INSTITUTIONS, VOLATILITY AND INVESTMENT

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Abstract
Countries with strong executive constraints have lower growth volatility but similar average growth to those with weak constraints. This paper argues that this may explain the relationship between executive constraints and inflows of foreign investment. It uses a a novel dataset of Dutch sector-level investments between 1983 and 2012 to explore this issue. It formulates an economic model of investment and uses data on the mean and variance of productivity growth to explain the relationship between investment inflows and executive constraints. The model can account for the aggregate change in inflows when strong executive constraints are adopted in terms of the reduction in the volatility in productivity growth. The data and model together suggest a natural way of thinking about country-level heterogeneity in investment inflows following the adoption of strong executive constraints. (JEL: O43, F21, D72, O11)

1. Introduction

It is now universally acknowledged that political institutions play an important role in shaping patterns of development and growth.[1] Yet, knowledge about the implications of the specific mechanisms remains quite modest and reduced-form correlations yield only limited insight into this. Hence an important part of the research agenda on institutions, development and growth is to study specific channels of influence and their associated outcomes.

The effect of institutions on investment is an important element of this research agenda. Here, we focus on cross-border capital flows by multinational firms. Increases

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1. See, for example, North (1990), North and Thomas (1973), Acemoglu et al (2005) and Acemoglu and Robinson (2012) for big picture discussions.

in such flows were a noteworthy feature of the recent period of globalization and political institutions may have influenced where firms chose to invest if they influence the risk/return profile that multinational enterprises (MNEs) face. Moreover, political risk is frequently cited as an important factor in surveys of MNE executives, particularly for investments in developing countries.[2]

This paper explores the link between the strength of executive constraints and foreign investment flows, investigating the possibility that such constraints encourage investment by reducing the variance of productivity shocks. We develop a simple model of politics to motivate this and explore this empirically using a panel of sector-level data on Dutch multinationals between 1983 and 2012 provided to us by the Dutch central bank. Although the data that we use are specific to one origin country, namely the Netherlands, they are available for a reasonably long time period and cover destination countries with a range of political institutions.

We first establish some raw "facts" and a robust reduced-form correlation between strong executive constraints and foreign investment flows. We then show that adopting strong executive constraints is indeed associated with reduced volatility in productivity growth.[3] Finally, we develop a model of expectations formation by investors in which they learn about the mean and variance of productivity growth from data on country-level experiences with and without strong executive constraints. A core element in the model is the weight that investors attach to the experience of other countries when evaluating the growth prospects of a particular country in which they are contemplating an investment. We estimate this weight based on fitting the investment model to the data and find that investment is positively correlated with higher mean productivity growth and negatively correlated with volatility.

The model can be used to simulate counterfactual investment flows for countries that adopted strong executive constraints. We show that the reduction in the variance of productivity growth can account for the observed magnitude in the reduced-form relationship between investment inflows and executive constraints. However, there is considerable heterogeneity by country that would be missed by a standard difference-in-difference approach. The reduction in the volatility of productivity shocks had a particularly large impact on investment inflows in some countries. For example, the estimates suggest that investment inflows to Poland and Argentina would have been less than half than what was observed had productivity growth not become more stable after the adoption of strong executive constraints.

Our data also allows us to look at sector-heterogeneity. Here, we find that patterns in the data appear to be related to sector-specific political factors such as political connections and bribery, suggesting that something more than technological differences are needed to explain sector differences in response to institutional change; the model points to the extent of rents in a sector as being a key factor.

2. These surveys are conducted by the Multilateral Investment Guarantee Agency (MIGA) of the World Bank Group and have between 100 and 500 respondants. For details see MIGA (2014).

3. It also shows up in measures of insurance risk rating and the volatility in IMF growth forecasts.

The remainder of the paper is organized as follows. The next section discusses related literature. We then introduce the data and present some reduced-form evidence. Section four looks at a mechanism based on specific theoretical approach. We then apply a specific model to explain the pattern of investment inflows among countries that adopted strong executive constraints over the period of our data. Section five looks at sectoral heterogeneity and finds a role for political factors in a sector while section six offers some concluding comments.

2. Related Literature

This paper is related to the large literature on democracy and economic performance such as Barro (1996), Papaioannou and Siourounis (2008), Persson and Tabellini (2009a,b), and Przeworski and Limongi (1993). It is now generally recognized that there is no simple empirical story to be told and that there could be considerable heterogeneity as discussed in Persson and Tabellini (2009b). Of more specific relevance are those papers that have pointed out democracies are less volatile than non-democracies; see, for example, Acemoglu et al (2003), Almeida and Ferraira, (2002), Mobarak (2005), and Weede (1996).

Also relevant to what we do is the literature on macro economic volatility in emerging economies. Aguiar and Gopinath (2007) observe that shocks to trend growth—rather than transitory fluctuations around a stable trend—are the primary source of fluctuations in emerging markets. This observation is in line with the idea that slow-moving political factors are behind growth trends.[4] García-Cicco et al (2010) provide evidence that the RBC model driven by productivity shocks does not provide an adequate explanation of business cycles in emerging countries. Koren and Tenreyro (2007) separate growth volatility on the country level from sector-specific volatility. They find that, as countries develop, their productive structure moves from more volatile to less volatile sectors and volatility of country-specific macroeconomic shocks falls. Our ideas are also related to the observation by Calvo (1998) that "sudden stops" in capital flows occur in countries because there is policy flexibility; local governments are more constrained in their policy choices creating less policy risk. This literature has not yet connected directly to that on changing political institutions and the impact on volatility.

There is also a large literature which links institutions, measures of risk and foreign direct investment. In the 1990s, most research on the influence of policy-related variables on FDI flows consisted of international cross-country studies. This found a negative link between institutional uncertainty and private investment (Brunetti and Weder (1998)), a positive relationship between FDI and intellectual property protection (Lee and Mansfield (1996)), and a negative impact of corruption on FDI flows (Wei (2000)). Using different econometric techniques and periods, Harms and Ursprung

4. We adopt their economic framework but, for simplicity, model volatility as a period-to-period variance.

(2002), Jensen (2003), and Busse (2004) find that multinational corporations are more likely to be attracted to democracies. Li and Resnick (2003) argue that the location decision is influenced by political risk.[5] Alfaro et al (2008) show that there is a significant relationship between capital flows and a composite index of institutional quality in a variety of specifications. Jensen (2008) looks at the link between political risk and FDI. He runs cross-country regressions for a sample 132 countries finding a negative correlation between FDI and measures of risk. Jensen also finds that the strength of executive constraints, in particular, is associated with lower political risk.

Exploiting panel data for 73 countries between 1995 and 1999, Egger and Winner (2005), find evidence of a positive correlation between corruption and FDI. They argue that, with high levels of regulation and administrative controls, corruption may serve as a "helping hand" for FDI. Using a panel data set on 55 developing countries for the period 1987-95, Harms (2002) estimated the impact of financial risk on equity investment flows (i.e., the sum of FDI and portfolio investment) and found that lower financial risk is associated with an increase in FDI and portfolio investment. In similar vein, Gourio et al (2015) look at the link between capital flows and stock markets for a sample of 26 emerging market economies with stock market data finding that uncertainty in the form of stock market volatility is negatively related to capital inflows.

Papaioannou (2009) uses data on inter-bank lending to show that financial flows increase when the political risk rating by the Political Risk Services (PRS) falls. This rating is a composite index that captures a broad set of factors including ethnic tensions, corruption, and the political, legal, and bureaucratic institutions of a country. He uses both a long panel for 50 recipient countries and a cross-sectional IV strategy to demonstrate the association between financial flows and the risk rating. His IV estimates suggest that a 10 point increase in institutional performance leads to a 60%-70% increase in inflows. Kesternich and Schnitzer (2010) consider how political risk impacts the firms choice of capital structure. Using data on German multinationals, they find that greater risk, as measured by the PRS, tends to increase leverage.

We make three main advances over prior work. First, we use a long panel of sector-level investments for a large number of countries which allows us to exploit rare changes in political institutions while controlling for a large set of country/sector fixed effects. The sector level data also allows us to illustrate that political factors are at the heart of changes in inflows. Second, we go beyond a reduced-form approach and explore a specific mechanism working through a reduction in aggregate volatility. This link also provides a possible explanation for the relationship between macro economic volatility and investment flows.

Finally, our work is related to work on the role of policy uncertainty for economic activity. Rodrik (1991) argues that even low levels of policy risk about the implementation of reforms can prevent inflow of foreign capital into developing

5. A related literature looks at the impact of institutions on comparative advantage and, hence, trade flows. See Nunn and Trefler (forthcoming) for a literature overview.

markets.[6] Baker, Bloom and Davis (2015) provide a measure of policy uncertainty using news reports. They find negative effects of uncertainty for firms heavily exposed to government contracts. In our paper, we posit that the absence of executive constraints may be a key driver of increased risk and suppose that investors might learn from the experience of other countries with the same institutional set-up.

3. Data and Preliminary Evidence

This section discusses the data that we use. It then looks at what the data suggest about the relationship between political institutions and foreign investment using a difference-in-difference approach which exploits within-country changes in institutions over time.

3.1. Data

Executive Constraints. Much of the literature on political institutions and economic performance treats democracy as an aggregate outcome based on the index in Polity IV. Here we use a disaggregated approach motivated by the model presented below.

Our central focus is on institutions which constrain the use of power rather than those which allocate power (such as elections). This focus has a venerable history. For example, Alexis de Tocqueville (1835) stressed the important role played by the power of the judiciary in American democracy. He wrote regarding the role of lawyers:

> "When the American people allow themselves to be intoxicated by their passions, or abandon themselves to the impetus of their ideas, jurists make them feel an almost invisible brake that moderates and stops them." [p.309]

And John Stuart Mill (1859) described a limit to the power of a ruler that can be achieved through

> [...] establishment of constitutional checks, by which the consent of the community, or of a body of some sort, supposed to represent its interests, was made a necessary condition to some of the more important acts of the governing power"

Our core measure of these constraints comes from the PolityIV variable *xconst* which is coded on a seven point scale. Whereas the variable is quantitative, there is no reason to believe that each increment in the index has equal importance. While it is ultimately an empirical question what cutoff matters, there are good reasons to suppose that it is only when the highest score is attained that constraints on the executive are fully binding. The coders designate this a case where *"(a)ccountability groups have*

6. Handley and Limao (2015) show that reduced uncertainty about future European trade policies can explain a large fraction of growth in firm entry and sales of Portuguese firms.

effective authority equal to or greater than the executive in most areas of activity." (Polity IV, Coding Manual)[7]

We use a categorical variable denoting whether or not $xconst = 7$. This gives us 33 countries in our time period which moved in and out of strong executive constraints. Examples of countries that changed their constraints are Argentina, Thailand, South Africa, Turkey and Poland. Strong executive constraints are reasonably rare in the Polity IV data; only 20% of country/year observations since 1950 have the highest score for executive constraints which is much smaller than the group of countries that regularly hold contested elections (around 50%). To validate this approach, it is interesting to see how a movement to $xconst = 7$ relates to other measures of political institutions which try to measure similar concepts. We find that our categorical variable is strongly correlated with the measure of checks and balances in Beck et al (2001) and judicial independence, specifically lifetime tenure for judges, in Melton and Ginsburg (2014).[8]

FDI Flows. We focus on FDI flows as we have a source of available data which cover a range of countries and long time-period.[9] Our main data on FDI flows comes from *De Nederlandsche Bank* (DNB) which provided us with quarterly, sector-level data from 1983 to 2012 for a sample of more than 200 territories, entities and countries. Since we are interested in the connection between foreign investment and political institutions, we merge this data with the Polity IV dataset on political institutions by country. We are then left with annual data on 156 countries between 1983 and 2012. As our dependent variable, we focus on gross positive investment inflows by multinationals to different countries.[10] Details of this variable and other data that we use are documented in the Appendix. Since we use sector level variation, we are able to include country/sector fixed effects in our empirical specifications.[11]

The main virtue of this data is the wide range of countries and the length of the time that it covers.[12] There are sufficient numbers of institutional changes in executive

7. The checklist for coders in the Polity IV manual states that the highest score of the variable "*xconst*" is only allocated if most important legislation is initiated by a parliament which holds the executive to account. Our reading of the country reports is that those coding countries pay a lot of attention to whether the executive relied on support from another organization (this could be, parliament, independent courts or the military) to conduct policy.

8. The appendix discusses this in detail. We also provide examples of the motivation provided for recent coding changes in Argentina and Turkey.

9. The arguments that we develop apply to all forms of investment. However, we do not have reliable data on domestic country- and sector-specific investment.

10. We discuss this choice in the appendix. However, our results are robust to using net flows.

11. All our results are robust to restricting the sample to the largest sectors. Note that of 21 sectors, the largest 15 sectors account for more than 99 % of all investment flows from the Netherlands over this period.

12. This is an advantage stressed also by Poelhekke (2015) who uses similar data from the Dutch Central Bank.

constraints to be able to use within-country variation.[13] Other available datasets, for example those from UNCTAD or the OECD, have a similar range of coverage in terms of countries and years but do not disaggregate by sector. Since our data comes from a single investing country, our focus is on variation in the characteristics of recipient countries. We do not, however, have any detail on how investment flows are used and whether they are leveraged locally. Our focus, therefore, differs from that of the FDI literature which studies vertical and horizontal patterns of FDI as an alternative to trade.[14]

3.2. Preliminary Evidence

Graphical Evidence. To take a preliminary look at the data, Figure 1 plots the relationship between strong executive constraints and mean investment flows for the period 1983-2012 distinguishing between countries with and without strong executive constraints. It shows that countries with strong executive constraints benefitted much more from investment flows during the wave of globalization from the mid 1990s onward; mean yearly flows from the Netherlands into countries with strong executive constraints were about 20 billion Euros towards the end of the 2000s compared with less than 2 billion in the sample with weak executive constraints. Moreover, the increase in FDI flows outpaced GDP growth significantly.

Figure 2 uses the same sub-samples of countries as shown in Figure 1 but now shows the average share of global flows, as opposed to the average flows, attracted by countries with strong and weak executive constraints. The average *share* in each category has been remarkably stable. In what follows we ask whether countries systematically change their investment inflows, controlling for sector/year fixed effects, i.e. we control for changes in global flows depicted in Figure 2.

Regression Evidence. The main outcome variable that we study is the gross investment inflow in sector s to country c in year t. This is a non-negative variable which takes on positive values with a large number of zeros. Following recent work in the trade literature, we will use a fixed-effects Pseudo Poisson regression model for investment flows.[15] While Figure 1 showed that the overall level of global flows increased significantly over time, it is important to identify the effect of this separately

13. Coverage in the foreign direct investment dataset provided by the U.S. Bureau of Economic Analysis (BEA), for example, is much lower - it covers about 1/3 of the country years in our dataset. This also means that coverage is sparse. Hungary and Poland, the only countries in Eeastern Europe that appear in the BEA dataset receive their first flows in 1999.

14. We are not aware of a dataset with a wide coverage of countries and a covering a long enough time period to be able to look at investment decisions in response to institutional changes using firm-level data.

15. See page 645 of Silva and Tenreyro (2006) who argue that gravity equations can be estimated with the Pseudo Poisson model (PML). We need country/sector fixed effects and sector/year fixed effects and therefore face severe convergence problems discussed at their webpage ("the log of gravity"). We therefore used the GLM command in STATA to estimate our models and cluster at the country level.

from the general time trend in investment flows. Hence, we include sector/year fixed effects.

Let $\delta_{ct} \in \{S, W\}$ denote whether country c at time t has strong (S) or weak (W) executive constraints as defined above. From this we construct the indicator variable $\Omega(S) = 1$ and $\Omega(W) = 0$ denoting which political institution is in place. The core specification that we estimate for the sector-level data is

$$E\{x_{sct} : \theta_{cs}, \theta_{st}, \delta_{ct}\} = \exp(\theta_{cs} + \theta_{st} + \gamma\Omega(\delta_{ct})) \quad (1)$$

where x_{sct} is the inflow of investment in sector s in country c in year t, θ_{cs} are country/sector fixed-effects, θ_{st} are sector/year fixed- effects. We will also look at country-level variation, i.e.

$$E\{\bar{x}_{ct} : \theta_c, \theta_t, \delta_{ct}\} = \exp(\theta_c + \theta_t + \gamma\Omega(\delta_{ct})) \quad (2)$$

where $\bar{x}_{ct}$ is total investment in country c in year t, θ_c are country fixed-effects and θ_t are year fixed-effects.[16]

The identification of the effect of strong executive constraints in all specifications comes from variation within countries over time. We control for almost 1750 country/sector fixed effects and 450 sector/year fixed effects in (1) which reduces concerns about changes in sectoral composition driving our results at the country level. This saturated specification is a good deal more cautious than most studies on the effect of institutions on economic outcomes. For our strategy to be credible, we require that there be no common confounding factors driving both changes in institutions and investment flows. The fact that our estimates barely change when we add different sets of economic or political controls is re-assuring in this regard. We discuss robustness in detail below.

