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The Return of Expansionary Austerity: Firms' Investment Response to Fiscal Adjustments in EMs

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ABSTRACT: We study the response of corporate investment in Emerging Markets to unexpected fiscal shocks. We find that, although firm-level investment decreases on impact following unexpected public expenditure adjustments (classical Keynesian multiplier effect), it quickly rises above pre-shock levels. The rebound in investment is facilitated by fiscal space, flexible exchange rates, and more predictable fiscal policy. We also show that the composition of fiscal adjustments matters for investment's response—compared to public investment adjustments, reductions in public consumption lead to larger private investment contractions on impact, but drive private investment to above pre-shock levels. Finally, we exploit firm-level heterogeneity in several dimensions, including to show that corporate investment's recovery is stronger in firms in the tradable sector and in larger and less indebted firms, and to show that the long-run benefits to economic activity of the fiscal shock appear to outweigh its short-run costs.

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WORKING PAPERS

The Return of Expansionary Austerity: Firms' Investment Response to Fiscal Adjustments in Emerging Markets

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I. INTRODUCTION

The COVID-19 shock prompted governments to implement ambitious fiscal packages aimed at preserving lives and livelihoods. More recently, however, concerns over inflationary pressures and public debt sustainability have sparked renewed chatter about the need for fiscal austerity. On the one hand, some argue that a more prudent fiscal stance, while possibly taking a toll on activity in the short-term, may help position economies for a strong private sector-led post pandemic rebound. On the other hand, others worry that a turn towards austerity may derail an already fragile recovery, especially in Emerging Markets.

We revisit the potential impact of a turn to fiscal prudence, focusing on the impact of fiscal shocks on economic activity. Specifically, we estimate the impact of unexpected changes in government expenditure on private (corporate) investment-capital ratios (ICR). We study both the "average" response of ICRs to fiscal shocks (byway of panel regressions), as well as the dynamic response (using the Local Projection Model proposed by Jordà, 2005). To the extent of our knowledge, the impact of fiscal shocks on firm-level investment has not been documented in the literature. This is key because it enables a clean identification strategy.

Our results provide evidence supporting the expansionary effect of a more prudent fiscal policy on corporate investment. We do find a Keynesian response of investment to fiscal shocks on impact. However, we also find that the immediate decline in corporate investment following unexpected reductions in public expenditure is short-lived and, on average, investment-capital ratios surpass pre-shock levels one year after the fiscal adjustment. Country-level policy variables, such as having larger fiscal space (as given by public debt), more exchange rate flexibility, and fiscal predictability, are important drivers of the recovery in corporate investment in the aftermath of fiscal shocks. We also find that the nature of the fiscal shock matters. Corporate investment's Keynesian drop is smaller if driven by public investment adjustment rather than public consumption adjustment. However, firm-level investment's recovery is stronger when fiscal tightening is driven by public consumption (presumably, adjusting public consumption may have a stronger cyclical effect, but may also signal a more permanent fiscal adjustment, on top of some degree of complementarity between public and private investment). Our results also suggest heterogeneous impacts of fiscal consolidations on investment across sectors and firms. The recovery in investment is driven by firms in the non-tradable sector and by larger and less indebted firms, all of which are key in the eventual increase in firm-level investment.

Moreover, when exploiting the heterogeneity at the firm level we observe that while lower policy space results in a more detrimental impact of fiscal shocks on investment of both large and small firms, its adverse effects appear to be larger for the latter. We also show that the results are robust to the inclusion of macroeconomic variables which may directly affect investment and fiscal policy, such as crises, changes in monetary policy, country risks, and macroeconomic uncertainty.

We conclude by looking at firm-level sales dynamics to assess the overall impact on the economy of unexpected fiscal adjustments. We find that after a year of negative growth, firm sales recover fast, starting in the second year after the fiscal shock and remain positive into a

4-year horizon. This suggests a quite persistent expansionary impact of the fiscal adjustment after the contraction during the first year, which seems to indicate that the expansionary force behind fiscal prudence may materialize relatively quickly, thus mitigating the short-term costs of adjustments. In other words, the investment dynamics translate into firms' sales dynamics. Thus, this also suggests that a leaner fiscal position may render higher potential growth, further making the adjustment worth paying its short-term costs. Additionally, this is consistent with Li and others (2021) who, using firm-level data, show that the pass-through from sovereign spreads to corporate spreads is about one, suggesting that a sounder fiscal policy stance should lower firm-level financing costs, stimulating investment.

