental organizations) but also from survey of domestic individuals or firms. We provide in the Appendix the exact list of data sources as documented by Kaufmann et al. (2010). These different data are then aggregated using an unobserved component model, where each source of data is considered as an imperfect signal of the actual level of the index. The resulting estimate of the index is normalize to take values between -2 and 2 and so that the world average remains constant at 0 overtime.

To provide more details on each individual index, Voice and Accountability index measures the ability of one country’s citizens to participate to the selection their government as well as freedom of speech, free medias while the Political Stability index determines the perception

\(^{10}\) Dias et al. (2015) also dismiss explanations based on skill intensity or innovative content and they emphasize within-sector misallocation of production factors for Spain. Our evidence for Italy draws a similar picture.

\(^{11}\) See Kaufmann et al. (2010) for more details on this database. We also provide additional material and description in the Appendix.
of the probability for the government to be destabilized. The Government Effectiveness index assesses the quality of public services and of the civil service (e.g. independence from political pressures) as well as the quality of policy formulation and implementation and the credibility of the government to commit to such policies. The Regulatory Quality index focuses more on the perception of the ability for the government to implement sound policies and regulations for developing the private sector activity. Finally, the Rule of Law index measures the citizens’ confidence and respect of the country’s rules. In particular, this measures contract enforcement, property rights, the police and the courts as well as crime. Finally, the Control of Corruption index determines whether public authorities are run in favor of private interests (different forms of corruption as well as capture by elites or private interests).

The fall in measures of quality of institutions. Figure 3 plots the six WGI indexes of institutional quality for Greece, Italy, Spain and Portugal between 1996 and 2013. The general trend over that period is decreasing. The timing of the decrease is sometimes different across countries, but in general, since the beginning of the euro, institutional quality has mainly decreased, or at best stagnated.

Alternatively, using the confidence intervals obtained from the unobserved component model, we can also test whether the significance of this decrease in the quality of institutions. Table 2 reports p-values from Wald tests that check whether the value of each indicator in 2013 is significantly different from the one in 1996.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Greece</td>
<td>4.88%</td>
<td>15.2%</td>
<td>&lt; 1e-7%</td>
<td>1.79%</td>
<td>12.91%</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>33.8%</td>
<td>7.94%</td>
<td>1.11%</td>
<td>6.30%</td>
<td>5.10%</td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td>4.98%</td>
<td>63.7%</td>
<td>4.28%</td>
<td>7.88%</td>
<td>22.02%</td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>9.76%</td>
<td>4.22%</td>
<td>1.10%</td>
<td>42.15%</td>
<td>10.8%</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 – Wald tests

This table reports probabilities that each variable’s value in 1996 equals its value in 2013.

Except for some cases, all these p-values are either below 10% or even 5%. Most notably, each country has experienced a significant institutional decay at least along two dimensions, if not more. We do not test the evolution of regulatory quality, which has been relatively constant, or even increasing during that period, as previously discussed.

A fall correlated with the decline in TFP. Figure 4 plots changes in the Rule of Law indicator and the cumulative change in TFP for the 1996 to 2011 period. As the graphs shows
Figure 3 – World Bank Indexes of institutional quality
there is a high correlation between changes in the quality of institutions as measured by the Rule of Law and the decline in aggregate productivity.

**Capital inflows and changes in the quality of institutions**  Figure 5 plots the relationship between changes in the quality of institutions measured by the Rule of Law and the average Current Account-to-GDP ratio for the same sample period (1996 to 2011). The graphs shows that Southern Europe was receiving large capital inflows during a period in which productivity and the quality of institutions was declining. The creation of the euro generated large capital inflows towards the periphery of Europe and allowed southern countries to borrow at much cheaper rates. In the next section we provide a theoretical model that links cheap funding and the quality of institutions.

Remark. Our analysis does not consider Ireland. Indeed, our evidence highlights that Ireland did not experience the same current-account deficits and institutional decay as Greece, Italy, Portugal or Spain did. In addition, the decline in TFP in Ireland was milder and more in line with core European countries such as Germany.
3 Why has institutional quality declined?