Table 1 gives the results. In columns (1) to (3) we show results at the sector level and in columns (4) to (8) we display results at the country level. Reported standard errors are clustered at the country level in all columns. Columns (1) and (4) present the core finding. The coefficient on strong executive constraints is statistically and economically significant in line with Figures 1 and 2. Investment flows increase by about 90% using sector-level variation and by about 82% using country-level variation when strong executive constraints are adopted. Columns (2) and (5) show that it is strong executive constraints rather than other measures of institutions that are correlated with investment inflows. Unlike strong executive constraints, there is no significant correlation between high competitiveness and/or openness of executive recruitment and investment flows as measured by the PolityIV data. These are the other dimensions describing the executive that go into calculating country-level "democracy" scores.[17] Our theory-driven focus on executive constraints seems to be

16. Changes in global flows are absorbed in sector/ year fixed effects in (1) and in year fixed effects in (2).

17. For details see the Polity IV manual codebook. We also used a more flexible specification with regard to the cut-off on executive constraints. This reveals quite clearly that it is the change from 6 to 7 which appears to be important for investment inflows. For a discussion see the previous section and the appendix.

confirmed by this result. The similarity between the sector-level and country total remains a feature of the results.

Columns (3) and (6) use the count of industries with inflows as an alternative measure for investment inflows. This deals with the concern that the results are primarily driven by some large "outlier" values in some sectors/countries. For this we first measure investment inflows in an industry as a dummy variable that takes the value one if the investment inflows are strictly positive in a given country/industry/year. We then add these up to the sector level in column (3) and the country level in column (6). The positive and similar coefficient is interesting since it indicates that the previous results were not driven by changes at the intensive margin alone (more flows in a given industry) but, also at the extensive margin (more industries with inflows).

Finally, columns (7) and (8) Table 1 look at two alternative data sources. Column (7) uses investment flows from *all* OECD countries provided by the OECD. Column (8) uses data provided by the UNCTAD which measures flows at the destination country. The main finding is robust and the size of the coefficient is similar to that found in column (4), 52 and 39 % respectively.

The results reported in Table 1 are robust to controlling for political reforms of capital restrictions and trade barriers, EU membership and even eight different variables to capture political turmoil. Unlike executive constraints, variables such as population or GDP per capita have no predictive power. This is different to other studies like Alfaro et al (2008) who rely on cross-sectional variation. Our results are also robust to controlling for natural resource trade as well as health and human capital measures. For a detailed discussion of robustness see the Online Appendix and Tables E.3(a), E.3(b), E.4, E.5 and E.6.[18]

It is also worth noting that inflows change rapidly, without any discernible pre-trend, following the adoption of strong executive constraints. Figure 3 illustrates this by looking at the dynamic consequences for investment of adopting strong executive constraints. The graph reports the results of a regression of investment flows on the strong constraints dummy and the adoption year dummy with 4 leads and lags.[19] The graph demonstrates that the effect of adopting strong executive constraints is discrete, albeit with a one year lag. Thus, investment inflows seem to respond one year after the change at a permanently higher level thereafter. The theoretical model developed in the next section is consistent with such a level effect.[20]

18. We have explored the possibility of endogeneity by following Persson and Tabellini (2009b) who suggest that foreign “Democratic Capital” could be important in sustaining institutional change. To implement this idea, we use a two-stage procedure where we first predict the adoption of strong executive constraints by using the adoption of such constraints in neighboring countries. This exercise, the results from which are reported in appendix Table E.6, is discussed in the online appendix and yields similar results.

19. See Table E.2 in the Online Appendix. Figure 3(a) uses results in column (1) and Figure 3(b) uses results in column (2). Figure E.2 shows the same graph for UNCTAD investment inflows.

20. The level effect is also realistic as investment flows in our data includes items such as credit to subsidiaries or asset purchases.

4. Exploring a Mechanism

This section develops a specific theoretical model and explores its implications. We begin by laying out a theoretical model and then show how it can be brought to the data.

4.1. Theory

The Economy. Consider an open economy with a fixed number of sectors indexed by i and where π_i be the number of firms in sector i. We study the behavior of a representative firm in each sector where, for convenience, set the price of each sector's output to be one. A sector's labor productivity has a time-invariant firm-specific component, ρ_i, and a time-varying country-specific component, Γ_t. The latter is assumed to depend on country-level economic policies along the lines articulated by Aghion and Howitt (2006) and evolves stochastically over time according to

$$\Gamma_t = \Gamma_{t-1} e^{p_t}$$

where $p_t = \kappa + \varepsilon_t$ with the stochastic time-varying shock to productivity growth being normally distributed, i.e. $\varepsilon_t \sim N\left(-\sigma_\varepsilon^2/2, \sigma_\varepsilon\right)$.[21] In the next subsection, we present a simple model of the political process in which κ and σ_ε depend on whether a country has weak or strong executive constraints.

Output in the representative firm in sector i is given by the following Cobb-Douglas production function:

$$Y_{it} = \left[(\Gamma_t \rho_i L_{it})^\alpha K_{it}^{1-\alpha}\right]^\eta$$

where $\eta < 1$. This is a Lucas (1978) "span of control" model of firm level heterogeneity where pure profit is a return to owning a specific technology.

Firms hire capital and labor in competitive factor markets. However, we assume a difference in timing between labor and capital decisions. Capital is installed before ε_t is realized while labor is chosen afterwards.[22] The labor market is closed with a fixed stock of labor L. The capital market is open with inflows of capital into foreign owned firms representing investment and the global cost of capital is r.[23] We show in the appendix that this yields the following expression for per capita output which depends only on exogenous variables:

$$y_t = B \times (\Gamma_t)^{\alpha\eta} \left(E\left[(\Gamma_t)^{\alpha\eta}\right]\right)^{\frac{(1-\alpha\eta)(1-\alpha)\eta}{1-\eta+(1-\alpha)\alpha\eta^2}} \qquad (3)$$

21. This implies that $E\left(e^{\varepsilon_t}\right) = 1$.

22. This is a key assumption and is tantamount to assuming that ex post adjustment costs are very high. Risk would not matter in our framework if capital could be chosen flexibly and costlessly adjusted after ε_t becomes known. The model could be complicated by assuming adjustment costs which would lead to option value in investment as in Dixit and Pindyck (1994).

23. This theoretical approach could be applied to domestic and foreign owned firms alike. For foreign owned firms, the assumption that r is exogenous is, however, more plausible. It would be straightforward, although tedious, to separately model the domestic and foreign-owned sectors of the economy.

where B is a time-invariant constant. The level of output now depends on the realized period t productivity shock and the ex ante mean and variance of productivity shocks since these affect the incentive to invest. Since we have assumed that the productivity shocks caused by the political environment are exogenous, equation (3) allows us to separate the direct effect of productivity shocks working through $[\Gamma_t]^{\alpha\eta}$ from the indirect effect of inhibited capital accumulation working through $E[(\Gamma_t)^{\alpha\eta}]$.

Politics. The role of executive constraints is to curtail instances of bad policy making in the spirit of the veto players model of Tsebelis (2002).[24] We think of this as achieved through the actions of a legislature which can reduce the discretion of the executive if it is inclined to act against the general interest of the citizens.[25] As above, let $\delta_{ct} \in \{W, S\}$ denote whether a country has strong or weak executive constraints at date t. With weak executive constraints, policy is determined solely by the executive while with strong executive constraints a legislature also influences policy as outlined below.

To map politics directly onto our economic model above, suppose that productivity growth p_t depends on policy making represented by a parameter Δ_t which varies stochastically depending of the behavior of policy-makers. While we do not model the micro-foundations of policy making, we have in mind a range of policies that could drive growth along the lines of Aghion and Howitt (2006). The expected productivity growth trend introduced in the previous section is now

$$\kappa(\delta) = E[\Delta_t : \delta].$$

As before we have productivity growth given by $p_t = \kappa(\delta) + \varepsilon_t$ but the error is now $\varepsilon_t = [\Delta_t - \kappa(\delta) + \omega_t]$. This error consists of an iid shock ω_t with mean $-\sigma_\varepsilon^2(\delta)/2$ and variance σ_ω^2 and political risk induced by the difference $\Delta_t - \kappa(\delta)$. Accordingly, the variance of productivity around its trend is:

$$\sigma_\varepsilon^2(\delta) = var(\Delta_t : \delta) + \sigma_\omega^2.$$

Thus political institutions affect productivity growth through the mean and variance of Δ_t. We now suggest a simple micro foundation for why executive constraints influence policies Δ_t.

No Executive Constraints $(\delta = W)$. In this case, the quality of decision making by the executive alone determines productivity growth. For simplicity, suppose that $\Delta_t \in \{\Delta_L, \Delta_H\}$ with $\Delta_H > \Delta_L$. The probability of Δ_H depends on the effectiveness

24. The theoretical approach is further developed in Besley and Mueller (2014). It is based on ideas in the political agency literature first developed in Barro (1973) and Ferejohn (1986). Besley (2006) offers a review of the main ideas.

25. As an example for a lack of constraints take the situation in Zimbabwe in 2001 where, after a stand-off with the executive, Anthony Gubbay, Zimbabwe's Chief Justice surrendered to government demands on the 2nd of March and agreed to relinquish office. In a Wikileaks cable, an US diplomat had described the independence of the judiciary as the *"last check on president Mugabe's exercise of untrammeled power."*

of the executive with λ denoting the probability that the executive is produces Δ_H. The parameter λ could be interpreted either as a measure of competence or as reflecting the extent to which there the incumbent is susceptible to rent-seeking influence.[26] Then:

$$\kappa(W) = \lambda\Delta_H + (1-\lambda)\Delta_L \quad \text{and} \quad \sigma_\varepsilon^2(W) = \lambda(1-\lambda)[\Delta_H - \Delta_L]^2 + \sigma_\omega^2.$$

In this case, it is λ which affects both $\kappa(W)$ and $\sigma_\varepsilon^2(W)$ directly. A higher value of λ due, for example, to a greater availability of political rents, increases the trend rate of productivity growth but has an ambiguous effect on its variance.

Executive Constraints $(\delta = S)$. Here we suppose, following coding practice in the data, that a legislature also has a say in making policy. Specifically, it can veto any proposal by the executive and impose a policy which yields $\Delta_0 \in [\Delta_L, \Delta_H]$. One interpretation of this is as maintaining a status quo rather than allowing policy activism and rent extraction.[27] The key assumption is that this has a moderating influence since the payoff of this policy lies between the bad and good outcomes achieved under pure executive discretion.

We model the imposition of this default outcome in a reduced-form way, supposing that Δ_0 is imposed with probability φ_J $(J \in \{L, H\})$ when the executive would have generated growth of Δ_J. If $\varphi_H > 0$, the constraint results in discretion sometimes being removed even when the outcome would have been Δ_H. However, if $\varphi_L > 0$, the legislature can prevent a policy error that would have resulted in a payoff of Δ_L. Thus the pair $\{\varphi_H, \varphi_L\}$ represent the competence of the legislature.

Now define:

$$\tilde{\Delta}_J = [(1-\varphi_J)\Delta_J + \varphi_J\Delta_0].$$

Using this, the key model parameters determining productivity growth are:

$$\kappa(S) = \lambda\tilde{\Delta}_H + (1-\lambda)\tilde{\Delta}_L \quad \text{and} \quad \sigma_\varepsilon^2(W) = \lambda(1-\lambda)\left[\tilde{\Delta}_H - \tilde{\Delta}_L\right]^2 + \sigma_\omega^2.$$

Comparing this to the case without executive constraints, these parameters now depend not only on the available political rents, λ, but also the competence of the legislature $\{\varphi_H, \varphi_L\}$ and the quality of the default policy Δ_0.[28]

Empirical Implications. We now develop two implications of the theory. The first is a prediction about productivity growth across political regimes and the second concerns the impact on investment. For productivity growth and volatility we have:

26. In Besley and Mueller (2014), we develop a model based on rent-seeking by incumbents.

27. This in the spirit of Tsebelis (2002) who argues that having more veto players increases status quo bias in political systems. Note, also that this model is consistent with the ideas in Acemoglu and Robinson (2000) who argue that economic rents can be an impedement to economically beneficial reforms if they flow towards the politically powerful.

28. In Besley and Mueller (2014), λ is derived as an endogenous variable and also varies with executive constraints.

LEMMA 1. *Trend productivity growth may be higher or lower with strong executive constraints, i.e.*

$$\kappa(S) \gtrless \kappa(W) \ \text{as}\ \lambda\varphi_H[\Delta_0 - \Delta_H] + (1-\lambda)\varphi_L[\Delta_0 - \Delta_L] \gtrless 0$$

The variance of the productivity shocks ε_t is unambiguously lower under strong executive constraints, i.e. $\sigma_\varepsilon^2(S) < \sigma_\varepsilon^2(W)$.

The mean effect depends on whether the constraints predominantly allow good executive discretion and eliminate bad use of discretionary policy. However, the reduction in the variance holds regardless of this as long as the default policy induces moderation, i.e. $\Delta_0 \in [\Delta_L, \Delta_H]$. If executive constraints always impose the default $\varphi_H = \varphi_L = 1$ then productivity growth $\kappa(S) = \Delta_0$ always and the model features no volatility due to policy. The model has, as another special case, a perfectionist view of executive constraints in which $\varphi_H = 0$ and $\varphi_L = 1$. In this case the outcome Δ_L is replaced by Δ_0 under strong executive constraints.[29]

We now use this comparison to derive implications for investment with and without executive constraints. The optimal capital stock, and hence investment, at the firm level depends on the expected productivity growth and its volatility. Investors should therefore react to changes in these. Following the evidence above, we are interested in understanding the implications for foreign owned firms and hence investment. But if we had good domestic firm data or sector specific data, this too could be used.[30] We will now state the empirical prediction specifically to emphasize the link to the data.

We show in the appendix that the optimal capital stock for firm i is given by

$$\ln K_{it}^*(\delta) = \ln C_i - \frac{(1-\alpha\eta)^2\alpha\eta}{2\left(1-\eta+(1-\alpha)\alpha\eta^2\right)}\sigma_\varepsilon^2(\delta) + \frac{\alpha\eta(1-\alpha\eta)}{1-\eta+(1-\alpha)\alpha\eta^2}\kappa(\delta) + \frac{\alpha\eta(1-\alpha\eta)}{1-\eta+[1-\alpha]\alpha\eta^2}\ln(\Gamma_{t-1}) \tag{4}$$

where C_i is a sector-specific constant. Equation (4) shows that investment incentives follow the underlying parameters of the productivity growth process $\kappa(\delta)$ and $\sigma_\varepsilon^2(\delta)$. In this way, changes in the political institutions $\delta_t \in \{W, S\}$ have a direct implication for investments given by:

PROPOSITION 1. *The optimal capital stock of foreign firms is increasing in $\kappa(\delta)$ and decreasing in $\sigma_\varepsilon^2(\delta)$.*

Thus, the model predicts that investment will respond to changes in $\{\kappa(\delta), \sigma_\varepsilon^2(\delta)\}$. This gives an immediate link to the reduced-form findings above where we found that

29. The key assumption that drives the comparison of the variances is that $\Delta_0 \in [\Delta_L, \Delta_H]$, i.e. that the legislature can never make things worse by vetoing what the executive does and can never improve on a good executive by intervening.

30. This underlines the benefit of having accurate data on investment at the sector-level for a large number of countries and years.

inflows of investment were higher under strong executive constraints. However, since Lemma 1 shows that $\kappa(\delta)$ can increase or decrease under strong executive constraints, the overall prediction for investment from the adoption of executive constraints using the theoretical model is ambiguous.