Our paper is related to a large body of literature studying the determinants of firm-level investment. Methodologically and in terms of the data source, we follow Kalemli-Ozcan and others (2022). However, their focus is on the impact of sovereign stress and bank balance sheet weaknesses on corporate investment in Europe, while ours is on the impact of unexpected fiscal consolidation in emerging markets. Our choice of firm-level and country-level variables, as well as our robustness exercises, is motivated by the findings in the existing literature. In particular, Magud and Sosa (2017) highlight the role of terms-of-trade shocks in determining corporate investment in emerging markets; Baker and others (2016) and Li and others (2020) point to the importance of external financial shocks in shaping corporate investment; Landon and Smith (2009), Alfaro and others (2020), and Brito and others (2018) document the impact of real exchange rate movements on firm-level investment; and Kalemli-Ozcan and others (2016) highlight the role of banking crises.

Our work also relates to the literature studying the impact of fiscal consolidations on economic activity. In contrast to the literature estimating fiscal multipliers using macro-level data (see for example Carrière-Swallow and others, 2021 Izquierdo and others, 2019), our paper exploits granular, firm-level data, to zoom into one specific channel through which fiscal policy affects economic activity—its impact on corporate investment. This approach has important advantages. First, by focusing on firm-level investment one can more credibly treat fiscal spending shocks as exogeneous. Second, one can exploit the variation in firm-level data to study the heterogeneous impact of fiscal shocks across firms. This allows us to expand previous work that quantified the expansionary impact of fiscal adjustment on private investment using aggregate data (for example, Alesina and others, 2002; Alesina and Perotti, 1997).[2] In this sense, our work is related to Correa-Caro and others (2018), who study the impact of fiscal support on corporate profitability in the context of the global financial crisis. In contrast to their work, however, our focus is on the impact of fiscal shocks on corporate investment over a longer period (the 2000-2018 period). Finally, it is important to emphasize that private investment is one of the main drivers of GDP's response to fiscal shocks (Alesina and others 2002), which suggests that the policy relevance of our results is not trivial.

Finally, it is worth stressing that we focus on fiscal expenditure shocks only. We do this because changes in tax policy would raise endogeneity issues since, by definition, tax changes

[2] Magud (2008) provides a theoretical argument, analyzing the impact of fiscal adjustment in economies with high public debt. He shows that a fiscal adjustment reduces market interest rates, in turn stimulating private investment.

can directly affect investment decisions. For instance, Cummings and others (1996) use firm-level data to study the link between corporate taxation and investment. Using the narrative approach with macroeconomic data Gunter and others (2018) document the nonlinear effects of changes in tax policy on economic activity. Additionally, data availability is more sparse and less systematic for tax policy changes than for fiscal forecast errors, as we use in this paper.

The rest of the paper is organized as follows. Section II provides some conceptual framework (with a simple model in the Appendix) and describes the empirical strategy and the data. Section III presents the main results of the paper. Section IV shows additional robustness checks and Section V discusses the overall effect of unexpected fiscal adjustment costs and benefits. Section VI concludes.

II. EMPIRICAL STRATEGY AND DATA

As stressed above, our goal is to quantify the impact of unexpected fiscal shocks on corporate investment decisions empirically. To that end, this section describes (a) first, a conceptual framework based on a bare-bones model to support the intuition of empirical results (a formal model is provided in the Appendix); (b) our definition of fiscal shocks; (c) the empirical approach used to estimate the impact of fiscal policy; and (d) the data.