One may wonder what was the cause of the institutional decline in the south of Europe after the introduction of the euro. One possible explanation is the inflow of capital from the rest of Europe starting with the introduction of the euro. In addition to the capital allocation effects analyzed by Gopinath et al. (2015), the abundance and the relatively low cost of resources may have reduced the incentives to maintain good institutions and practices (see Mengus, 2015, for an analysis of implicit guarantees on debt and the resulting low level of interest rates). Indeed, if maintaining institutional quality is costly, cheap resources may prevent paying this cost as they allow to compensate the agents that may suffer from the institutional decay; this would reduce these agents’ willingness to maintain good institutions. Consider, for example, the case of a court decision that has to decide upon liquidating a business. In the presence of cheap resources for the government, a poor decision that gives too much to the creditors or too much to the entrepreneur can be easily compensated by transfers in any form to the former or the latter.

In this section, we build a model to illustrate the mechanism explaining why interest rates may have a joint effect on the quality of institutions and productivity. In particular, we illustrate why the government is better off reducing, or even not engaging, in \textit{ex ante} effort to improve economic institutions when facing low real interest rates. The key assumption...
for our results is the government’s inability to commit to future policies, namely, to commit not to compensate private agents for the costs of operating under weak economic institutions. Our model is directly inspired by the soft-budget constraint literature, which shows how government’s inability to commit may distort investment decisions ex ante.

3.1 Model description

Time is discrete and indexed by \( t \in \{0, 1, 2\} \). The economy is populated by domestic entrepreneurs, domestic investors, foreign investors and a government. There is only one homogeneous good.

**Domestic entrepreneurs.** A continuum of mass 1 of domestic entrepreneurs are endowed with projects in period 0. With probability \( \alpha \), the project is good. Otherwise, it is bad. Domestic entrepreneurs can decide whether to submit their projects for funding. The type of the project is private information to the entrepreneur.

With \( i \) unit of good invested in period 0, a good project yields a verifiable return \( R^g_i \) and a private benefit to the entrepreneur \( B^g_i \) in period 2. In contrast a bad project yields in period 2 only if an amount \( j \leq i \) is reinvested in that period. In this case, it yields a verifiable return \( R^p_j \) and a private benefit \( B^p_j \) to the entrepreneur in period 2. If no reinvestment occurs, the project is liquidated in period 1, yielding \( R^l_i \) to the investors and \( B^l_i \) to the entrepreneur.

**Assumption 1.** \( B^l < 0 \).

In addition, we assume that bad projects are inefficient to fund:

**Assumption 2.** \( 0 > R_p + B_p - 2 \).

**Domestic investors.** Domestic investors are endowed with 1 unit of good in period 0. They can invest in domestic entrepreneurs’ projects. To this purpose, they can borrow from foreign investors and invest their own money. Yet, their borrowing constrained so that they can only pledge a fraction \( \rho \) of their future income.\(^\text{12}\)

**Foreign investors.** Foreign investors are risk neutral and value consumption at both dates. They are endowed with a large amount of goods in period 0 and can lend to the domestic government as well as to the domestic entrepreneurs. They have also access to an outside CRS investment opportunity that yields \( 1 + r \) units of goods in period 1 for 1 unit of goods.

\(^{12}\)This constraint can be micro-funded by moral hazard as well.
invested in period 0. This investment opportunity is infinitely supplied. Such an investment opportunity pins down the real interest rate required by foreign investors.

The government. The government can raise funds in period 2 and it can borrow from investors in period 1 and period 0. In period 2, it can reimburse $E$. In period 1, it can make transfers to entrepreneurs and to domestic investors. Transfers to entrepreneurs are used to reinvest in projects ($j$) and transfers to domestic investors are defined as a fraction $\eta$ of the proceeds of reinvestment, so that domestic investors receive a transfer $\eta R^p$ from the government in period 1.

Assumption 3. The government cannot commit not to implement transfers in period 1.

Commitment solution. Suppose that the government commits not to step in in period 1 ($j = 0$). As a result, no bad project are submitted by entrepreneurs and funded by domestic investors. Aggregate productivity is then $R^p$.