Proposition 1 motivates trying to decompose the outcome into an effect coming through mean productivity growth $\kappa(\delta)$ and its variance $\sigma_\varepsilon^2(\delta)$. To that end, we will first estimate $\kappa(\delta)$ and $\sigma_\varepsilon^2(\delta)$ from aggregate growth data. We show in the Appendix, that mean output growth, $\hat{\mu}_g(\delta)$, and the variance of growth $\hat{\sigma}_g^2(\delta)$ can be used to derive estimates of the productivity parameters $\{\hat{\kappa}(\delta), \hat{\sigma}_\varepsilon^2(\delta)\}$ from:

$$\hat{\kappa}(\delta) = \frac{1-\eta+\alpha\eta}{\alpha\eta}\hat{\mu}_g(\delta) + \frac{1-\alpha\eta^2+\alpha^2\eta^2}{2(\alpha\eta)^2}\hat{\sigma}_g^2(\delta) \tag{5}$$

$$\text{and} \quad \hat{\sigma}_\varepsilon^2(\delta) = \left(\frac{\hat{\sigma}_g(\delta)}{\alpha\eta}\right)^2. \tag{6}$$

In the following section we will use the estimated parameters $\{\hat{\kappa}(\delta), \hat{\sigma}_\varepsilon^2(\delta)\}$ from equations (5) and (6) to explain investment inflows motivated by (4). This will allow us to decompose the effect of adopting strong executive constraints into an effect operating through a change in trend growth, $\kappa(\delta)$, and a change in the variance of productivity shocks, $\sigma_\varepsilon^2(\delta)$. In line with Lemma 1 and Proposition 1, we will see whether the variance reduction can explain the reduced-form finding in the previous section.

4.2. Evidence

Executive Constraints and Growth. Table 2 shows that there are strong empirical regularities in the relationship between growth volatility and executive constraints. Panel A gives summary statistics for real GDP per capita growth from the Penn World Tables differentiated according to whether a country has strong or weak executive constraints. The first part of the table summarizes the raw data for the full sample of countries between 1970 and 2010. The sample of country/year observations with strong executive constraints grew by 2.2 % on average while the sample with weak executive constraints grew by 1.9 % on average. This difference in average growth between the two groups is negligible and is not statistically significant. There is, however, a large difference in the second moments between the two groups. The variance of growth is roughly 3.5 times higher in the sample of countries with weak executive constraints and the difference is statistically significant at 5%.[31] This observation is consistent with the prediction in Lemma 1.

The second part of Table 2, panel A shows that this difference across regimes based on variation in political institutions is not driven purely by cross-sectional differences in growth. This observation is important in light of the well-known fact that poorer

31. The F statistics of the test in the full sample is $F = 3.8$.

countries, which tend to have weak executive constraints, also have more volatile growth rates.[32] If we restrict the sample to those countries that spent at least five years in both strong and weak executive constraints between 1970 and 2010, the same basic picture emerges of a similar level of growth along with lower variance when strong executive constraints are introduced.

The evidence in Table 2 suggests that a change from strong to weak executive constraints induces a mean preserving spread in growth rates. Figure 4 depicts this by plotting Kernel densities for growth rates under strong and weak executive constraints. The distribution of growth rates is approximately normal. The more extreme outcomes (high and low) under weak executive constraints are clearly visible. The share of country/year observations with a negative growth rate under weak executive constraints is 32% but only 22% under strong executive constraints despite very similar average growth rates. *Prima facie*, this finding gives credence to the idea that we might explain the regression results above as being due to a reduction in the volatility of productivity growth. If investors understand this relationship, we should expect investment to be higher when volatility is lower.[33]

Equations (5) and (6) allow us to move from the mean and variance of growth to the parameters which affect investment in theory. To illustrate, we use these equations and the growth summary statistics in Table 2, Panel A to produce estimates of $\left\{\hat{\kappa}\left(\delta\right), \hat{\sigma}_{\varepsilon}^{2}\left(\delta\right)\right\}$ in Panel B. We need to postulate values of α and η for this purpose and we set $\alpha = 2/3$ with $\eta = 3/4$.[34] Unsurprisingly, in light of (6), our observation on the variance of growth maps into a prediction about $\hat{\sigma}_{\varepsilon}^{2}\left(\delta\right)$. The variance under weak executive constraints is about four times higher than the variance under strong executive constraints.

Updating. Our theory suggests that investors will form expectations about $\left\{\hat{\kappa}\left(\delta\right), \hat{\sigma}_{\varepsilon}^{2}\left(\delta\right)\right\}$ to guide their decisions. It is reasonable to suppose such expectations to be informed by country-specific as well as world-wide experiences of growth under strong and weak constraints.[35] If a country has never been in strong executive constraints, then we need to assign a "reasonable" expectation about $\kappa\left(\delta\right)$ and $\sigma_{\varepsilon}^{2}\left(\delta\right)$ after the change takes place. One option would be to base this on the average past global experience or it could try to take the country-specific experience into account. After some experience with strong executive constraints, we might expect that a country's growth experience will become salient to investors rather than only using the average experience of all countries in the world.

32. See, for example, Koren and Tenreryo (2007).

33. In appendix Table E.7 we show that this is not unrealistic. First, the evaluation of political country risk by a public risk insurer (ONDD) seems to fall with the adoption of strong executive constraints. Second, IMF forecasts become less volatile with the adoption of strong executive constraints. It is re-assuring that the mean of these forecasts does not change.

34. Changing these assumptions in a reasonable interval does not change our results much.

35. This idea is similar in spirit to Buera et al (2011) which studies the diffusion of policy across nations as a learning process.

We approach this issue empirically by building a Bayesian model of expectations formation for beliefs about trend productivity growth and its variance across political regimes. We use this model to show that our model leads suggests a heterogeneous "treatment effect" from adopting strong executive constraints, both with respect to the timing of the change and the country's previous experience. To give a concrete example, the East Asian crisis of the mid-1990s is in our time period. The timing of a country's transition into executive constraints might reasonably depend on whether it occurred before or after the crisis as beliefs about the benefits from strong executive constraints would have been influenced by this experience. Moreover, some countries may have experienced greater reductions in growth volatility compared to their time under weak executive constraints.

The procedure for computing $\{\hat{\kappa}_{ct}(\delta), \hat{\sigma}_{\varepsilon ct}(\delta)\}$ has two steps. First, we use standard updating formulae for evolving expectations of $\hat{\sigma}_g^2(\delta)$ and $\hat{\mu}_g(\delta)$ in the light of fresh information on growth outcomes. Second, we use these estimates to calculate the parameters of productivity growth using equations (5) and (6).

Suppose that a country has a single transition in our data period.[36] When country c transitions at time $\tau(c)$ we use growth data between 1970 and time $\tau(c)$ from all countries to construct the following data moments:

$$G^1(\delta, \tau(c)) = \hat{\mu}_g(\delta, \tau(c)) \text{ and } G^2(\delta, \tau(c)) = \hat{\sigma}_g^2(\delta, \tau(c)) + \hat{\mu}_g^2(\delta, \tau(c)).$$

Then, as growth in the country is observed we we can write the updated expectation of mean growth as

$$\hat{\mu}_{gct}(\delta, \tau(c), D) = \frac{D \times G^1(\delta, \tau(c)) + \sum_{s=\tau(c)}^{t} g_{cs}(\delta)}{D + t - \tau(c)}$$

where $\tau(c)$ is the year in which the country transitioned into regime $\delta \in [S, W]$. The parameter D gives the strength of the prior which comes from the growth history of all other countries. For this, we use observations of growth for *all* countries in a given regime between 1970 and the relevant transition date.[37] A higher value of D means that more weight is given to the growth history of other countries with the same institutions. Importantly, the longer a country is in a regime, i.e. the higher $t - \tau(c)$, the more weight is put on the particular growth history of the country in question. For example, if $D = 10$, then it takes a decade under the new institutions until half the weight is put on the experience of the country whose institutions have changed.

36. The same basic approach can be used to form in expectations when there are multiple institutional transitions. In such cases, we assume investors recall what happened previously in a particular institutional regime. Our results are all robust whether or not we include countries with multiple transitions.

37. We use residuals of a regression of growth on country fixed effects. The main implication of using residuals is that changes in mean growth with the regime are calculated from the within-country variation, i.e. after taking out a country-specific growth mean. Using raw growth data makes no qualitative difference to our results.

Analogously, we assume that foreign investors form beliefs about the volatility of a country through

$$\hat{\sigma}^2_{gct}(\delta, \tau(c), D) = \frac{(D+t-\tau(c)) \times \left[D \times G^2(\delta, \tau(c)) + \sum_{s=\tau(c)}^{t} [g_{cs}(\delta)]^2\right] - \left[D \times G^1(\delta, \tau(c)) + \sum_{s=\tau(c)}^{t} g_{cs}(\delta)\right]^2}{(D+t-\tau(c)-1)(D+t-\tau(c))}$$

using the standard formula for updating the sample variance of a normally distributed variable.[38]

To construct the predicted mean and variance as a function of institutions, we use $\hat{\mu}_{gct}(\delta, \tau(c), D)$ and $\hat{\sigma}^2_{gct}(\delta, \tau(c), D)$ from the updating formulas to calculate productivity growth given by our economic model

$$\hat{\kappa}_{ct} = \frac{1-\eta+\alpha\eta}{\alpha\eta}\hat{\mu}_{gct}(\delta, \tau(c), D) + \frac{1-\alpha\eta^2+\alpha^2\eta^2}{2(\alpha\eta)^2}\hat{\sigma}^2_{gct}(\delta, \tau(c), D), \tag{7}$$

$$\hat{\sigma}^2_{\varepsilon ct} = \frac{\hat{\sigma}^2_{gct}(\delta, \tau(c), D)}{(\alpha\eta)^2}. \tag{8}$$

This approach to modelling expectations is implicitly allowing for a country-specific relationship between an institutional transition since it is based on the regime-specific growth history of each country. As both equations (7) and (8) are functions of D the updating model depends on how much weight is given to the prior. In the next section we will choose D based on the best fit of the model to the investment data.

Empirical Results. Figure 5 gives a first impression of how the model helps to understand the investment flow patterns in the data. On the y-axis we show the (log of) average inflows for those countries that switched regime in our sample. At the same time, the figure shows the country/episode average of the estimates of $\hat{\sigma}^2_{\varepsilon ct}$ for $\delta = W$ (triangular icons) and for $\delta = S$ (square icons). The fall of the expected variance with the adoption of strong executive constraints is clearly visible. All observations in strong executive constraints are to the left of observations under weak executive constraints. At the same time inflows increase so that the general move in a north-westerly direction is clearly visible.

In addition, the heterogeneity in country experiences is also apparent from Figure 5. What is particularly interesting here is that there are large differences in the variance among countries with weak executive constraints. And in cases such as Nicaragua and Lesotho, for example, high volatility was accompanied by particularly low average inflows.

In order to test the model in a more systematic way we now run regressions where instead of including strong executive constraints directly, we use our estimates of trend productivity growth and the variance of productivity as a conduit for such constraints to affect outcomes. The sector-level specification is:

$$E\left\{x_{sct} : \alpha_{cs}, \hat{\sigma}^2_{\varepsilon ct}, \hat{\kappa}_{ct}, y_{ct}\right\} = \exp\left(\alpha_{cs} + \alpha_{st} + \gamma_1 \times \hat{\sigma}^2_{\varepsilon ct} + \gamma_2 \times \hat{\kappa}_{ct}\right) \tag{9}$$

38. So see this set $D = 0$ which gives the standard sample variance formula

$$\hat{\sigma}^2_{ct}(\delta, 0) = \frac{(t-\tau(c)) \times \sum_{s=\tau(c)}^{t} g^2_{cs}(\delta) - \left[\sum_{s=\tau(c)}^{t} g_{cs}(\delta)\right]^2}{(t-\tau(c)-1)(t-\tau(c))}.$$

where x_{sct} is the inflow of investment in sector s in country c in year t. We will also look at specifications where we use the total flow at the country level, i.e.

$$E\left\{\bar{x}_{ct} : \alpha_{cs}, \hat{\sigma}^2_{\varepsilon ct}, \hat{\kappa}_{ct}, y_{ct}\right\} = \exp\left(\alpha_c + \alpha_t + \gamma_1 \times \hat{\sigma}^2_{\varepsilon ct} + \gamma_2 \times \hat{\kappa}_{ct}\right) \quad (10)$$

where $\bar{x}_{ct}$ is the inflow of investment in country c in year t. In both of these specifications, we expect $\gamma_1 < 0$ and $\gamma_2 > 0$.

As discussed in the previous section the variables $\hat{\sigma}^2_{\varepsilon ct}$ and $\hat{\kappa}_{ct}$ are functions of D. In order to find the D that describes the investment data best, we run (9) and (10) repeatedly and report a standard goodness of fit measure for a GLM model, namely the deviance.[39] The result of this exercise is reported in Figure 6 which shows that deviance falls rapidly with larger values of D in both the sector and country level. However, after $D = 40$, both deviance curves start to flatten out so that we get minimum deviance for $D = 46$ using country-level variation and $D = 68$ using sector-level variation. Taken literally, this implies that investors put a lot of weight on the historical experiences of other countries when evaluating the impact of an institutional reform in a specific country.

Table 3 present estimates of our updating model at the sector and country level using minimum deviance estimates of D above. Columns (1) and (4) of Table 3 contain our main results. The results show a strong negative relationship between investment and expected volatility and a strong positive relationship between investment and expected trend growth. In columns (2) and (5) we show results for the full sample, including countries that did not switch institutions. Again, we get the expected signs of $\hat{\gamma}_1 < 0$ and $\hat{\gamma}_2 > 0$. This is somewhat re-assuring as it indicates that the model is able to describe the investment data even if most observations come from countries that did not switch regime. In columns (3) and (6) we control for the covariance of productivity growth between the Netherlands and the respective country. We find a negative coefficient, as one would expect from portfolio choices of firms in the Netherlands, although it is somewhat imprecisely estimated.

We can examine how well the approach reported in Table 3 does relative to a reduced-form model of Table 1 using a likelihood ratio test. This shows that the are substantial gains in explanatory power using the results reported in Table 3. To illustrate this finding, Figure 7 plots the kernel densities of the average prediction errors for countries which change their executive constraints. The model in equation (10) produces prediction errors which are, on average, much closer to zero.[40]

The results in Table 3 suggest that a reduction of expected volatility of 0.01 is accompanied by an increase in investment inflows of around 100 % which, from Figure 6, is broadly in line with the reduction induced by a change in the volatility when a country switches from weak to strong executive constraints. This effect is coming from learning in other countries and explains the abrupt increase in investments inflows depicted in Figure 3. Another way to understand the magnitudes is to go back to equation (7) and think about the impact of the expected growth rate, $\hat{\mu}_{gct}$. Our assumptions imply that $(1 - \eta + \alpha\eta)/\alpha\eta = 1.5$ so that an increase of mean growth, $\hat{\mu}_{gct}$, by half a percentage point, for example, would imply that investment inflows increase by 75 %.

The Heterogeneous Effect of Institutional Transitions. The main advantage of fitting a specific model to the data compared to the difference-in-difference results is that we can gain

39. This is given by $2\sum\{x_{sct}\log(x_{sct}/\hat{x}_{sct}) - (x_{sct} - \hat{x}_{sct})\}$ where $\hat{x}_{sct}$ are the fitted values from equation (9) or (10).

40. This suggests that the regression model from our preliminary look at the evidence can over- or under-estimate average inflows in some countries by significant margin. We show in Appendix Figure E.3 that the reduced form model understimates flows in Europe and it overestimates inflows into Asia (by over 200 million Euros on average).

an insight into heterogeneous effects across countries from institutional changes based on a specific mechanism. To do this, we can exploit both time-series and cross-sectional variation in $\{\hat{\mu}_{gct}, \hat{\sigma}^2_{gct}\}$. Countries have benefitted differentially from adopting strong constraints depending on their own particular reduction in policy risk and the effect this had on subsequent investment flows.

To illustrate the importance of heterogeneity across countries, we show how our model can be used to account for changes in investment inflows for each country according to their specific experience.