A. Conceptual Framework

The Appendix presents a simple model of corporate investment to illustrate the main channels through which fiscal shocks affects firms' investment decisions. This helps to motivate the empirical exercises. The intuition is as follows. On impact, a fiscal adjustment reduces aggregate domestic demand. The effect is thus contractionary, reducing private investment. However, the unexpected fiscal correction improves private sector investment incentives in its aftermath by triggering a protracted reduction in the cost of capital. To the extent that the change in the cost of capital is sufficiently persistent (for example, because the demand for investment goods is sticky due to adjustment costs) while demand effects are relatively short-lived, investment will recover. In fact, private investment could end above pre-fiscal adjustment levels if the price of capital declines over time due to investment-specific technological change (see Greenwood and others, 1997).

Therefore, our simple model points to two distinct and opposing mechanisms through which fiscal policy affects firm-level investment. On the one hand there is the standard Keynesian channel that results from a fiscal contraction. If the latter is protracted and if the reduction in the cost of capital is not large enough, investment can remain depressed for a relatively long period of time, even if it is expected to increase in the long run. On the other hand, by contrast, if the demand contraction following the fiscal shock is short-lived or, especially, if the impact on the price of capital is sufficiently large and persistent, the negative effect of fiscal shocks on investment can be relatively short-lived. In this case, the fiscal adjustment would give place to an expansionary austerity outcome. In the end, the ultimate response of investment will depend on which of these mechanisms dominates in the short and medium-term. The answer of which effect dominates is ultimately empirical. Thus, below we explore which of these two scenarios dominates in the data and analyze the role of different macroeconomic variables and policies in facilitating an expansionary austerity scenario.

B. Constructing Fiscal Shocks

Our definition of fiscal shocks uses the forecast error approach. The approach relies on the idea that, while fiscal forecasts are constructed by agents using all available information at time *t*, forecast errors are unanticipated increases/decreases in fiscal spending (see Auerbach and Gorodnichenko, 2013).

As in Furceri and Li (2017) and Alichi and others (forthcoming), expenditure forecast errors are constructed using IMF's October publication of the World Economic Outlook (WEO) vintage data.[3] The WEO reports macroeconomic data at an annual frequency for IMF member countries, and forecasts are made by IMF staff for the projection years. Forecasts are constructed using all available information up to the publication cutoff date. We construct forecast errors using the IMF teams' one-year-ahead forecasts and the outturn of the fiscal variable (using information reported in the following year's WEO). The government expenditure forecast error can be expressed as:

$$Gov.Exp.Forecast\ Error_{i,t} = 100 * \left(\frac{\Delta Gov.Exp._{i,t}^{F}}{Gov.Exp._{i,t-1}} - \frac{\Delta Gov.Exp._{i,t}^{O}}{Gov.Exp._{i,t-1}}\right) * \overline{\left(\frac{Gov.Exp.}{GDP}\right)} \qquad (1)$$

where $Gov.Exp._{i,t-1}$ is government expenditure in country *i* during period $t-1$ in real terms, calculated as the sum of real government current expenditure and real government investment. $\Delta Gov.Exp._{i,t}^{F}$ is the change in real government expenditure forecasted by the IMF between years *t-1* and *t* and $\Delta Gov.Exp._{i,t}^{O}$ is the observed change in real government expenditure between years *t-1* and *t*. $\overline{\left(\frac{Gov.Exp.}{GDP}\right)}$ is the average government expenditure to GDP ratio over each country's full sample period observations.[4] Alternatively, the government expenditure forecast error can be rewritten as the difference between the forecast and the outturn relative to expenditure in period $t-1$, multiplied by the average public expenditure-to-GDP ratio. In parts of the paper, we use similar expenditure shocks for real government current consumption and real government investment separately.

One concern in interpreting forecast errors as true fiscal surprises is that they may be capturing inflation of growth surprises, which in themselves affect investment. To mitigate these concerns, we follow the methodology in the October 2017 World Economic Outlook, which consists in regressing fiscal forecast errors on the forecast errors of inflation and real GDP growth, and then using the residuals of the latter regression as our government expenditure shock.

[3] Auerbach and Gorodnichenko (2013) and Abiad and others (2016) used a forecast error approach constructed using OECD forecasts.