3.2 Equilibrium description

In this subsection, we describe the equilibrium of our model. To this purpose, we proceed backwards, starting from the government decision at date-1 and, then, given this decision, we infer date-0 private agents’ choices. From now on, we assume that the government cannot commit not to intervene in period 1.

Period 1. Let us describe the date-1 government decision. The government can decide to refund bad projects at a scale $j$, that is lower than the initial scale $i$, and, also, it can choose to compensate domestic investors at an endogenous rate $\eta$. Crucially, the government has two options for raising funds to reinvest in projects and compensate investors: either it can raise taxes or it can issue debt.

In the end, the government solves the following problem in period 1:

$$\max_{j \leq i, 0 \leq \eta \leq 1} \max_{T^1 + T^2 = j + \eta R^p} (j(R^p + B^p) + \eta R^p - T^1 - T^2 \beta(1 + r)) + 1_{j=0}(R^d + B^d)i. \quad (2)$$

The decision about how to finance reinvestment and compensation hinges on the relative cost of taxes and debt. Issuing debt implies to pay interest to creditor but delays taxes so that the discounted marginal cost of raising one unit of resources through debt is $\beta(1 + r)$. In comparison, the corresponding marginal cost for current taxes is 1. As a result the government will choose to finance itself through debt when $\beta(1 + r) \leq 1$. 

16
Turning to the decision to reinvest in bad projects, such a decision only compares the future marginal gain of reinvestment \((R^p + B^p)\) with the cost of reinvestment (that depends on how reinvestment is financed) and with the opportunity cost of not reinvesting \((R^l + B^l)\).

Finally, the decision to compensate domestic investors \((\eta)\) hinges on the gain to do so, which amounts to transfer consumption to these investors so that, relative to its cost. Again, this cost depends on the way that the government finances itself. As a result the government will choose to compensate domestic investors if and only if this cost is below 1.

The following proposition summarizes the government _ex post_ decision:

**Proposition 1.** _When the interest rate satisfies_ \(\beta(1 + r) < 1:\)_

- compensation is optimally financed by debt, \(T^2 = j + \eta R^j\) and \(T^1 = 0\),
- the government optimally reinvests at full scale \((j = i)\) when:
  \[
  1 + r \leq 1 + \tilde{r} = \beta^{-1} \left[ R^p - R^l + B^p - B^l \right]
  \] (3)
  Otherwise, the government reinvests 0 and liquidates the project.
- the government compensates at full scale domestic investors: \(\eta = 1\).

_When the interest rate satisfies_ \(\beta(1 + r) \geq 1:\)_

- compensation is optimally financed by taxes, \(T^1 = j + \eta R^j\) and \(T^2 = 0\),
- the government optimally reinvests at full scale \((j = i)\) when:
  \[
  R^p + B^p - 1 \geq R^l + B^l
  \] (4)
  Otherwise, the government reinvests 0 and liquidates the project.
- the government does not compensate domestic investors: \(\eta = 0\).

The government’s assistance thus hinges on its borrowing cost in period 1. When this borrowing cost is low enough, the government is better off reinvesting in private agents’ projects using borrowed funds. When borrowing costs are high, the government prefers to fund its assistance through current taxes. This also holds true for transfers to domestic investors: the cheaper is the borrowing cost, the more likely they are compensated.

For the rest of the paper, we assume the following:
Assumption 4. Tax-finance transfers are not desirable:

$$R^p + B^p - 1 \leq R^l + B^l. \quad (5)$$

Under such an assumption, we obtain the following corollary:

**Corollary 2.** The government provides assistance to bad projects if and only if

$$1 + r \leq 1 + \bar{r} = \beta^{-1} \left[ R^p - R^l + B^p - B^l \right] \quad (6)$$

**Proof.** The only point to be check is that, under condition 6, the government optimally choose debt to finance its support, which is the case as $R^p - R^l + B^p - B^l \leq 1$ from Assumption 4. This implies that $(1 + r)\beta \leq 1$. \qed

**Period 0.** Let us continue to proceed backward and we now turn to the private agents’ decision in period 0. Private agents’ decisions are: the entrepreneurs’ decision to submit projects for funding and the domestic investors’ decision to invest.