We construct counterfactuals in which we imagine that the adoption of strong executive constraints did not change either the mean or the standard deviation of growth. To be more precise, our counterfactual assumes that investors do not understand that they are in a new regime and keep updating based on their previous beliefs. This has two effects. First, the priors do not shift in the adoption year. This is particularly important for the expected variance, $\hat{\sigma}^2_{gct}$. Secondly, the new growth data receives a much smaller weight.[41] We then compare these counterfactuals to the actual values of the fitted model to gain an estimate of the investment flow due to the path of $\{\hat{\mu}_{gct}, \hat{\sigma}^2_{gct}\}$ taken by a country according to our model. This gives us an estimate of the change in investment flows which can be attributed to the changing mean and variance for each country.

Table 4 column (1) gives the average yearly investment inflows during the episode of strong executive constraints for each country that changed institutions over our time period. Flows varied significantly between countries with those in Eastern Europe experiencing gross yearly inflows of more than three billion EUR per year. To generate the predicted flows in column (2), we use the estimates from Table 3, column (4). The fitted values reported in column (2) predict the country experience reasonably well.[42]

Columns (3) and (5) report two estimates of how the trend and variance in productivity growth matter for each country. In column (3), we predict investment inflows supposing that the prior in $\hat{\mu}_{gct}$ had not changed when strong executive constraints were introduced. For each country this gives a counterfactual investment inflow holding all other influences, including the growth history, on investment fixed. We can then compare this to the prediction based on the actual path of $\hat{\mu}_{gct}$ that we have calculated for each country. In column (5) we do something similar holding the prior in the variance of productivity growth fixed as our counterfactual. Heterogeneity across countries in these estimates is now dependent on a country's growth history and its effect on $\{\hat{\mu}_{gct}, \hat{\sigma}^2_{gct}\}$.[43]

Column (4) looks at mean growth, $\hat{\mu}_{gct}$ by comparing columns (2) and (3). It reports the log difference between inflows with and without the country-specific change in trend growth. There is a wide range of estimates which is consistent with Lemma 1. For example, our estimate for Argentina suggests that the decline in trend growth in Argentina reduced investment inflows by about 22% compared to the counterfactual. Column (4) also illustrates why the impact of strong executive constraints through mean growth is fairly small on average. A similar number of countries have positive and negative experiences with some seeing improved and others deteriorating growth after adopting strong executive constraints. On average, the mean effect of adoption is relatively close to zero which is in line with the average growth effect. However, the numbers indicate quite a dramatic degree of heterogeneity across countries.

41. A country that switches after twenty years of being in weak executive constraints, for example, will give a weight of $1/67$ to the new observation instead of $1/47$ (assuming $D = 46$).

42. If we run a linear OLS regression of actual and fitted FDI flows for both strong and weak executive constraints we get an adjusted R-squared of 0.72.

43. An important subtlety is that more weight goes into a country's growth history regime when the prior changes because the previous growth history is disgarded.

Column (6) reports the implications of changes in the variance of growth, $\hat{\sigma}^2_{gct}$, by comparing columns (2) and (5). The counterfactual is now the adoption of strong executive constraints without a shift in priors at the adoption date. The estimates are now uniformly positive, illustrating that the reduction in $\hat{\sigma}^2_{gct}$ led to an increase in investment inflows in *all* countries which adopted strong executive constraints in our data. In some countries the counterfactual suggests a very large impact of the variance reduction. For example, we predict that yearly gross investment flows into Poland would have been about 3 billion EUR less per year if strong executive constraints had not lowered the expected variance of productivity growth. According to our model, Turkey would have experienced a reduction of gross investment inflows by over 400 million EUR per year without the shift in variance beliefs. Many more countries from all regions of the world are estimated to have benefitted massively from the reduction of growth volatility.

Table 4 underlines the heterogeneity in country-level experiences from adopting strong executive constraints.[44] This is consistent with Lemma 1 which emphasizes that the impact on mean growth depends on whether the constraints predominantly curtail misused discretionary policy decisions either due to incompetence or rent-seeking by incumbents. Of course, adopting strong executive constraints can backfire if the executive is competent and/or if the legislative or judicial powers are used unwisely. But the pattern that we find is consistent with the idea that as veto players, their limit on discretion and, hence, rent-seeking has a positive effect on investment inflows by reducing political volatility.

While forcing the effect of institutions to work through trend productivity growth and the volatility of productivity growth is limiting, the model does a reasonably good job at explaining heterogeneity across countries and predicts an overall impact of a change from weak to strong executive constraints of around 140 percentage points in investment inflows which is similar in magnitude to what we found in the reduced-form approach. The results in Table 4 also illustrate the importance of decomposing the effects country by country and into those due to changes in the mean and volatility of productivity growth. These are masked by the average effects from a reduced-form difference-in-difference approach.

5. Sectoral Heterogeneity

So far, we have not considered sectoral heterogeneity. However, our data make it possible to investigate whether there are differences in responses of investment flows to executive constraints across sectors Moreover, there is scope to see how this varies according to political factors which affect the sector. Having first established that there is some heterogeneity, we present suggestive evidence that politics may be behind this. Finally, we show that this is also consistent with how volatility differentially affects sectoral investment flows.

As a preliminary, we run a regression of the form in equation (1) but allowing a different relationship with executive constraints in each of our 15 sectors.[45] The coefficients, ordered by the point estimate, along with the 95% confidence intervals are reported in Figure 8. There is a clear evidence of sectoral heterogeneity. Moreover, most service sectors are towards the

44. Table E.8 in the on line appendix, shows clearly different patterns across continents. The adoption of strong executive constraints is associated with lower growth in all continents with exception of Europe and especially in Asian countries. At the same time, reductions in volatility have been larger in Africa and Europe than in Asia and Latin America. Not surprisingly, these differences also lead to different changes in inflows with adoption.

45. In this regression we drop the remaining sectors as they capture less than 1% of flows and are identified by much fewer observations.

left of the graph, i.e. have small/insignificant effects, while heavy industries and the most other heavily regulated service sectors, such as finance, are towards the right. Manufacturing, which is the largest sector in our data, has a precisely estimated coefficient towards the middle of the range.

We next explore whether the heterogeneity displayed in Figure 8 is related to political factors which vary by sector using two different measures. The first is the Index of Bribery in Business Sectors from *Transparency International*. This is a sector score on a scale from 0 to 10 where 10 indicates that the sector is less prone to bribe-giving. A limitation of this is that we only have a measure of this on average across countries rather than country-specific variation. After including country/sector fixed effects and sector/year fixed effects we interact the executive constraints dummy variable with this bribery index to see whether most of the effect comes from sectors which tend to pay most bribes. Since giving bribes relates to the extent of rent extraction by the government, we expect more exposure to bribery to be associated with larger benefits from the adoption of executive constraints. In Figure 9 we show that this does seem to be the case. The figure reports the coefficients from Figure 8 and contrasts them with the bribery score from Transparency International.[46] Table 5, column (1) confirms the relationship with a simple dummy that separates the eight sectors in bribing and non-bringing sectors. Inflows in bribing sectors react almost twice as much to the adoption of strong executive constraints than in non-bribing sectors.

We can also look at heterogeneity in political factors using data from Faccio (2006) which reports on political connections in 35 countries for 18 of our sectors.[47] Politically connected firms benefit from ties to the government which could impose costs to outsiders (such as foreign investors) thereby deterring them from investing. To the extent that strong executive constraints limit policies enacted for private political gain, then there will be a more level playing field for foreign firms after executive constraints are adopted leading to larger increases in investment flows in sectors with political connections. We can use the data in Faccio (2006) to classify a sector in a given country as “politically connected” if at least one firm in the sector is classified has being politically connected. This yields about one third of all sectors being classified as politically connected on this basis. In line with our expectations, column (2) of Table 5 shows that, controlling for country/sector fixed effects and sector/year fixed effects, politically connected sectors respond more to adopting strong executive constraints. Strikingly, this is still true if we control for country/year fixed effects instead of sector/year fixed effects, i.e. there is a relative change of inflows towards sectors which have strong internal political connections.[48]

Our final investigation looks at heterogeneity in the way productivity shocks affect a sector. Here, we allow for a sector-specific relationship between the variables (7) and (8) and investment flows. Although, this approach leads to less precisely estimated coefficients, all of the significant sector-specific coefficients on $\hat{\sigma}^2_{\varepsilon ct}$ are negative and all of the significant sector-specific coefficients on $\hat{\kappa}_{ct}$ are positive.[49] Moreover, we find a similar relationship between politics and heterogeneity to that found using a reduced-form approach. Specifically, the sector which is most responsive to volatility, as measured by $\hat{\sigma}^2_{\varepsilon ct}$, is construction. While the lack of precision means that this evidence should only be regarded as suggestive, we do find an

46. See the Appendix for a discussion of matching the scores to sectors. We were not able to find matches for the remaining sectors.

47. See also Fisman (2001) and Desai and Olofsgaard (2011).

48. In order to control for the fact that some countries might have more connected firms overall we also interact the measure with the share of firms in each country which are in the respective sector. Results are reported in Table E.9. The higher the share, the higher are the changes in inflows with the adoption of strong executive constraints.

49. Results are reported in Appendix Table E.10.

ordering of the coefficients on $\hat{\sigma}^2_{\varepsilon ct}$ that matches with the transparency international index of bribe-giving by sector.[50] Hence, overall the sectoral-level patterns are consistent with the broad approach taken here emphasizing the role of politics and productivity shocks.[51]

6. Concluding Comments

Much of the literature on the importance of political institutions for economic outcomes is not specific about the mechanism at work. Having observed a robust reduced-form relationship between investment inflows and strong executive constraints, we have suggested a specific approach based on the observation that there is a robust link between strong executive constraints and reduced volatility in country-level growth rates. This motivates our focus on an economic channel working through risk and investment incentives where capital is committed before productivity shocks are realized. Our model provides a natural way of thinking about the heterogeneous relationship between institutions and foreign investment flows.

Our approach postulates that institutions matter because government policy matters for the productivity of investment. At the core of the model is the idea that institutional constraints on the executive limit policy discretion. This will be beneficial if either there is a general increase in the competence when responsibilities are shared or because possibilities for rent-extraction which distorts policy is reduced.

Certain features of the data seem to be captured by the approach that we take. We have found that inflows in the aggregate increase when strong executive constraints are adopted and that this increase in inflows is associated consistently with the reduction in volatility which follows. A model based on changing beliefs about volatility following a change in institutions does a good job at capturing the heterogeneous effect across countries. We have also shown that, consistent with a model where political distortions are linked to incumbent rent-seeking, sectors which are most prone to rent extraction experience the strongest increase in inflows after the adoption of constraints and react most strongly to our measure of volatility. All of this is consistent with the fact that many enterprises also report concerns about political risk in survey data. Together, these pieces suggest that a model based on discretionary rent-seeking which leads to greater economic volatility, as outlined above, provides a fruitful way of describing these patterns in the data and the reason why strong executive constraints matter.

The inclusion of a range of country, time and sector fixed effects means the paper is extremely cautious in its approach to identification and is able to control for many sources of unobserved heterogeneity. Our results lend support to the idea that countries can avoid downside risks and thereby attract foreign investment. In the long run, this could lead to the significant cross-sectional differences in income and investment flows that we see between countries with strong and weak executive constraints.

Our focus on investment flows by foreign firms comes purely from the fact that we have good data for Dutch multinationals for a range of countries which have reformed their political institutions over the relevant time period. It would be interesting in future to test the ideas

50. See Appendix Figure E.4.

51. A further concern is that politically connected sector may differ in other characteristics, for example average firm size, and that this may be driving the result. We do not have direct measure of firm size in our data. However, we looked at this in US data as a benchmark and find that there is no clear relationship between the average firm or establishment size in the US and the reaction of inflows to the adoption of strong executive constraints. For example, electricity, gas and steam is a clear outlier in terms of establishment and firm size but towards the middle in Figure 8.

developed here for domestic firms where we would expect similar findings. However, this would require identifying data of comparable quality to that which is available to study FDI flows.

More generally, the results developed here offer a specific take on debates about the causes and consequences of political risk. Modern approaches to economic growth such as Aghion and Howitt (2006) have argued persuasively that the policy environment for growth is of first-order importance. An important role for political institutions can be to provide predictability in that policy environment for firms, thereby reducing policy risk. The benefits of checks and balances then go beyond mean comparisons and suggest a role for the impact of institutions on volatility. While investment is only one window on the economic consequences of this, discussions of risk are paramount in such cases. Moreover, there is a wider set of concerns about how policy risk due to weak institutions can have economic consequences at the micro level and which merit further investigation.

Appendix A: The Economic Model

We first derive the formula for the profit-maximizing capital stock. The representative firm in sector i chooses its labor demand to maximize:

$$\left[(\Gamma_t \rho_i L_{it})^{\alpha} K_{it}^{1-\alpha}\right]^{\eta} - w_t L_{it}$$

which yields

$$L_{it} = Y_{it} \frac{\alpha\eta}{w_t}.$$

Hence, in the aggregate:

$$w_t = Y_t \frac{\alpha\eta}{L}.$$

Plugging L_{it} into the firm's production function yields:

$$\begin{aligned} Y_{it} &= [\Gamma_t \rho_i]^{\alpha\eta} \left[\frac{\alpha\eta Y_{it}}{w_t}\right]^{\alpha\eta} K_{it}^{(1-\alpha)\eta} \\ &= [\Gamma_t \rho_i]^{\frac{\alpha\eta}{1-\alpha\eta}} \left[\frac{\alpha\eta}{w_t}\right]^{\frac{\alpha\eta}{1-\alpha\eta}} K_{it}^{\frac{(1-\alpha)\eta}{1-\alpha\eta}} \end{aligned}$$

and plugging in w_t implies that aggregate output is

$$Y_t = (\Gamma_t L)^{\alpha\eta} \left(\sum \pi_i \rho_i^{\frac{\alpha\eta}{1-\alpha\eta}} K_{it}^{\frac{(1-\alpha)\eta}{1-\alpha\eta}}\right)^{1-\alpha\eta}$$

Now define

$$\hat{K}_t \equiv \left(\sum \pi_i \rho_i^{\frac{\alpha\eta}{1-\alpha\eta}} K_{it}^{\frac{(1-\alpha)\eta}{1-\alpha\eta}}\right)^{1-\alpha\eta}$$

so that aggregate output can be written as

$$Y_t = [\Gamma_t L]^{\alpha\eta} \left(\hat{K}_t\right). \tag{A.1}$$

Plugging this back into the firm-level production function

$$Y_{it} = (\Gamma_t L)^{\alpha\eta} \rho_i^{\frac{\alpha\eta}{1-\alpha\eta}} \left(\hat{K}_t\right)^{-\frac{\alpha\eta}{1-\alpha\eta}} K_{it}^{\frac{(1-\alpha)\eta}{1-\alpha\eta}}$$

and using the above equation, we have the following expression for the firm-level expected profit function:

$$(1-\alpha\eta)\, EY_{it} - rK_{it} = (1-\alpha\eta)\, E\left[(\Gamma_t)^{\alpha\eta}\right] (L)^{\alpha\eta} \rho_i^{\frac{\alpha\eta}{1-\alpha\eta}} \left(\hat{K}_t\right)^{-\frac{\alpha\eta}{1-\alpha\eta}} K_{it}^{\frac{(1-\alpha)\eta}{1-\alpha\eta}} - rK_{it}.$$

The first order condition for choice of capital is therefore

$$(1-\alpha)\,\eta E\left[(\Gamma_t)^{\alpha\eta}\right] L^{\alpha\eta}\rho_i^{\frac{\alpha\eta}{1-\alpha\eta}} K_{it}^{\frac{[1-\alpha]\eta}{1-\alpha\eta}-1}\left(\hat{K}_t\right)^{-\frac{\alpha\eta}{1-\alpha\eta}} = r$$

which implies that the capital stock follows expected output according to

$$K_{it} = (1-\alpha)\,\eta\frac{E\left[Y_{it}\right]}{r}.$$

Now to complete the solution, note that expected firm-level output is

$$\begin{aligned} E\left[Y_{it}\right] &= E\left[(\Gamma_t)^{\alpha\eta}\right]\rho_i^{\frac{\alpha\eta}{1-\alpha\eta}}\left[[1-\alpha]\,\eta\frac{E\left[Y_{it}\right]}{r}\right]^{\frac{(1-\alpha)\eta}{1-\eta\alpha}}[L]^{\alpha\eta}\left(\hat{K}_t\right)^{-\frac{\alpha\eta}{1-\alpha\eta}} \qquad (A.2)\\ &= E\left[(\Gamma_t)^{\alpha\eta}\right]^{\frac{1-\alpha\eta}{1-\eta}}\rho_i^{\frac{\alpha\eta}{1-\eta}}\left[\frac{(1-\alpha)\,\eta}{r}\right]^{\frac{(1-\alpha)\eta}{1-\eta}}[L]^{\frac{\alpha\eta(1-\alpha\eta)}{1-\eta}}\left(\hat{K}_t\right)^{-\frac{\alpha\eta}{1-\eta}}. \end{aligned}$$

We now use this to solve for $\hat{K}_t$.

$$\begin{aligned} \hat{K}_t &= \left[\frac{(1-\alpha)\,\eta}{r}\right]^{[1-\alpha]\eta}\left(\sum \pi_i\rho_i^{\frac{\alpha\eta}{1-\alpha\eta}}\left(E\left[Y_{it}\right]\right)^{\frac{[1-\alpha]\eta}{1-\alpha\eta}}\right)^{1-\alpha\eta}\\ &= \left[\frac{(1-\alpha)\,\eta}{r}\right]^{\frac{([1-\alpha]\eta)(1-\alpha\eta)}{1-\eta+[1-\alpha]\alpha\eta^2}}\left(\sum \pi_i\rho_i^{\frac{\alpha\eta}{(1-\eta)}}\right)^{\frac{(1-\eta)(1-\alpha\eta)}{1-\eta+[1-\alpha]\alpha\eta^2}}[L]^{\frac{\alpha\eta(1-\alpha\eta)[1-\alpha]\eta}{1-\eta+[1-\alpha]\alpha\eta^2}}\left(E\left[(\Gamma_t)^{\alpha\eta}\right]\right)^{\frac{(1-\alpha\eta)(1-\alpha)\eta}{1-\eta+(1-\alpha)\alpha\eta^2}}. \end{aligned}$$

Inserting this back into (A.1) implies that per capita output is

$$y_t = B\left[\Gamma_t\right]^{\alpha\eta}\left(E\left[(\Gamma_t)^{\alpha\eta}\right]\right)^{\frac{(1-\alpha\eta)(1-\alpha)\eta}{1-\eta+(1-\alpha)\alpha\eta^2}}$$

where B is a constant.