[4] Alichi and others (forthcoming) use a slightly different definition of the fiscal shock. Their definition is $FE = (Gov.Exp^{F} - Gov.Exp^{O})/GDP_{t-1}$, which is equivalent to ours if instead of using the average government expenditure to GDP ratio we use the same ratio in *t-1*.

C. Econometric Approach

To assess the impact of expenditure shocks on corporate investment, we follow two approaches. First, we estimate panel regressions in the spirit of Magud and Sosa (2017), Li and others (2020), and Kalemli-Ozcan and others (2022). The baseline specification takes the following form:

$$ICR_{f,i,t} = \alpha_f + \gamma_t + \mu_s + \beta FE_{i,t} + \delta X_{i,t} + \theta Z_{f,t} + \varepsilon_{f,i,t} \quad (2)$$

where $ICR_{f,i,t}$ is the investment-capital ratio of firm f, in country i at time *t*. Following Kalemli-Ozcan and others (2022),[5] we define investment in year *t* as the change in tangible fixed assets within the year, while the capital stock is the value of tangible fixed assets at the beginning of the year. α_f, γ_t and μ_s are firm-, year, and sector-fixed effects, respectively. $FE_{i,t}$ is the government expenditure shock (forecast error), while $X_{i,t}$ captures lagged country-specific macroeconomic and fiscal variables including real GDP growth, terms-of-trade (ToT) growth, changes in the real effective exchange rate (REER), government debt as a share of GDP, and government expenditure as a share of GDP.[6] $Z_{f,t}$ includes a set of lagged firm-level variables commonly used in the literature, such as sales growth, the liability-asset ratio (long-term debt plus current liabilities, divided by total assets; that is, a measure of the firm's leverage), the cash flow to assets ratio (net income plus depreciation and depletion within the year, normalized by total assets at the beginning of the year), the logarithm of total assets, and the earning to assets ratio (operating profits/losses, EBIT, normalized by total assets). The latter variable is included as a rough proxy of future earnings. Although this is technically not a proxy for Tobin's Q (which intends to capture future profitability, as per the market valuation of a firm), we loosely refer to Tobin's Q in the spirit of profits signaling investment opportunities. Moreover, this enables us to exploit the fact that Orbis' data includes non-listed firms—which by definition lack a market valuation. Using non-listed firms is key. Not only because it widens the dataset but, more importantly, because unlisted firms are typically smaller firms and less financially sophisticated. Additionally, most small and medium firms are usually non-listed and are key drivers of macroeconomic dynamics.[7] Consequently, Orbis provides, compared to other existing datasets, a better source of firm-level data to investigate the impact of fiscal policy on firm-level investment.

Fiscal expenditure forecast errors are macroeconomic-level variables that are not driven by individual firm-level investment decisions. This is key, as it provides a strong identification strategy. The use of Orbis' data that includes non-listed firms further contributes to strengthening the identification strategy given the enhanced orthogonality of smaller firms to unexpected fiscal adjustment.

[5] As in Kalemli-Ozcan and other (2022), all standard errors are clustered at the firm level.

[6] Note that neither our baseline panel specification in (2) nor the baseline local projections include variables directly capturing the cost of capital. This is in line with the literature on corporate investment and is mostly due to lack of data availability for the countries in our sample. In the robustness exercises in section IV we control for proxies of the monetary policy stance, which affects the cost of capital.

[7] Close to 97 percent of the observations used in the analysis comes from non-listed firms.

It is worth clarifying that the panel approach is aimed at estimating the "average" response of investment to fiscal shocks. Also, some parts of the paper expand this baseline specification by including interactions with different variables.