**Project submission.** Entrepreneurs endowed with good projects are always better off to submit their projects, as their private benefits are always positive ($B^g > 0$). Entrepreneurs endowed with bad projects receive a positive private benefit if their project is rescued in period 1 ($B^p > 0$) but a negative one if it is not rescued ($B^l < 0$). So, they are better off submitting their projects only if they anticipate to be rescued by the government.

**Domestic investors.** There maximize profits with respect to their level of investment and so as to satisfy their borrowing constraint. Formally, they solve the following problem:

$$\max_i \left( \hat{\alpha} R^g + (1 - \hat{\alpha}) \eta R^p \right) i - (1 + r)(i - 1) \quad (7)$$

s.t. $(1 + r)(i - 1) \leq \rho i. \quad (8)$

As a result, when the marginal profit with respect to investment is sufficiently large:

$$\hat{\alpha} R^g + (1 - \hat{\alpha}) \eta R^p \geq 1 + r,$$

domestic investors invest all their endowment and borrow up to the constraint. Investment then equals:

$$i = \frac{1 + r}{1 + r - \rho}. \quad (9)$$
Note that funding bad projects are not crowding out the funding of good projects, except if the number of bad projects is sufficiently large to shut down funding of all projects. Indeed, when funding a bad project, domestic entrepreneurs increase their pledgeable income and, thus, can borrow more.

**Date-0 equilibrium.** We can now describe the date-0 equilibrium as a function of the country’s current and expected borrowing cost. A date-0 equilibrium is 1) a submission choice of projects by entrepreneurs and investment choices by domestic investors that solve the programs of these agents, given beliefs on date-1 government’s moves, and 2) given date-0 private agents’ choice, date-1 government’s moves are optimal from the point of view of the government.

The following proposition describes the set of such equilibria:

**Proposition 3 (Equilibrium).** Suppose that the cost of borrowing in period 1 is low enough so that \((1 + r)\beta \leq 1\), then the unique equilibrium is as follows:

(i) In period 1, the government provides full-scale assistance to domestic entrepreneurs’ bad projects \((j = i)\) and full-scale support to domestic investors \((\eta = 1)\).

(ii) In period 0, all bad projects are submitted for funding and the investment scale is

\[
i = \frac{1 + r}{1 + r - \rho}.
\]  

Otherwise, when \((1 + r)\beta \geq 1\), in equilibrium, the government provides no assistance in period 1 \((j = 0\) and \(\eta = 0)\) and no bad projects are submitted in period 0.

In the end, the nature of the equilibrium depends on the level of interest rate at which the government is expected to borrow. When the real interest rate is below the discount rate \(\((1 + r)\beta \leq 1\)\), the economy is in an equilibrium where the government is expected to rescue bad projects, thus giving incentives to entrepreneurs to submit these projects. When the real interest rate is above the discount rate \(\((1 + r)\beta > 1\)\), a rescue is too costly for the government. In turn, bad projects are not submitted in period 0, as no rescue is expected.

However, the expectation of such rescue arises only if a long period of low borrowing costs is anticipated by private agents. Indeed, what matters for the implementation of a rescue is not current but future levels of real interest rates.

Let us now discuss different implications of our model on productivity and the level of investment.
Productivity. The first implication of our model is that the distribution of productivity differs across equilibria. In an equilibrium without assistance by the government, the average ($R$) and the dispersion ($\sigma(R)$) of productivities are, respectively:

$$\bar{R} = R^g \text{ and } \sigma(R) = 0. \quad (11)$$

Submissions of bad projects in the equilibrium with assistance lead to the following average and dispersion of productivities:

$$\bar{R} = \alpha R^g < R^g \text{ and } \sigma(R) = \alpha(1 - \alpha)(R^g)^2 > 0 \quad (12)$$

This leads to the following corollary:

**Corollary 4.** When expecting a government’s rescue, the economy’s average productivity decreases and its dispersion increases with the share of bad projects. In particular, the economy’s average productivity is lowered than when no rescue is expected.