Appendix B: Proofs of Propositions

Proof of Proposition 1

The variance of ε_t with strong executive constraints variance can be written as:

$$\lambda\,(1-\lambda)\left[(1-\beta_H)\,\Delta_H-(1+\beta_L)\,\Delta_L\right]^2+\sigma_\omega^2$$

where

$$\beta_H = \left(\frac{\Delta_H-\Delta_0}{\Delta_H}\right)\varphi_H \text{ and } \beta_L = \left(\frac{\Delta_0-\Delta_L}{\Delta_L}\right)\varphi_L.$$

This variance is lower than under weak executive constraints since:

$$\Delta_H-\Delta_L > (1-\beta_H)\,\Delta_H-(1+\beta_L)\,\Delta_L$$

as claimed.

Proof of Proposition 2

Using the results above, we know that the firm level capital stock is given by:

$$
\begin{aligned}
K_{it} &= \frac{(1-\alpha)\,\eta}{r} E\left[(\Gamma_t)^{\alpha\eta}\right]^{\frac{1-\alpha\eta}{1-\eta}} \rho_i^{\frac{\alpha\eta}{1-\eta}} \left[\frac{(1-\alpha)\,\eta}{r}\right]^{\frac{(1-\alpha)\eta}{1-\eta}} [L]^{\frac{\alpha\eta(1-\alpha\eta)}{1-\eta}} \left(\hat{K}_t\right)^{-\frac{\alpha\eta}{1-\eta}} \\
&= \frac{[1-\alpha]\,\eta}{r} E\left[(\Gamma_t)^{\alpha\eta}\right]^{\frac{1-\alpha\eta}{1-\eta}} \rho_i^{\frac{\alpha\eta}{1-\eta}} \left[\frac{(1-\alpha)\,\eta}{r}\right]^{\frac{[1-\alpha]\eta}{1-\eta}} [L]^{\frac{\alpha\eta(1-\alpha\eta)}{1-\eta}} \\
&\quad \times \left(\left(\frac{(1-\alpha)\,\eta}{r}\right)^{\frac{(1-\alpha)\eta(1-\alpha\eta)}{1-\eta+[1-\alpha]\alpha\eta^2}} E\left[(\Gamma_t)^{\alpha\eta}\right]^{\frac{(1-\alpha)\eta(1-\alpha\eta)}{1-\eta+[1-\alpha]\alpha\eta^2}} L^{\frac{\alpha\eta(1-\alpha)\eta(1-\alpha\eta)}{1-\eta+[1-\alpha]\alpha\eta^2}} \right. \\
&\quad \left. \left(\sum \pi_i \rho_i^{\frac{\alpha\eta}{1-\eta}}\right)^{\frac{(1-\eta)(1-\alpha\eta)}{1-\eta+[1-\alpha]\alpha\eta^2}}\right)^{-\frac{\alpha\eta}{1-\eta}}
\end{aligned}
$$

Gathering terms related to $E\left[(\Gamma_t)^{\alpha\eta}\right]$ and labelling the remaining terms C_i, this becomes

$$
K_{it} = C_i \times \left(E\left[(\Gamma_t)^{\alpha\eta}\right]\right)^{\frac{1-\alpha\eta}{1-\eta+[1-\alpha]\alpha\eta^2}}.
$$

Now using the fact that

$$
E\left((\Gamma_t)^{\alpha\eta}\right) = e^{-\frac{[1-\alpha\eta]\alpha\eta}{2}\sigma_\varepsilon^2} (\Gamma_{t-1})^{\alpha\eta}\, e^{\alpha\eta\kappa},
$$

we obtain the following expression for the optimal capital stock of a representative firm i

$$
\begin{aligned}
\ln K_{it}^* &= \ln C_i - \frac{(1-\alpha\eta)^2\,\alpha\eta}{2\left(1-\eta+(1-\alpha)\,\alpha\eta^2\right)}\sigma_\varepsilon^2 \\
&\quad + \frac{\alpha\eta\,(1-\alpha\eta)}{1-\eta+(1-\alpha)\,\alpha\eta^2}\kappa + \frac{\alpha\eta\,(1-\alpha\eta)}{1-\eta+[1-\alpha]\,\alpha\eta^2}\ln(\Gamma_{t-1})
\end{aligned}
$$

which implies that the optimal capital stock is increasing in κ and decreasing in σ_ε^2 as claimed.

Appendix C: Productivity Growth and GDP per Capita Growth

In order to get an expression for mean growth we insert

$$
\begin{aligned}
E\left((\Gamma_t)^{\alpha\eta}\right) &= e^{-\frac{[1-\alpha\eta]\alpha\eta}{2}\sigma_\varepsilon^2} (\Gamma_{t-1})^{\alpha\eta}\, e^{\alpha\eta\kappa} \\
\Gamma_t &= \Gamma_{t-1} e^{\kappa} e^{\varepsilon_t}
\end{aligned}
$$

into the equation for y_t to get

$$
\begin{aligned}
y_t &= B\,[\Gamma_t]^{\alpha\eta} \left(E\left[(\Gamma_t)^{\alpha\eta}\right]\right)^{\frac{(1-\alpha\eta)(1-\alpha)\eta}{1-\eta+(1-\alpha)\alpha\eta^2}} \\
&= B\left[\Gamma_{t-1} e^{\kappa} e^{\varepsilon_t}\right]^{\alpha\eta} \left[e^{-\frac{[1-\alpha\eta]\alpha\eta}{2}\sigma_\varepsilon^2} (\Gamma_{t-1})^{\alpha\eta}\, e^{\alpha\eta\kappa}\right]^{\frac{(1-\alpha\eta)(1-\alpha)\eta}{1-\eta+\alpha(1-\alpha)\eta^2}} \\
\ln y_t &= \ln B + \beta \ln(\Gamma_{t-1}) + \beta\kappa + \alpha\eta\varepsilon_t - \beta\frac{(1-\alpha\eta)\,(1-\alpha)\,\eta}{2}\sigma_\varepsilon^2
\end{aligned}
$$

with $\beta = (\alpha\eta)/(1-\eta+\alpha\eta)$. Then mean growth is

$$
\mu_g = E\left[\ln y_t - \ln y_{t-1} \mid \Gamma_{t-1}\right] = \beta\kappa - \frac{\alpha\eta}{2}\sigma_\varepsilon^2 - \beta\frac{(1-\alpha\eta)\,(1-\alpha)\,\eta}{2}\sigma_\varepsilon^2 \tag{C.1}
$$

which we can combine with

$$\sigma_g^2 = (\alpha\eta)^2 \sigma_\varepsilon^2.$$

We now solve for trend productivity growth $\hat{\kappa}(\delta)$ and its variances using:

$$\hat{\kappa}(\delta) = \frac{1}{\beta}\hat{\mu}_g + \frac{1-\eta+\alpha\eta}{2}\hat{\sigma}_\varepsilon^2 + \frac{(1-\alpha\eta)(1-\alpha)\eta}{2}\hat{\sigma}_\varepsilon^2.$$

Hence

$$\hat{\kappa}(\delta) = \frac{1-\eta+\alpha\eta}{\alpha\eta}\hat{\mu}_g(\delta) + \frac{1-\alpha\eta^2+\alpha^2\eta^2}{2(\alpha\eta)^2}\hat{\sigma}_g^2(\delta) \quad \text{and} \quad \hat{\sigma}_\varepsilon^2(\delta) = \left(\frac{\hat{\sigma}_g(\delta)}{\alpha\eta}\right)^2. \tag{C.2}$$

Appendix D: Data

D.1. Political Institutions

Summary statistics are in Table E.1. We use data on political institutions from three sources. Our main source is data on political institutions from the Polity IV data base whose manual is available at user's manual for the Polity IV dataset available from the website http://www.systemicpeace.org/. We coded all negative values in *xropen*, *xrcomp* and *xconst* as 0. (Excluding these values instead does not affect our main estimates.)

Openness of executive recruitment is the variable $xropen$ which is intended to capture the extent to which the politically active population has an opportunity to attain the position through a regularized process. This is on a four point scale. At one extreme a value of one denotes the most closed possibility where chief executives are determined by hereditary succession and includes kings, emperors, beys, emirs, etc. A score of four (maximal openness) denotes the case where chief executives are chosen by elite designation, competitive election, or transitional arrangements that fall between designation and election.

Competitiveness of executive recruitment is the variable *xrcomp* which tries to capture the to which "prevailing modes of advancement give subordinates equal opportunities to become superordinates". The lowest score of one denotes the case where chief executives are determined by hereditary succession, designation, or by a combination of both, as in monarchies whose chief minister is chosen by king or court. The highest score of three goes to countries where chief executives are typically chosen in or through competitive elections matching two or more major parties or candidates.

The executive constraints variable that we use is *xconst* available on a seven point scale. The manual explains the variable's construction as follows:

> "Operationally, this variable refers to the extent of institutionalized constraints on the decision making powers of chief executives, whether individuals or collectivities. Such limitations may be imposed by any "accountability groups." In Western democracies these are usually legislatures. Other kinds of accountability groups are the ruling party in a one-party state; councils of nobles or powerful advisors in monarchies; the military in coup-prone polities; and in many states a strong, independent judiciary. The concern is therefore with the checks and balances between the various parts of the decision-making process."

There is a value of one where there is unlimited authority in which there are no regular limitations on the executive's actions (as distinct from irregular limitations such as the threat or actuality of coups and assassinations) and category seven is executive parity or subordination where accountability groups have effective authority equal to or greater than the executive in most areas of activity. We construct a dummy for executive constraints as there is no reason to believe that effects on investments will be linear in *xconst*. We use a cut-off of $xconst = 7$ as this is the only level at which another entity becomes completely autonomous and therefore poses a very immediate constraint on the executive. This fits our theory of what executive constraints are best. We discuss robustness below. Appendix Figure E.1 shows the share of countries with a score of *xconst* equal to 7. The share went from around 0.25 in the 1980s to over 0.35 in 2010.

Given the still relatively broad definition of *xconst* it is useful to think about what institutional changes underlie these changes over time. The perhaps best way to understand the coding decisions is to look at the arguments explaining the coding decisions. Argentina was set from $xconst = 6$ to $xconst = 7$ in 2015. The justification in the list of changes, available from http://www.systemicpeace.org/inscrdata.html is:

> In elections held on 25 October 2015, opposition candidate Mauricio Macri forced a runoff ballot held on 22 November 2015. Macri narrowly defeated the Justicialist candidate and was inaugurated on 10 December 2015. He is the first non-Peronist president to be elected since 1916. He faces a congress controlled by the Justicialists.

In 2014 constraints in Turkey were coded $xconst = 4$ down from $xconst = 7$ in the previous year. This change took place amongst other coding changes in the same year. Still, the elements involved in determining the level of executive constraints are still clear from the following explanation:

> There seems little doubt about the political interests and aspirations of Recep Tayyip Erdoğan, the founder and leader of the Justice and Development Party (AKP) of Turkey. Having voiced his desire to alter the constitution to make Turkey a presidential system, he has accomplished an unquestioned concentration of authority and has secured the office of the president on 28 August 2014; he has not been able to secure the support needed to change the constitution, however. His subsequent actions, then, indicate that he intends to act as though he has that legal authority, or doesn't need it to exercise that authority. Either way, this "pattern of authority" is consistent with a usurpation of power that is not vested in his elected office, that is, an auto-coup. His use of government levers to restrict both the media and the opposition to ensure his presidential bid and his manipulation of ethnic-tensions to negate an unfavorable parliamentary outcome and ensure a more favorable subsequent outcome are indicative of restrictions placed on executive and general competition and a sharp diminution of executive constraints.

As an additional check on our measure of executive constraints we use two alternatives. The first is a measure of checks and balances which comes from Beck et al (2001). The variable, *checks_lax*, is based on the *number* of checks on the executive (See Keefer and Stasavage(2003) for a discussion). While positively correlated with the measure based on *xconst*, it is based on a different procedure. Crucially, the variable only codes the power and composition of the legislature when coding checks and balances. If judicial control is important, then this is an important difference between the two measures. In addition, the composition of parliament receives much more weight than the constitutional rules which govern the interplay between legislature and executive.

One attempt in coding de jure institutions which govern judicial independence is due to Melton and Ginsburg (2014) who try to capture the independence of the highest ordinary court in each country by coding several dimensions of the selection, recruitment and retention of judges from constitutional provisions, i.e. they focus on de jure provisions. In this they focus on six dimensions: statements of judicial independence, judicial lifetime tenure, selection procedures, removal procedure, limited removal conditions and salary insulation.

Both the count of checks on the executive and the dummy for judicial tenure are both strongly correlated with our main measure of executive constraints even when we control for country and time fixed effects. The association with *xconst* is much weaker. One plausible explanation is that the (rare) occasions in which countries adopt tenure for judges in the top court are cases in which the court is able to impose meaningful constraints on the executive. Following this interpretation, we use the number of checks on the executive and the dummy for judicial tenure to run robustness checks.

D.2. Investment Inflows

Our investment flow data comes from the Dutch central bank, De Nederlandsche Bank (DNB). The definition of Investment Inflows used by the DNB comes from the IMF Best Practice Manual 5.0 according to which direct investments are transactions relating to movements in share capital by foreign-owned enterprises, i.e. equity participations which are conducted with a *lasting interest*. The *lasting interest* is defined through the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the investor on the management of the enterprise.

Investment inflows consist of three different investment flows: equity capital, reinvested earnings and other capital flows. Debt and equity are reported directly by reporting agents. Reinvested earnings is calculated by the Dutch Central Bank as the difference between 'result' in financial year (which is reported) and dividend in financial year (which is also reported). Equity and reinvested earnings are both direct results of capital investments (shareholders' equity). Other capital contains all other intercompany flows, mainly loans.

A particular feature of the Dutch data is that it contains regular entities and special purpose entities (SPEs). In fact, more than half the investment flows we observe in our sample of countries comes from SPEs. An SPE is a legal entity that is created to fulfill narrow, specific or temporary objectives. This serves two purposes. First, SPEs are used by companies to isolate the firm from financial risk. Normally a company will transfer assets to the SPE for management or use the SPE to finance a large project thereby achieving a narrow set of goals without putting the entire firm at risk. Secondly, SPEs are also used to hide debt (inflating profits), hide ownership, and obscure relationships between different entities which are in fact related to each other. In order to reduce the impact of the second motivation on our estimation we excluded tax havens and very small countries with less than 100,000 inhabitants.