Our second approach, and the most important, focuses on estimating the dynamic response of corporate, firm-level investment to fiscal shocks. This is similar to the dynamic approach followed by Kalemli-Ozcan and others (2022). To do so, we follow the local projection method proposed by Jordà (2005). The method has the advantage that it does not constrain the shape of the impulse response functions and is therefore less sensitive to misspecification than estimates of VAR models (Jordà and Taylor, 2016). The benchmark specification is as follows:

$$ICR_{f,i,t+h} = \alpha_f^h + \gamma_t^h + \mu_s^h + \beta^h FE_{i,t} + \vartheta^h FE_{i,t-1} + \sigma^h ICR_{f,i,t-1} + \delta^h X_{i,t} + \theta^h Z_{f,t} + \varepsilon_{f,i,t+h} \quad (3)$$

where for each horizon $h = \{0,1,2,3,4\}$ we estimate equation (3). We cap our analysis at 4 years after the shock because for most countries in our sample, the firm-level time series is relatively short (since, given the availability of a broad sample of countries, it starts in 2000). Our coefficient of interest will be β^h, which captures the dynamic impact of fiscal shocks. Notice that, in addition to the controls included in (1), we also control for past values of the forecast error and the ICR. The inclusion of these additional controls aims at taking into account past dynamics of our variables of interest, which may be important determinants of current values. Our estimation of (3) also includes future values of the fiscal shock, as suggested by Teulings and Zubanov (2014).

One additional attractive feature of the local projection method is that it allows to study state contingencies in the response of the dependent variable to shocks in a parsimonious and flexible way. Making use of this feature, in some of the exercises below we study whether the impact of expenditure shocks on corporate investment varies with country-level and firm-level state variables, such as a high public debt-to-GDP ratio or high firm leverage. When focusing on these exercises, we estimate the following state-dependent local projection:

$$ICR_{f,i,t+h} = \alpha_f^h + \gamma_t^h + \mu_s^h + \beta_h^h FE_{i,t} * S_{i,f,t} + \beta_l^h FE_{i,t} * (1 - S_{i,f,t}) + \vartheta^h FE_{i,t-1} + \sigma^h ICR_{f,i,t-1} + \delta^h X_{i,t} + \theta^h Z_{f,t} + \varepsilon_{f,i,t+h} \quad (4)$$

in which $S_{i,f,t}$ stands for a dummy variable that takes value 1 if a specific country or firm characteristic is satisfied in $t-1$ (for example country *i* having high public debt) and zero otherwise. We cap our horizon in the interacted Local Projections at h=2, as some data partitions result in small samples for longer horizons.

D. Data

The paper relies on country-level and firm-level yearly data for a sample of 29 emerging (or formerly emerging) economies, conditional on availability. The data spans 2000-2018, although not every country has data available for every year. Most country-level data come from the IMF's WEO and IFS databases. These data are complemented with data on exchange

rate flexibility from Ilzetzki and others (2019), data on crises from Laeven and Valencia (2020), and data on uncertainty from Ahir and others (2018).

Firm-level data is from Bureau van Dijk's (BvD) Orbis global database. Orbis is the largest cross-country firm-level database, covering over 200 countries and 200 million firms. These data can be used for research focusing on linking firms' financial accounts, ownership structure, and production decisions. It reports data for all industries and for both private and public firms. BvD collects data from various sources (in particular, publicly available national company registries) and harmonizes the data into an internationally comparable format. The coverage of firms varies both by country, industry, over time, and across variables. The reason for variation in firm coverage by country is that different countries have different laws in terms of which firms are required to file their financial accounts.

The dataset used in the analysis follows the cleaning steps described in Kalemli-Ozcan and others (2015) and Gopinath and others (2017). The variables used in the analysis are total assets, sales, operating revenue (gross output), tangible fixed assets, liabilities, EBIT and cash flow. All data are transformed into constant 2010 U.S. dollars. We drop financial firms and government-owned firms and keep all the other sectors. As in Kalemli-Ozcan and others (2022), all firm-level variables are winsorized.[8]