The level of investment. The level of investment in the economy is determined by domestic investors:

$$i = \frac{1 + r}{1 + r - \rho}, \quad (13)$$

which also increases with the level of real interest rate. This leads to the following corollary:

**Corollary 5.** When borrowing costs are cheaper, the level of investment is higher, even though average productivity is lower.

3.3 Ex ante interventions

We now turn to the possibility of *ex ante* interventions by the government. We assume that the government has a costly technology that prevents bad projects to be implemented. This technology allows the government to limit the amount of projects that it will be forced to bail out in period 1, but involves to pay an *ex ante* cost in period 0: $C(\gamma)$, where $\gamma$ is the share of bad projects that are not submitted for funding. We interpret $\gamma$ as an index of the institutional quality: the higher is $\gamma$, the better are institutions, as the more the government prevents bad projects to be funded.

We assume that the cost $C$ is an increasing and convex function of $\gamma$. Note that this technology leaves unaffected the number of good projects, which is $\alpha$.

The resulting date-0 government’s problem is:

$$\max_{\gamma} \gamma(1 - \alpha) \left[ N \left( (R^p + B^p) - 1 - \beta(1 + r) \right) i \right] - C(\gamma)$$
And so, the government reduces the number of bad projects in the economy from $1 - \alpha$ to $\gamma(1 - \alpha)$, $\gamma$ is such that the marginal cost per project to reduce the number of bad projects equals the marginal cost to let bad projects to obtain funding:

$$
((R_p + B_p - 1) - \beta(1 + r)) i = \frac{C'(\gamma)}{1 - \alpha}.
$$

As the marginal cost of letting bad project to obtain funding decreases with the level of real interest rates, we obtain the following proposition:

**Proposition 6.** *When the interest rate satisfies $\beta(1 + r) < 1$, the lower is the real interest rate, the lower is the government’s investment in good institutions. This results in lower level of average productivity but a greater dispersion of firm-level productivities.*

In the end, the cost of government’s funding affects its *ex ante* decision to maintain good institutions, that is its willingness to reduce inefficiencies in the economy, as captured by the number of bad projects that are funded.

**Interpreting the cost of maintaining institutions.** First, the cost of maintaining good institutions ($C(\gamma)$) may derive from the pecuniary cost resulting from the institutions that aim at reducing inefficiencies, as regulation agencies (regulation of competition, banking, ...). The second view of the cost of maintaining good institutions also relates to the opportunity cost for policymakers to adopt good institutions (see Buera et al., 2011, for a discussion and the quantitative effects of such costs): good institutions also reduce discretionary powers of policymakers.

To summarize, we have built a model in which lower real interest rates resulting from capital inflows lead a country to reduce the quality of its institutions and, then, the productivity of its economy. The main mechanism is that lower real interest rates increases the government’s ability to bail out its residents, thus exacerbating soft budget constraints in the economy. In turn, as soft budget constraints are less costly because of the cheaper cost of external resources, the government prefers to tolerate socially inefficient projects rather than maintaining costly institutions that would allow to avoid these inefficient projects.

\section*{4 A general link between capital inflows and institutional quality}

This section investigates whether there is a general link between capital inflows and changes in institutional quality.
Data description. We combine the WGI dataset with IFS data on Current Account (CA) as fraction of GDP growth. The resulting combined dataset is an unbalanced panel with 188 countries from 1996 to 2013. We drop countries that, for the whole sample, exhibit a current account deficit higher than 10% as fraction of GDP. Those are mostly very small countries. We also drop countries that experience a decline in GDP of more than 10% in one year in indication of a war or civil unrest (e.g. Libya, Rwanda or Iraq). After dropping these observations the dataset contains information for 102 countries.

Results. Table 3 presents the results. We first test the cross-sectional relationship between changes in the Rule of Law for the whole sample period with the sample mean current account-to-GDP. We also include the mean of GDP growth as control variable. We find a positive and significant relationship between the Current-Account-to-GDP and changes in the quality of institutions as measured by the Rule of Law. Countries that experience persistent current account deficits tend to have a decline in the quality of institutions, even after controlling for GDP growth. This result supports the main claim of this paper, namely that persistent external deficits can induce a worsening in the quality of institutions by changing incentives as a result of capital inflows. The sample mean GDP growth rate has a positive coefficient but it is not statistically significant.