We have data at the industry level but aggregate the data into sectors to avoid having too many zeros. We also run robustness checks with the largest 15 sectors which contain more than 99% of all the FDI from the Netherlands.

We focus on gross inflows for most of this study as this generates a number which is either zero or strictly positive. It is important to keep in mind that, on the sector level at least, the investment data is often dominated by sudden and large flows. Including outflows would force us to produce a dataset with more zeros, we would have 25% fewer flows in the data. However, in order to provide a sense of net inflows we also study positive net inflows. For this we calculate the net inflow and set it equal to 0 in country/sector/years in which it is negative. Since results are robust and even the size of the coefficient is similar, we are confident that what we capture are investment flows. In addition, we study whether a country/sector had any inflow at all in a given year in order to make sure that outliers do not play an essential role.

In order to be sure that our results are not driven by particularities of the Dutch data we have also gathered investment flow data at a country level from the OECD web site. We focus on gross flows into "partner" countries from all OECD countries and add across all OECD countries. We were able to match data for 158 countries between 1985 and 2012. We also used data from the UNCTAD FDI flows dataset which gives inflows in millions of dollars and comes from the UNCTAD World Investment Reports. We match data for 157 countries between 1983 and 2012 and replace negative observations by zero.

D.3. Other Data

D.3.1. Growth, GDP and Population. Growth and real GDP data is from the Penn World Tables (PWT) version 7.0 and is based on the rgdpl variable. Growth is the percentage points increase from one year to the next. Population and openness are also from PWT 7.0.

D.3.2. ONDD. Political risk is from the Belgian insurer Office National du Ducroire (ONDD). ONDD insures international transactions like credit and foreign direct investments against political risk like political violence or expropriation. Its insurance rates are linked to publicly available country ratings of political risk published on the ONDD web site. We use their numbers for short term and mid-term credit risks as these are available from 1994 till 2010. ONDD analysts meet four times a year to update the country risk ratings. Each country is reviewed at least once a year in one of the four quarterly meetings based on the country's geographic region. Countries that are not in the region under review can be added to the agenda in cases of political change that requires a reevaluation. Ratings go from 1 (low risk) to 7 (high risk). Columns (1) and (2) in Table 1 show that an increase of risk by one point corresponds to a decrease in foreign investment by around 10 %. These categories are used to generate the prices charged for political risk insurance.

D.3.3. ICRG. Information on property rights protection is taken from the International Country Risk Guide. (ICRG) provided by the Political Risk Services (PRS) Group. Since 1984, PRS Group (2005a) has provided information on 12 risk indicators that address not only political risk but also various components of political institutions. We use their measure of risk of expropriation which is coded between 0 and 10 with higher scores implying better protection.

D.3.4. Bribery Measures by Sector. We use the bribe-giving scores by sector from the 2011 Transparency International report. This Index is an average of the answers to three questions in the Bribe Payers Survey. Business executives around the world were asked 'How often do firms in each sector: a) engage in bribery of low-level public officials, for example to speed up administrative processes and/or facilitate the granting of licenses?; b) use improper contributions to high-ranking politicians or political parties to achieve influence?; and c) pay or receive bribes from other private firms?' Sectors are scored on a scale of 0-10, where a maximum score of 10 corresponds with the view that companies in that sector never bribe and a 0 corresponds with the view that they always do. We match as many sectors as possible to sectors in our data. This can mean that we can match more than one sector. For example, in manufacturing we can match "light" and "heavy" manufacturing. In such cases we take a simple average across the relevant sectors.

D.3.5. Political Connections. We use two measures for connected sectors. Our main measures is from Faccio (2006) who assembled a database of 20,202 publicly traded firms in 47 countries. A company is identified as being connected with a politician if at least one of its large shareholders (anyone controlling at least 10% of voting shares) or one of its top officers (CEO, president, vice-president, chairman, or secretary) is a member of parliament, a minister, or is closely related to a top politician or party. We mark a sector as connected if at least one firm in the sector is politically connected in a given country.

To match firms we typed each firm's name on the search engine of the website Credit Risk Monitor (www.crmz.com). Whenever a firm is available on this website's dataset, it will show its NAICS classification (most often, more than 1 sector is identified for each firm). In case a firm is not available on Credit Risk Monitor, we use Bloomberg Business' search engine and read the firm's profile to identify the sector(s). In case a firm is not available on either CRM or Bloomberg we used other sources. For this, we did a standard google search of a firm's name and looked for a website that provides the information. Of course, the accuracy in identifying the correct sector(s) in this situation can potentially decrease. Using this method we could match data for 32 countries and 19 sectors.

As a second measure we use the share of all firms that are active in the respective sector. This measure is tailored to the specification with country/year fixed effects as, in this case, only the relative connectedness of the sector should matter which seems to be the case.

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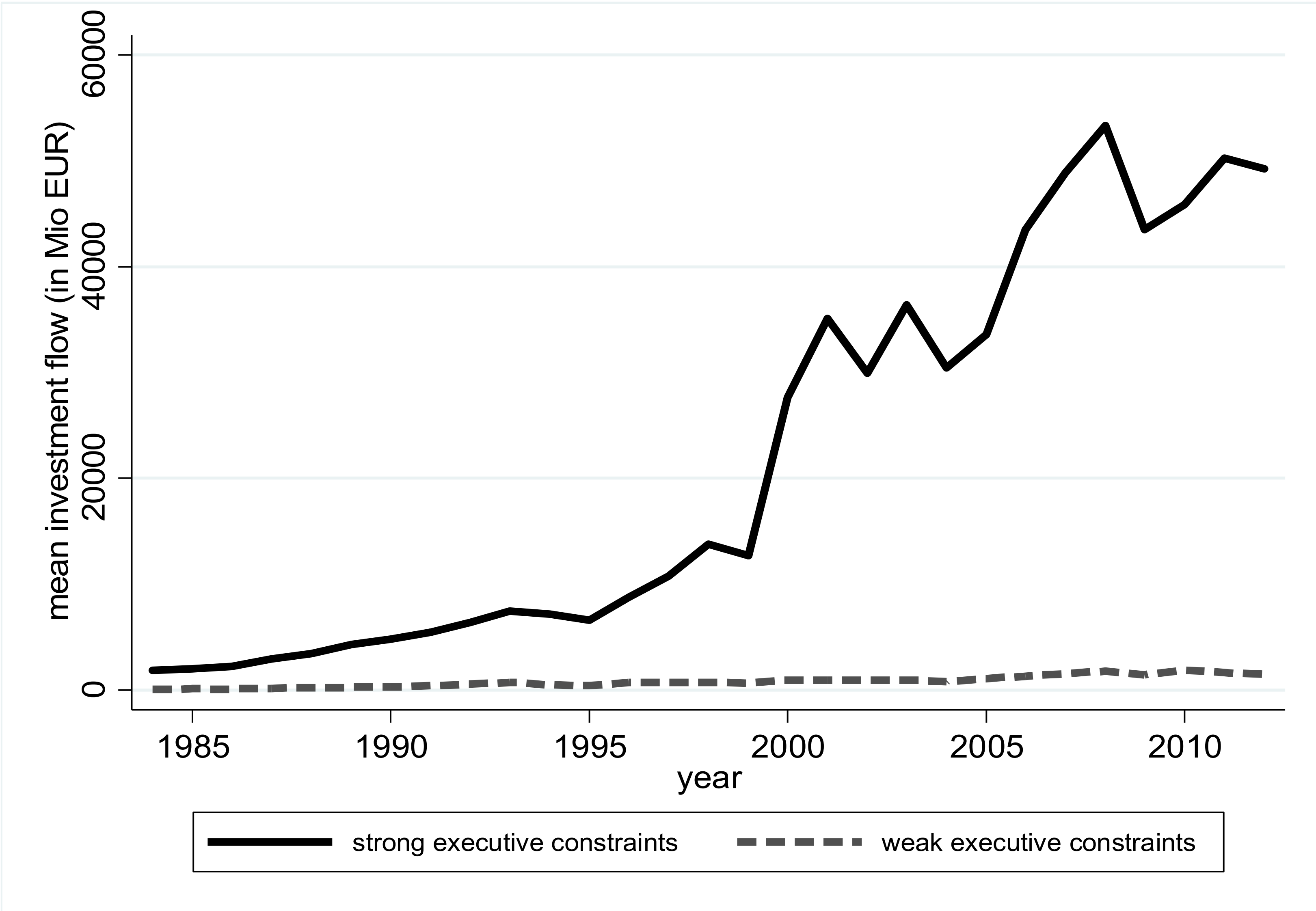
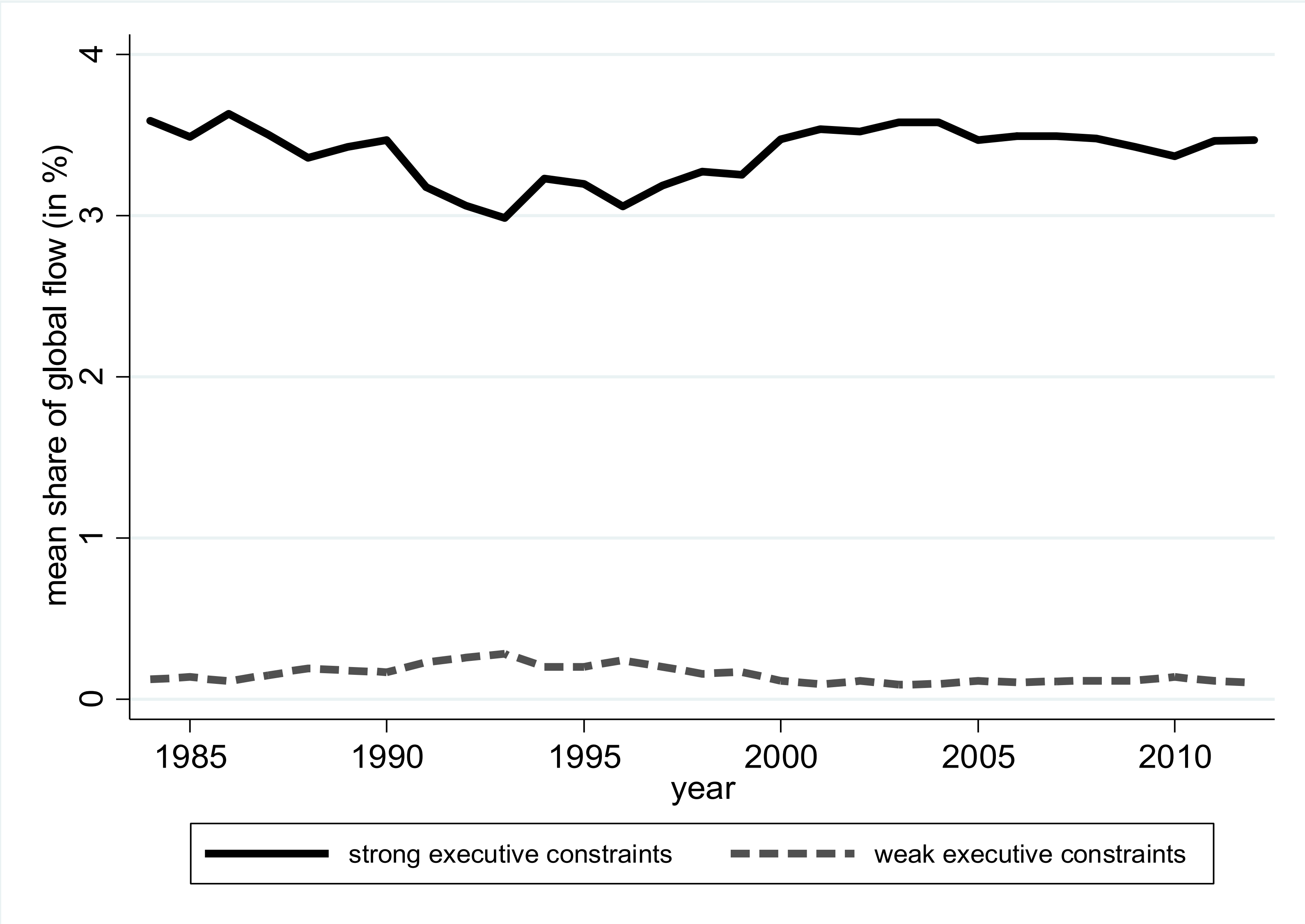
Figure 1: Investment Inflows over Time (Mean Flow)



Note: Graph shows average for countries that were always in strong or weak executive constraints.

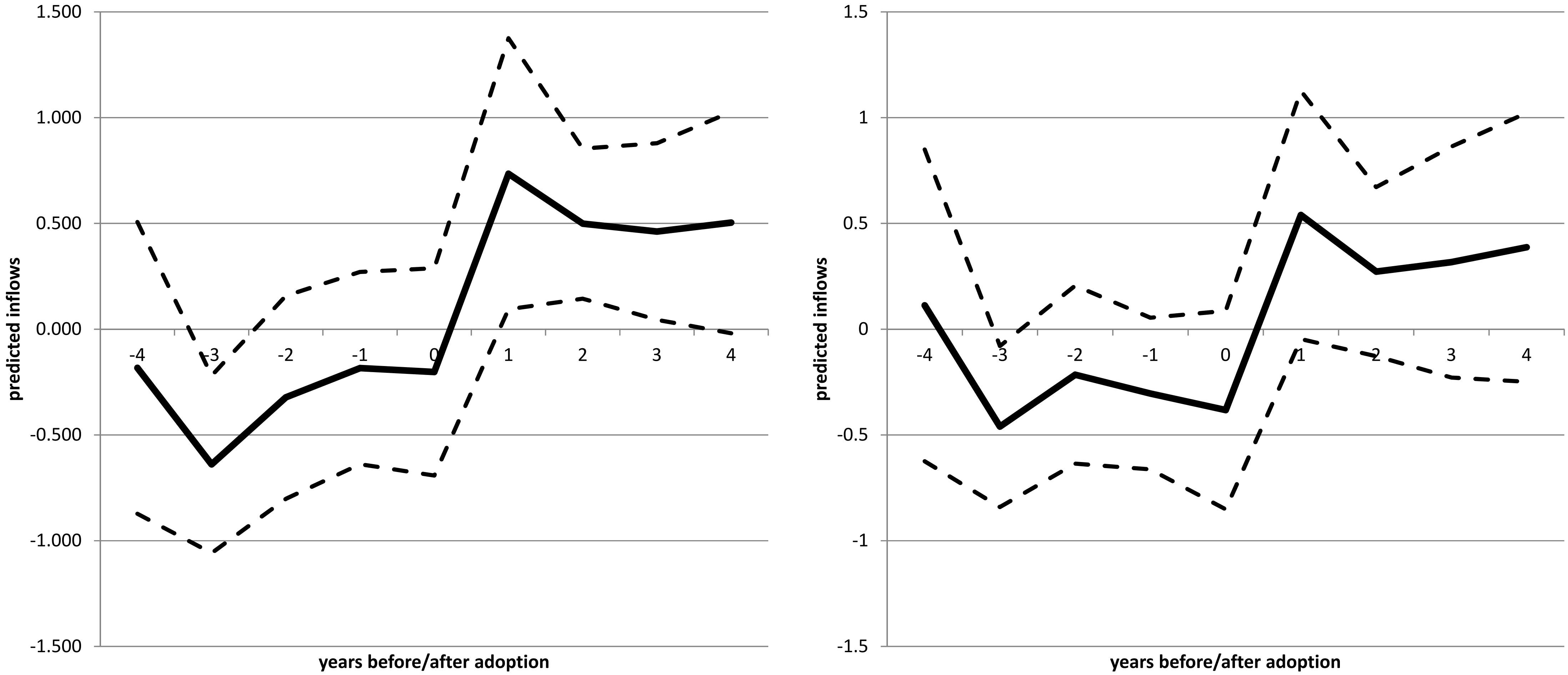
Figure 2: Investment Inflows over Time (Mean Share)



Note: Graph shows average for countries that were always in strong or weak executive constraints.