The final sample contains data from over 1 million firms in 29 emerging markets. Table 1 presents some basic descriptive statistics of the variables used in the baseline regression and in some extensions and robustness checks. We observe that, after winzoring, the data seems to be well behaved. A key variable in our work are the forecast errors, so we look into them more carefully. Figure 1 shows the distribution of forecast errors for the 29 EMs over the time frame used in the analysis. Although the distribution has a slight bias towards negative FEs (forecasts that are lower than outturns), forecast errors are essentially centered around zero. Moreover, the distribution is roughly symmetric around the mean. Additionally, we observe that forecast errors are also correlated with changes in the primary balance as a share of GDP (Table 2). This is particularly evident in columns (3) and (4) where we show outlier-robust regressions. This is relevant for our identification, as it is indicative of evidence that forecast errors are indeed capturing changes in governments' fiscal stance—we assess below, in the robustness checks, the role, if any, of multi-year fiscal adjustment processes. Table 3 shows the sample of countries and the time coverage for each country.

[INSERT TABLE 1 HERE]

[INSERT FIGURE 1 HERE]

[INSERT TABLE 2 HERE]

[INSERT TABLE 3 HERE]

[8] For net investment to lagged capital, liabilities to assets ratio, cash flow to assets, sales growth, EBITDA to assets, and log of capital stock we drop outliers on both ends of each variable's distribution. In particular, we winsorized values at the 5%, 3%, 2%, 2%, 1% and 1% level, respectively.

III. RESULTS

This section presents the results of the estimated impacts of fiscal shocks on corporate investment. As described earlier, the discussion will cover both the average and the dynamic response of investment to fiscal shocks.

Before turning our attention to the main empirical findings of the paper, Table 4 shows the impact of firm-level and exogenous macroeconomic variables (to each individual firm) on the investment-capital ratio (ICR). These are relationships that have been previously studied in the literature, using other data sources and samples. All the estimated coefficients are strongly statistically and economically significant and are in line with previous studies. At the firm level, we observe that investment is higher when expected future profitability (using earning to assets as a proxy for Tobin's q) is higher, when firm sales are higher (following the accelerator model), and when liabilities are lower (as they enable more room for borrowing to invest and at lower financial costs, in line with the financial accelerator in Bernanke and others, 1999). We also note that firms are typically financially constrained (given the positive association of the ICR with firms' cash flow), and larger firms (defined by the size of their assets) invest relatively less (as found in Kalemli-Ozcan and others, 2022). Regarding the macroeconomic data, all else equal, faster aggregate economic activity is associated with more firm-level investment (also in line with an accelerator model). Economies with stronger currencies (in real terms) invest more, in line with Diaz-Alejandro (1966)'s work, which highlights the role of the real purchasing power of country's currency as needed to import capital. This is likely a by-product of our sample consisting of emerging markets, where firm investment by and large consists of imported capital goods. Stronger terms of trade are also associated with more firm-level investment (as in Magud and Sosa, 2017), pointing to the advantage of increasing investment during periods when economies become exogenously richer.

[INSERT TABLE 4 HERE]

A. The Average and Dynamic Impacts of Fiscal Shocks on Corporate Investment

Turning to fiscal policy, the focus of the paper, we find that corporate investment exhibits a Keynesian response to unexpected fiscal shocks (Table 5). Following an unexpected fiscal adjustment of 1 percent of GDP, the corporate investment-capital ratio falls by around 0.6 percentage points, all else equal. This fall is both statistically and economically important. To get a sense of the economic importance of the fall in ICRs, one must keep in mind that capital stocks are typically 4 times as large as GDP. Thus, a back-of-the-envelope calculations that assumes that our estimate applies to aggregate investment suggests that the decline in investment following fiscal shocks would entail a fall in investment as share of GDP of about 2 percentage points. This finding is robust to the inclusion of other fiscal variables, including the overall fiscal space (proxied by the public debt-to-GDP ratio) and the size of the public sector (measured as the government expenditure-GDP ratio), as well as other macroeconomic variables. In fact, the inclusion of real GDP growth, ToT growth, and the growth of the real effective exchange rate, amplifies the Keynesian effect of unexpected fiscal shocks, as given by the absolute magnitude of the latter's coefficient. All this suggests that the drop in domestic demand resulting from the unexpected reduction in public spending appears to dominate, on

average, the potential decline in cost of capital, thus reducing firms' incentives to invest (see the previous section for a discussion).