Second, we use the time dimension of the data and run a fixed-effect panel for 95 countries on the Rule of Law using a two-year lag of the same indicator, the CA-to-GDP lagged for different time horizons and lagged values of the GDP growth rate. In particular, country fixed effects capture any country-specific explanation for changes in the quality of institutions and allows us to focus on the common impact of capital inflows across countries.

Table 3 reports estimates for specifications including 2, 5 and 8 years of past CA-to-GDP. We find that, for a horizon of 5 years or longer, the mean of past values of the current account to GDP is positive and significant at explaining the Rule of Law. In contrast, shorter term current account deficits have a less significant effect on the quality of institutions. Such a finding is consistent with the view that persistent external deficits are necessary to have an

---

13 There is a large literature devoted to study the determinants of difference in the quality of institutions across countries and their relationship with economic variables. In this exercise we focus, instead, on changes in these indicators.

14 In the online appendix we also document the positive relationship between changes in TFP and WGI indicators for the same sample period and for a large sample of countries.

15 We use a two-year lag for the Rule of Law in order to maximize the number of observations in the regression as this indicator is only available at the beginning of the sample every two years. Our results are robust to using a one-year lag.

16 In the online appendix we provide estimates for a larger set of lag variables.
effect on institutional quality.

The average of the GDP growth rate for 5 years, which we use as a control variable, is also significant and positive, which suggests that business cycle events such as economic crisis have an effect on the quality of institutions. Yet, the lagged current account variable remains significant after controlling for GDP growth, thus suggesting that the relationship between external financing and institutional quality is not explained by sudden-stops or economic downturns.

Similar results hold if use other indicators of the WGI dataset. These results are available in the online appendix of the paper.

5 Conclusion

In this paper, we document a decline in the quality of institutions in the South of Europe (Greece, Italy, Spain and Portugal), that was correlated with negative productivity growth and current account deficits. We then build a model of soft budget constraints that can account for such a correlation: cheaper borrowing due to capital inflows reduces the need to maintain good institutions and, in turn, this decreases the average productivity of projects run in the economy. Finally, we confirm the relation between current account deficits or capital inflows and the quality of institutions on a large panel of countries.
### Table 3 – Current Accounts and Changes in the Rule of Law

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Changes Rule of Law</th>
<th>Panel Regressions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model (I)</td>
<td>Model (II)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.018</td>
<td>0.571</td>
</tr>
<tr>
<td>GDP Growth</td>
<td>-0.115</td>
<td>0.074</td>
</tr>
<tr>
<td>CA-to-GDP</td>
<td>0.018</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>[1.46]</td>
<td>[2.42]</td>
</tr>
<tr>
<td></td>
<td>[1.05]</td>
<td>[3.16]</td>
</tr>
</tbody>
</table>

Note: This table reports the estimates and t-statistics (in brackets) of the cross-sectional regression of changes in the Rule of Law indicator from 1996 to 2013 as function of a constant, the sample mean Current Account (CA) to GDP and the sample mean GDP growth rate (Model I). It also presents the estimates of a balanced panel for the same sample period including country fixed effects, the mean of GDP growth for the previous 5 years and the CA-to-GDP mean for previous years with different time horizons depending on the specification (Models II-IV). The overall fit of the regression both within and between groups is relatively high, because the Rule of Law indicator is strongly persistent.
Table 4 – Cross-Sectional Regression of Changes in TFP and the quality of institutions

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Changes TFP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(I) (II) (III) (IV) (V) (VI)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.11 0.12 0.12 0.12 0.11 0.12</td>
</tr>
<tr>
<td></td>
<td>[4.50] [4.47] [4.38] [4.62] [4.45] [4.38]</td>
</tr>
<tr>
<td>Changes Rule of Law</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>[2.05]</td>
</tr>
<tr>
<td>Changes Control of Corruption</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>[0.94]</td>
</tr>
<tr>
<td>Changes Voice and Accountability</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>[0.31]</td>
</tr>
<tr>
<td>Changes Political Stability</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>[1.46]</td>
</tr>
<tr>
<td>Changes Government Effectiveness</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td>[3.13]</td>
</tr>
<tr>
<td>Changes Regulatory Quality</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>[0.35]</td>
</tr>
<tr>
<td>Observations</td>
<td>66 66 66 66 66 66</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.06 0.01 0.02 0.03 0.13 0.02</td>
</tr>
</tbody>
</table>

Note: This table reports OLS estimates and t-statistics (in brackets) of the cross-sectional regression of changes in TFP as a function of a constant and changes in the World Governance Indicators (WGI) from 1996 to 2011. The TFP data is from the Penn-World Tables 8.1.
References


A World Governance Indicators.