Figure 3: Adoption of Strong Executive Constraints

a) sector level b) country level



Note: Solid line shows coefficients on leads and lags around the adoption date (at 0) of strong executive constraints plus the coefficient on the "strong executive constraints" dummy from Table A1. Dashed lines show 95% confidence intervals using the standard deviation of the lead and lag coefficients. Regression is controlling for country/sector and year/sector fixed effects in a) and country and year fixed effects in b).

Figure 4: Executive Constraints and GDPpc Growth

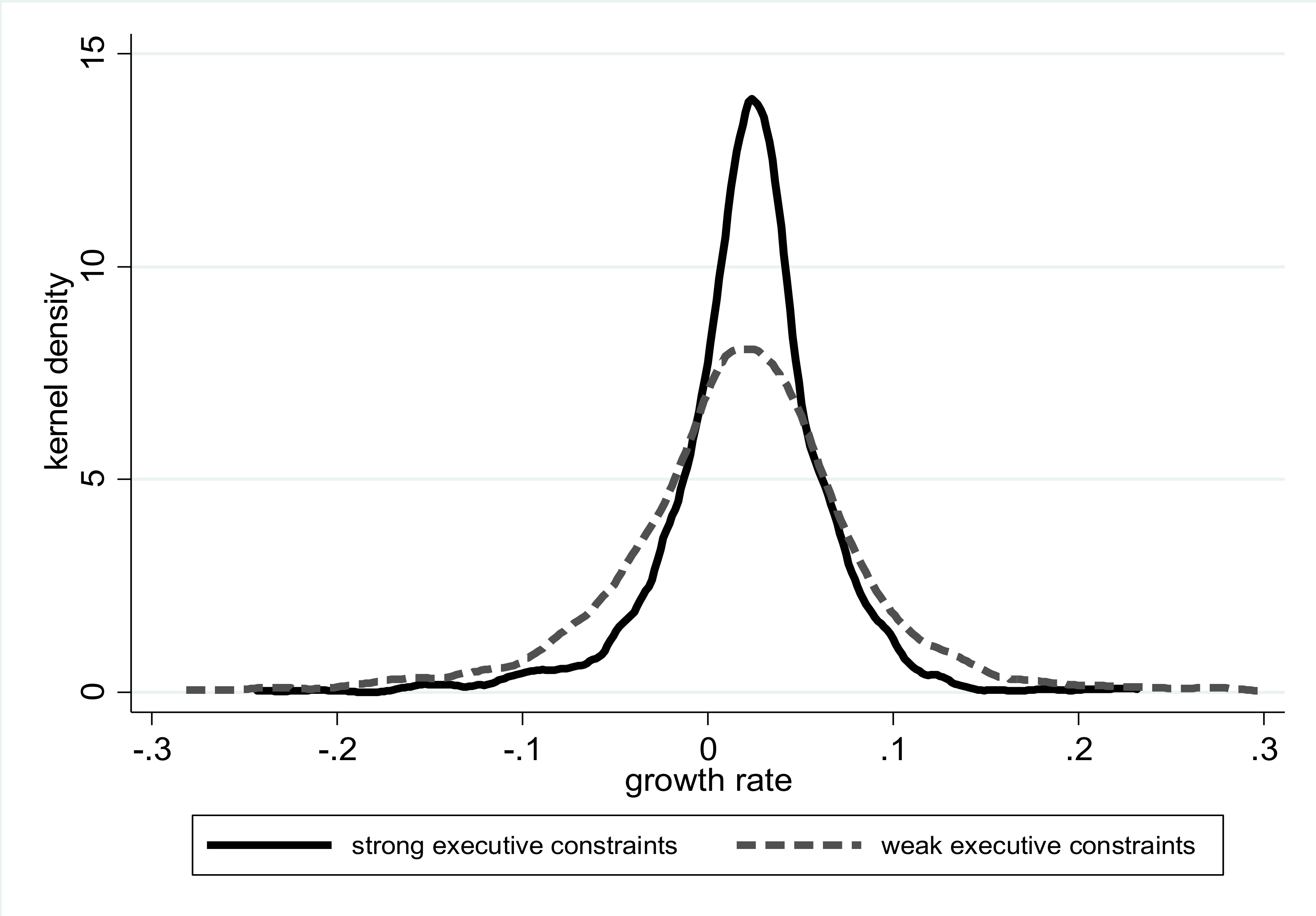
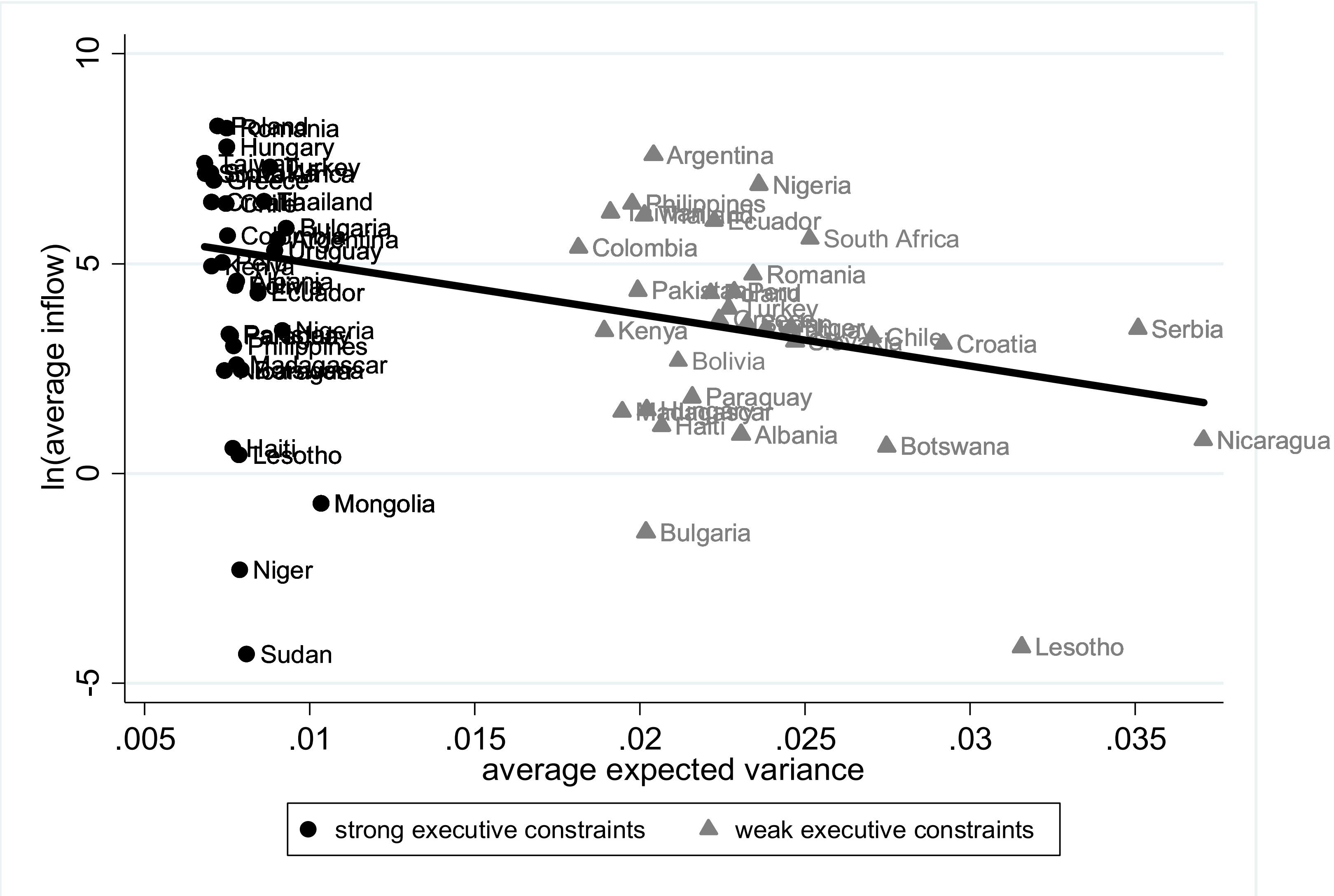
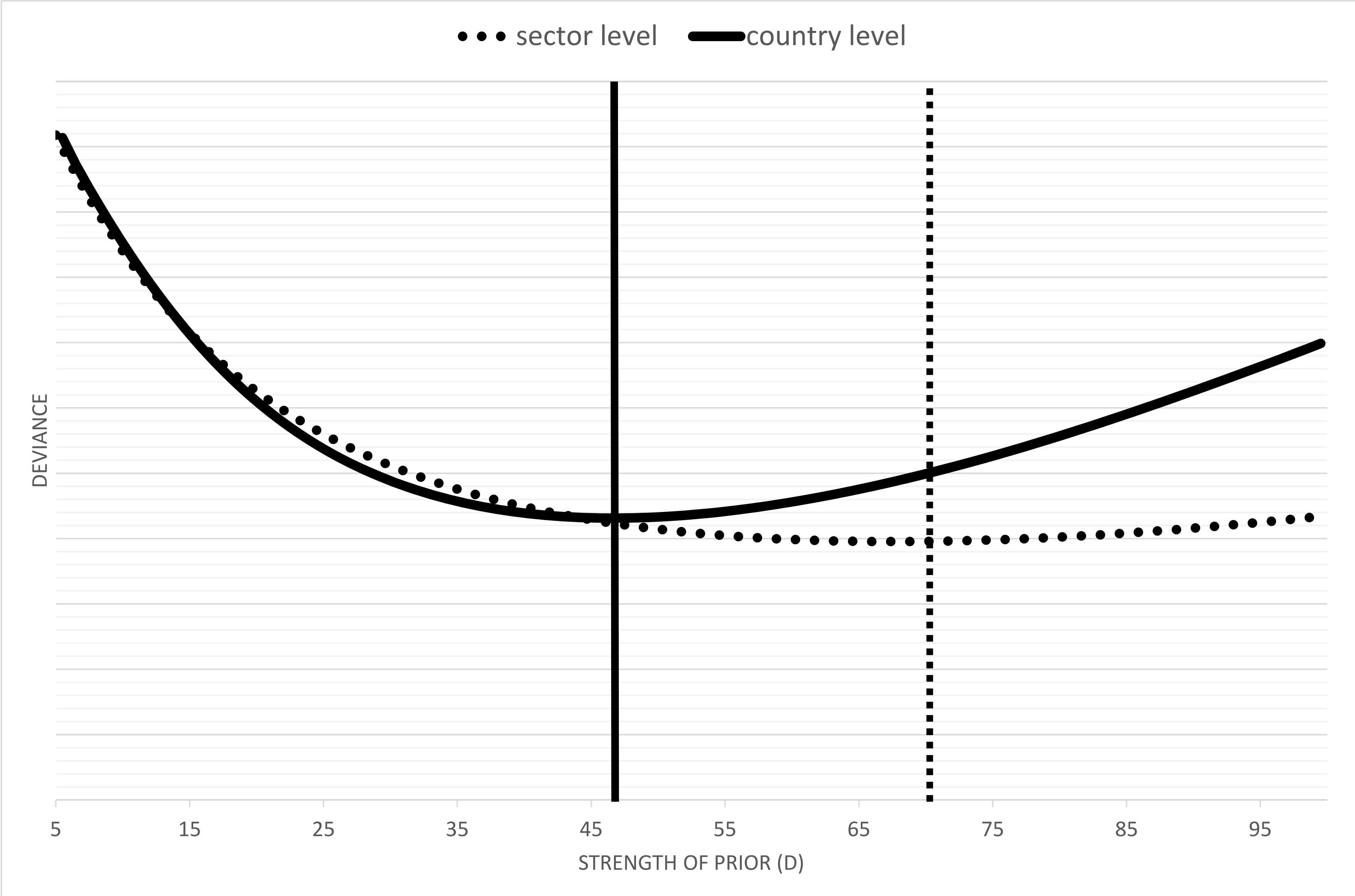


Figure 5: Executive Constraints, Stability and Foreign Investments



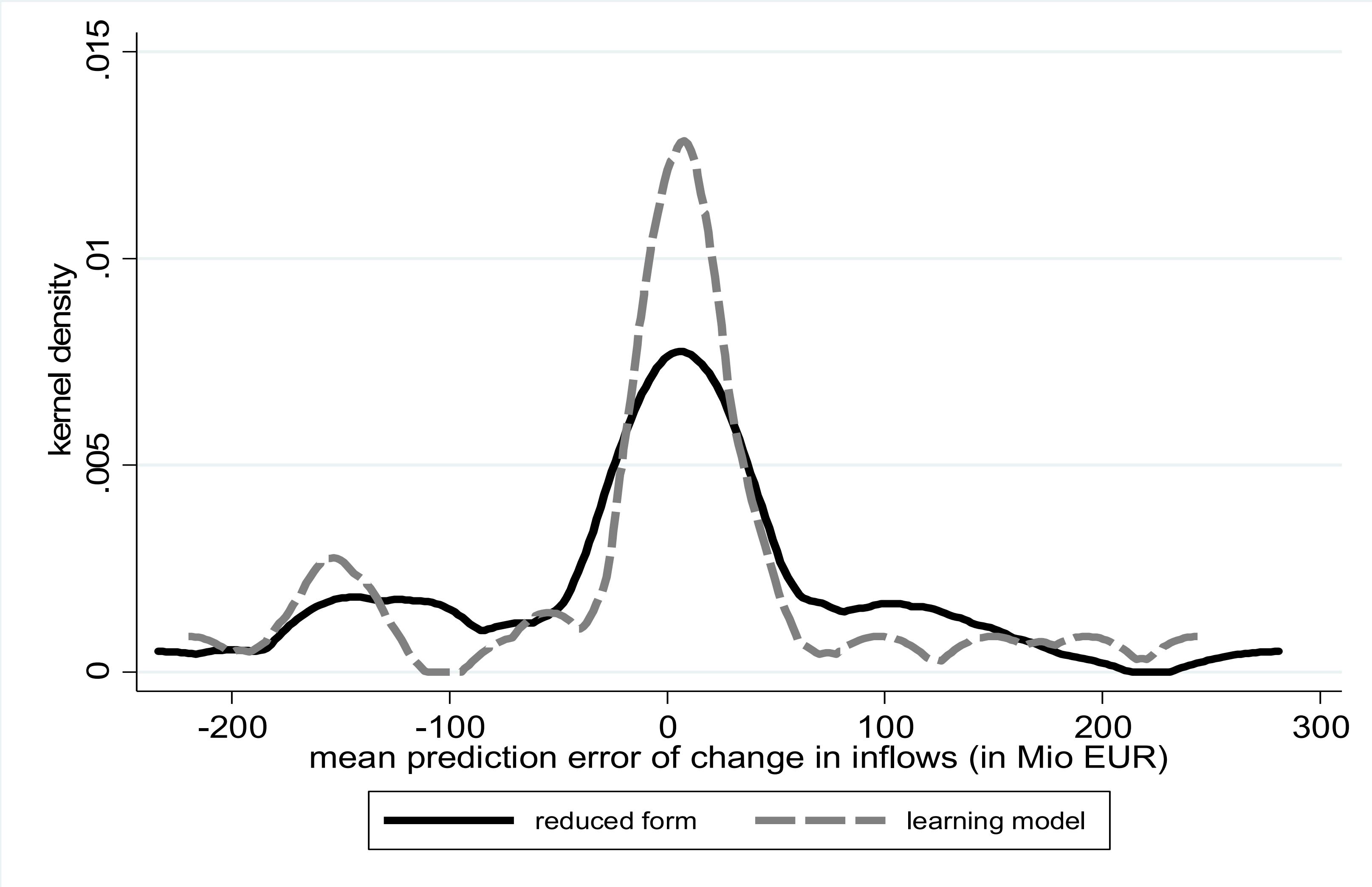
Note: Graph displays the ln of thr average investment inflows for each country/regime episode on the y-axis. The x-axis gives the average exp. variance of productivity growth in each episode. Expectations are calculated using the updating model under the assumption of D=46.

Figure 6: Strength of Prior and Deviance of the Updating Model



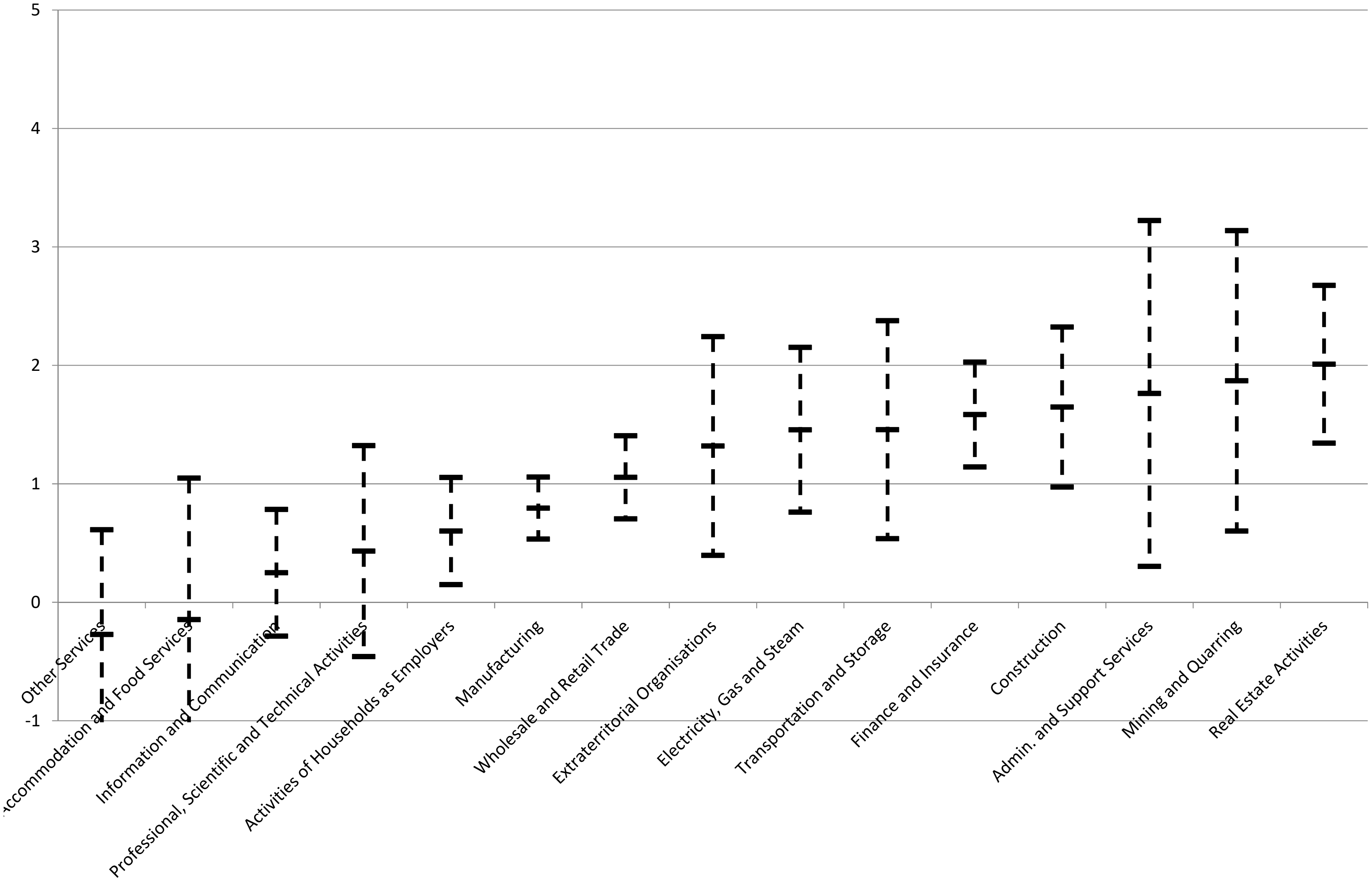
Note: Vertical lines indicate minimum deviance values on the sector and country level respectively.

Figure 7: Distribution of Mean Prediction Error by Country



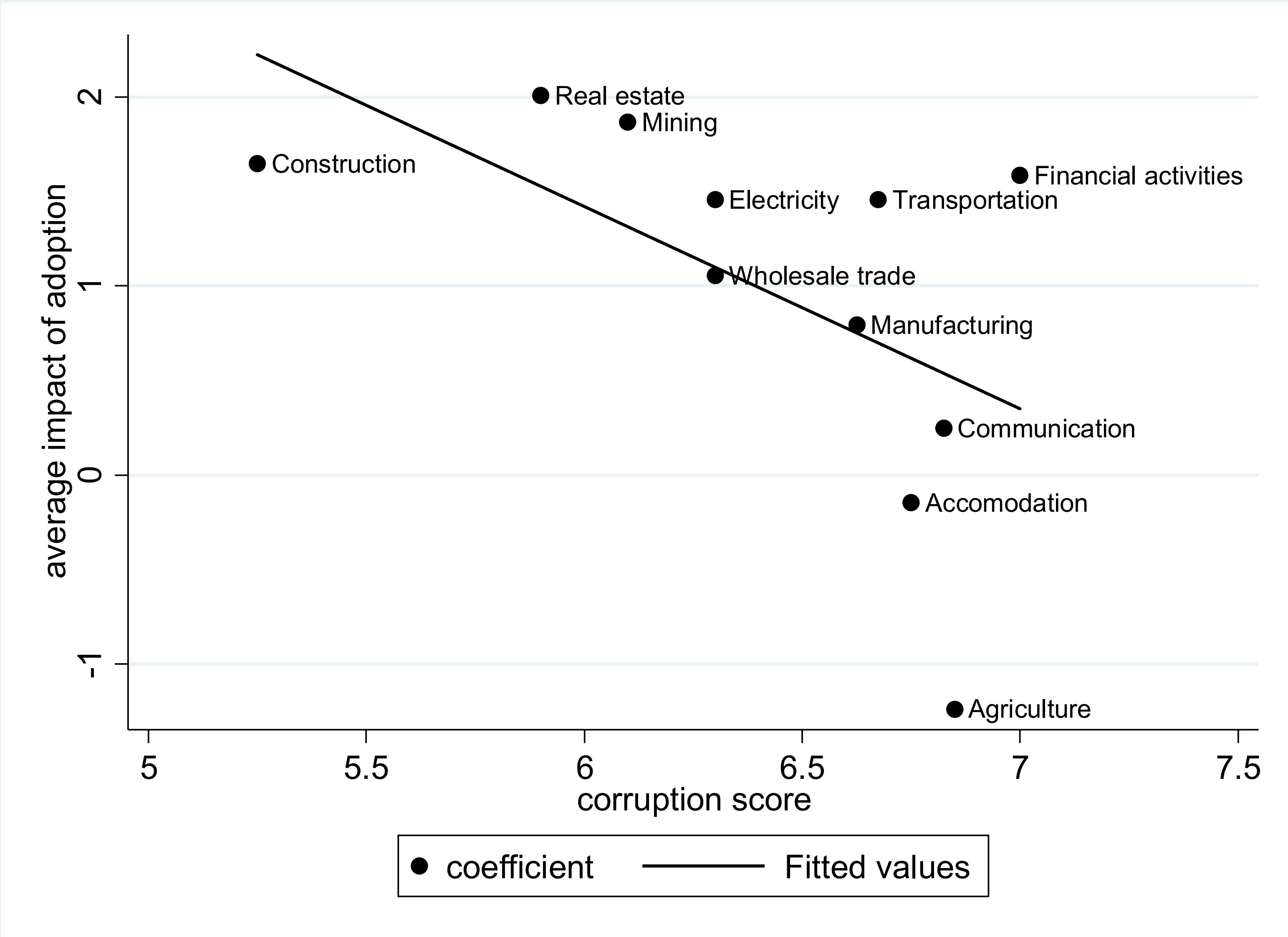
Note: Graph displays esitmated distribution function of the mean linear errors in the reduced form model and the updating model. Errors are calculated by comparing the actual change of inflows at the country level from weak to strong executive constraints to the fitted values in the two models. Figure disregards two outliers in the reduced form model.

Figure 8: Sector Heterogeneity



Note: Figure displays regression coefficients and 95% confidence intervals. Coefficients come from a regression as in Table (1), Column (1) in which executive constraints are interacted with a set of sector dummies. Figure reports results on the 15 largest sectors.

Figure 9: Sector Heterogeneity



Note: Figure displays regression coefficients from Figure 8 together with scores from the Bribery in Business Sectors report by Transparency International. Higher scores mean that the sector is less prone to bribe giving.

Table 1: Executive Constraints and Foreign Investment

VARIABLES	(1) Investment Inflow	(2) sector level Investment Inflow	(3) Number of Industries with Inflows	(4) Investment Inflow	(5) Investment Inflow	(6) country level Number of Industries with Inflows	(7) Investment Inflow (OECD)	(8) Investment Inflow (UNCTAD)
strong executive constraints	0.902***	0.912***	0.349***	0.787***	0.821***	0.334***	0.521**	0.392***
	(0.297)	(0.303)	(0.0911)	(0.301)	(0.307)	(0.0903)	(0.217)	(0.124)
high openness		-0.0538			-0.112			
		(0.179)			(0.184)			
high competitiveness		0.237			0.284			
		(0.313)			(0.334)			
country/sector fixed effects	yes	yes	yes	no	no	no	no	no
sector/year fixed effects	yes	yes	yes	no	no	no	no	no
country fixed effects	no	no	no	yes	yes	yes	yes	yes
year fixed effects	no	no	no	yes	yes	yes	yes	yes
Observations	45,937	45,937	46,846	4,469	4,469	4,581	4,347	4,621

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All columns report results from a fixed effects poisson regression. Dependant variable is the gross investment inflow from the Netherlands into the country or country/sector except for in columns (3) and (6). Columns (3) and (6) use the number of industries with a positive inflow. Dependant variable is the flow of investment from all OECD countries in column (7) and from all countries in column (8). All explanatory variables are lagged by one year.

Table 2: Executive Constraints and Growth (1970-2010)

Panel A: GDP per Capita Growth Data

Sample	Constraints	Obs	Mean	Variance
whole sample	strong executive constraints	1676	0.022	0.0019
	weak executive constraints	4002	0.019	0.0069
countries with at least five years in strong and weak executive constraints	strong executive constraints	534	0.023	0.0019
	weak executive constraints	811	0.021	0.0062

Panel B: Calculated Productivity Growth (assuming alpha=0.66 and eta=0.75)

Sample	Constraints	Obs	Mean	Variance
whole sample	strong executive constraints	1676	0.040	0.0076
	weak executive constraints	4002	0.046	0.0281
countries with at least five years in strong and weak executive constraints	strong executive constraints	534	0.042	0.0077
	weak executive constraints	811	0.047	0.0255

Notes: Units are country/years. Sample are all countries between 1970-2010. Growth is GDP per capita growth (not in percent).

Table 3: Inspecting the Mechanism

	(1)	(2)	(3)	(4)	(5)	(6)
		sector level			country level	
VARIABLES			Investment Inflow			
variance of productivity growth (estimated on country level)	-134.1***	-91.64***	-122.3***	-119.3***	-75.81***	-108.9***
	(37.34)	(32.41)	(32.03)	(32.92)	(28.34)	(29.87)
mean productivity growth (estimated on country level)	117.0***	98.13***	103.0***	102.0***	96.20***	90.28***
	(35.20)	(34.77)	(28.46)	(24.42)	(27.29)	(20.92)
covariance of productivity growth with Netherlands			-143.1			-150.8
			(91.89)			(95.63)
country/sector fixed effects	yes	yes	yes	no	no	no
sector/year fixed effects	yes	yes	yes	no	no	no
country fixed effects	no	no	no	yes	yes	yes
year fixed effects	no	no	no	yes	yes	yes
Observations	36,118	9,244	9,178	3,780	898	892

Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1 All columns report results from a fixed effects poisson regression. Dependant variable is the gross investment inflow from the Netherlands into the country or country/sector. The table uses *D=68* in columns (1) - (3) and *D=46* in columns (4) to (6). Columns (1) and (4) use the entire sample. Columns (2)-(3) and (5)-(6) use just the sample of switchers. All explanatory variables are lagged by one year.

Table 4: Counterfactual FDI Flows

	(1)	(2)	(3)	(4)	(5)	(6)
			adoption of strong constraints without change in mean productivity growth		adoption of strong constraints without change in variance of productivity growth	
		(I)	(II)	ln(II)-ln(I)	(III)	ln(III)-ln(I)
country	mean yearly investment inflows	fitted value of investment inflows	simulated fitted value of investment inflows	effect of change in mean on inflow	simulated fitted value of investment inflows	effect of change in variance on inflow
Albania	98054	99674	44437	**81%**	12789	**205%**
Argentina	263381	163135	203923	**-22%**	42034	**136%**
Bolivia	87754	82215	165995	**-70%**	33229	**91%**
Botswana	11837	12474	53984	**-147%**	1558	**208%**
Bulgaria	348508	333506	2032526	**-181%**	137342	**89%**
Chile	622376	630490	154564	**141%**	141843	**149%**
Colombia	290534	123328	153083	**-22%**	24751	**161%**
Croatia	644454	657542	156185	**144%**	122877	**168%**
Ecuador	74176	80816	304607	**-133%**	23082	**125%**
Greece	1068985	1072056	1786512	**-51%**	374068	**105%**
Haiti	1834	4899	5376	**-9%**	613	**208%**
Hungary	2399784	2362905	5813608	**-90%**	867742	**100%**
Kenya	138391	189025	159539	**17%**	41440	**152%**
Lesotho	1542	1477	1100	**29%**	146	**232%**
Madagascar	13450	3876	4552	**-16%**	773	**161%**
Mongolia	487	469	1094	**-85%**	127	**131%**
Nicaragua	11651	13514	5089	**98%**	949	**266%**
Niger	101	26711	18734	**35%**	3327	**208%**
Nigeria	30278	17817	26473	**-40%**	2418	**200%**
Pakistan	27859	35546	45643	**-25%**	10087	**126%**
Paraguay	26633	27905	127999	**-152%**	7484	**132%**
Peru	157474	251577	147503	**53%**	44483	**173%**
Philippines	20730	121345	109810	**10%**	23770	**163%**
Poland	3943650	3953977	2014290	**67%**	927219	**145%**
Romania	3768022	3458702	2277528	**42%**	485955	**196%**
Serbia and Montenegro	0	162056	78528	**72%**	25968	**183%**
Slovakia	1285825	1276911	965403	**28%**	359683	**127%**
South Africa	1261258	1279585	1390801	**-8%**	1040161	**21%**
Sudan	13	58987	45089	**27%**	11268	**166%**
Taiwan	1610792	1555414	2481339	**-47%**	330926	**155%**
Thailand	654031	494277	1910636	**-135%**	142608	**124%**
Turkey	1473559	806766	1003502	**-22%**	402992	**69%**
Uruguay	202042	788108	496157	**46%**	287266	**101%**
			AVERAGE:	**-11%**	AVERAGE:	**151%**

Notes: All inflows are average yearly inflows during strong executive constraints (in 1000 EUR). "mean yearly investment inflows" is the actualy average yearly inflow of investment into the country. "fitted value of investment inflows" is the fitted value from Table 3, Column (5). "simulated fitted value of investment inflows" replaces the expected mean growth (in (II)) and the expected variance of growth (in (III)) in the episode with strong executive constraints with the respective values without updating the prior. The difference between (I) and (II) (or (I) and (III) respecitvely) captures the effect of changing priors in the new regime through the expected mean (variance) on investment inflows in the model.

Table 5: Rent Seeking, Executive Constraints and Investment Inflows

	(1)	(2)	(3)
VARIABLES	Investment Inflow	Investment Inflow	Investment Inflow
strong executive constraints	0.906***	-0.0203	
	(0.111)	(0.167)	
strong executive constraints * bribing sector	0.846**		
	(0.375)		
strong executive constraints * politically connected sector		0.584**	1.898***
		(0.237)	(0.366)
country/sector fixed effects	yes	yes	yes
sector/year fixed effects	yes	yes	no
country/year fixed effects	no	no	yes
Observations	27,109	13,240	13,240

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All columns report results from a fixed effects poisson regression. Dependant variable is the gross investment inflow from the Netherlands into the country/sector. Bribing sector is defined through the bribe giving index from transparency international. We take the score from the latest (2011) report and average across all industries which we can match to sectors in our data. The sectors with a score higher than the median are coded "bribing sectors". Political connection is from Faccio (2006). We first match firms in this data to our sectors and then use a dummy which indicates that a firm in the sector is coded a politically connected by Faccio (2006).