In this appendix, we provide some further elements on the World Governance Indicators as well as robustness checks for the decrease in institutional quality in the periphery of Europe.

Data sources. The WGI indicators are based on "expert" or survey-based indicators. We list here all these databases.


CBIP stands for Commercial Business Information Provider, GOV for Public Sector Data Provider and NGO for Nongovernmental Organization Data Provider.


Quantifying the trend. Table 5 gathers the results of the following regression:

\[ Y_{i,t} = \alpha_i + (Trend + \delta_i PeriTrend)t + \epsilon_{i,t} \]

with \( \delta_i = 1 \) for Greece, Italy, Portugal and Spain and 0, otherwise, and where \( Y \) is one of the six measures of institutional quality: voice and accountability, government effectiveness, control of corruption, Political stability, rule of law and regulatory quality. The general outcome is that, for all variables, the trend in the periphery is significantly negative.

Robustness with underlying series. Indicators are aggregates of data coming from multiple sources, and their composition may evolve over time. In this paragraph, we check that the trends observed on aggregates also hold for most of the indicators’ components.

Table 6 reports how the series underlying each governance indicators evolve over time. For almost all indicators and for all countries, more than two thirds of the series have a downward trend, thus confirming the aggregate behavior that we have identified. There is only one exception: control of corruption in Portugal. In this case, three of the increasing underlying series are in fact close to be constant.
<table>
<thead>
<tr>
<th>V.A.</th>
<th>G.E.</th>
<th>C.C.</th>
<th>P.S.</th>
<th>R.L.</th>
<th>R.Q.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trend</td>
<td>0.007 (.0012)</td>
<td>-0.0138 (.0023)</td>
<td>-0.0036 (.0022)</td>
<td>-0.0109 (.0019)</td>
<td>0.0054 (.0010)</td>
</tr>
<tr>
<td>Peri. trend</td>
<td>-0.0248 (.0028)</td>
<td>-0.0339 (.0056)</td>
<td>-0.0426 (.0053)</td>
<td>-0.0252 (.0047)</td>
<td>-0.0333 (.0023)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.0769</td>
<td>0.2642</td>
<td>0.3154</td>
<td>0.1274</td>
<td>0.2183</td>
</tr>
</tbody>
</table>

Table 5 – Institutional decay

<table>
<thead>
<tr>
<th>VA</th>
<th>PS</th>
<th>GE</th>
<th>RL</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greece</td>
<td>6 / 2</td>
<td>5 / 1</td>
<td>4 / 1</td>
<td>5 / 2</td>
</tr>
<tr>
<td>Italy</td>
<td>5 / 3</td>
<td>4 / 2</td>
<td>5 / 0</td>
<td>6 / 2</td>
</tr>
<tr>
<td>Portugal</td>
<td>8 / 0</td>
<td>4 / 2</td>
<td>3 / 2</td>
<td>7 / 1</td>
</tr>
<tr>
<td>Spain</td>
<td>7 / 1</td>
<td>4 / 2</td>
<td>4 / 1</td>
<td>5 / 2</td>
</tr>
</tbody>
</table>

Table 6 – Number of decreasing / increasing underlying series.

This table reports the number of decreasing and increasing series underlying each indicator and that are available at least from 2002 onwards. The first number indicates the number of decreasing series and the second one the number of increasing series.
<table>
<thead>
<tr>
<th>Variable</th>
<th>All</th>
<th>Agri.</th>
<th>Manuf.</th>
<th>Utilities</th>
<th>Constru.</th>
<th>Retail</th>
<th>Hotels</th>
<th>Trans. &amp; Com.</th>
<th>Finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>90.337</td>
<td>58.330</td>
<td>70.359</td>
<td>79.495</td>
<td>96.389</td>
<td>84.698</td>
<td>118.512</td>
<td>71.905</td>
<td>106.326</td>
</tr>
<tr>
<td></td>
<td>(1.201)</td>
<td>(3.322)</td>
<td>(3.881)</td>
<td>(4.728)</td>
<td>(2.994)</td>
<td>(5.281)</td>
<td>(4.676)</td>
<td>(2.800)</td>
<td>(1.610)</td>
</tr>
<tr>
<td>Trend</td>
<td>0.476</td>
<td>2.201</td>
<td>1.287</td>
<td>0.753</td>
<td>−0.140</td>
<td>1.803</td>
<td>−1.058</td>
<td>1.658</td>
<td>−0.358</td>
</tr>
<tr>
<td></td>
<td>(0.070)</td>
<td>(0.411)</td>
<td>(0.455)</td>
<td>(0.273)</td>
<td>(0.345)</td>
<td>(0.328)</td>
<td>(0.543)</td>
<td>(0.315)</td>
<td>(0.149)</td>
</tr>
<tr>
<td>Trend Euro Member</td>
<td>0.149</td>
<td>0.834</td>
<td>0.353</td>
<td>0.904</td>
<td>0.746</td>
<td>−1.402</td>
<td>−0.077</td>
<td>0.127</td>
<td>−0.065</td>
</tr>
<tr>
<td></td>
<td>(0.137)</td>
<td>(0.508)</td>
<td>(0.537)</td>
<td>(0.625)</td>
<td>(0.412)</td>
<td>(0.682)</td>
<td>(0.696)</td>
<td>(0.375)</td>
<td>(0.223)</td>
</tr>
<tr>
<td>Trend Eur. bef. Crisis</td>
<td>0.043</td>
<td>−0.076</td>
<td>0.485</td>
<td>0.566</td>
<td>−0.244</td>
<td>0.357</td>
<td>0.366</td>
<td>0.197</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>(0.059)</td>
<td>(0.334)</td>
<td>(0.150)</td>
<td>(0.341)</td>
<td>(0.181)</td>
<td>(0.176)</td>
<td>(0.152)</td>
<td>(0.235)</td>
<td>(0.144)</td>
</tr>
<tr>
<td>Trend South Eur. bef. Crisis</td>
<td>−0.408</td>
<td>−0.170</td>
<td>−1.258</td>
<td>−0.856</td>
<td>−0.648</td>
<td>−0.766</td>
<td>−0.487</td>
<td>−0.761</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>(0.157)</td>
<td>(0.331)</td>
<td>(0.287)</td>
<td>(0.717)</td>
<td>(0.239)</td>
<td>(0.367)</td>
<td>(0.207)</td>
<td>(0.530)</td>
<td>(0.171)</td>
</tr>
<tr>
<td>No. of observations</td>
<td>384</td>
<td>409</td>
<td>384</td>
<td>409</td>
<td>384</td>
<td>409</td>
<td>384</td>
<td>384</td>
<td></td>
</tr>
<tr>
<td>$R^2$ within</td>
<td>0.67</td>
<td>0.78</td>
<td>0.70</td>
<td>0.57</td>
<td>0.13</td>
<td>0.51</td>
<td>0.38</td>
<td>0.74</td>
<td>0.29</td>
</tr>
<tr>
<td>$R^2$ between</td>
<td>0.54</td>
<td>0.31</td>
<td>0.38</td>
<td>0.30</td>
<td>0.09</td>
<td>0.03</td>
<td>0.01</td>
<td>0.54</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Source: Author’s Regressions. The dependent variable is the TFP at the sectorial level for an unbalanced panel of 15 OECD countries from 1980 to 2007 as reported by the EU Klem database. The OLS coefficients include country and year fixed-effects. Robust standard errors, adjusted for clustering by country are in parenthesis. South Europe corresponds to Spain and Italy. North Europe is composed of Austria, Belgium, Finland, France, Germany and Netherlands.