Beyond the impact of fiscal shocks, the results in Table 5 point to a potential crowding-out effect of fiscal policy. All else equal, firms in countries with lower public debt-to-GDP ratios exhibit higher ICRs compared to those in countries with higher public debt-to-GDP ratios (Table 5, columns 2, 3, 5, and 6), in line with macro-data findings in Gunter and others (2021). Similarly, firms operating in countries with a larger government footprint (as measured by the public expenditure to GDP ratio) have, on average lower ICRs (Table 5, column 3). This result, however, does not hold when we include other macroeconomic variables (Table 5, column 6).

[INSERT TABLE 5 HERE]

Macroeconomic policy variables also appear to shape the response of corporate investment to fiscal shocks. Considering interaction terms, we observe that the impact of fiscal shocks on ICRs is more muted in countries with high public debt-GDP ratios (Table 6, column 1). This is consistent with the literature that finds larger fiscal multipliers in countries with lower fiscal space/default risk (Huidrom and others, 2020, and Carrière-Swallow and others 2021). A more predictable fiscal policy (measured by the 5-year moving variance of government spending forecast errors) is associated with higher levels of private firms' investment and does not appear to affect the response of ICRs to fiscal shocks (Table 6, columns 2 and 3). Finally, the country's exchange rate framework does not appear to be linked to the average response of ICRs to fiscal shocks. However, firms in countries with more flexible exchange rate frameworks do exhibit, on average, higher investment-capital ratios (Table 6, column 4).

Our results point to a relatively symmetric impact of fiscal shocks. That is, the magnitude and statistical significance of unexpected fiscal expansions and contractions is about the same (Table 6, columns 5 and 6). This suggests that, on average, fiscal multipliers are of similar size regardless of the direction of the unexpected fiscal spending movement.

[INSERT TABLE 6 HERE]

Thus far, we have only presented the results of the panel regressions, as described in (2). These coefficients capture the "average" impact of fiscal shocks on corporate investment but are silent about their dynamic impact. As illustrated in the simple model in Section II, studying the dynamic response of corporate investment to fiscal shocks can shed light on the channels through which these shocks percolate into the economy and on the speed at which the adjustment process occurs. To that end, below we show results corresponding to the estimation of local projection models as those in equation (3) and (4).

Our baseline local projection estimation shows that, after a sharp drop on impact, ICRs experience a strong recovery in the aftermath of fiscal shocks. Figure 2, Panel A, shows that firm-level investment falls on the year of the unexpected fiscal adjustment, in line with the Keynesian multiplier reported in the panel regressions. The estimated LP shows that a one standard deviation increase in the FE (which amounts to an adjustment of roughly 1.3 percent

of GDP) results in a decrease in the ICR of over 1 percentage points. As discussed above, this is a significant effect both from a statistically and economic standpoint. However, ICRs recover to pre-shock levels 1 year after the unanticipated fiscal expenditure adjustment and after two years they stand above the pre-shock baseline. Thus, after the Keynesian-multiplier driven short-term contraction, investment increases to a level higher than the level existing before the fiscal adjustment. In short, unexpected fiscal spending contractions results in eventual expansionary austerity.[9]

The average dynamic response depicted in Figure 2, Panel A, masks the role of policy levers in shaping the impact of fiscal shocks which, as discussed above, may prove important. As shown in Figure 2, Panel B, the rapid recovery in ICRs seems to come from firms operating in countries with a (relative) low level of public debt—which we define as having a debt-to-GDP ratio below the yearly median value for the countries in our sample. By contrast, in countries with (relatively) high public debt levels, corporate investment suffers a less pronounced contraction on impact but does not fully recover in the 2-year window we study.

[INSERT FIGURE 2 HERE]

Exchange rate flexibility and the predictability of fiscal policy also appear to drive the expansionary austerity dynamics. Figure 2 also shows the contribution of having a flexible exchange rate regime (Panel C) or a smaller variance of public spending forecast errors (Panel D) to this (investment) expansionary austerity after the short-run Keynesian contraction in private firms' investment. Conversely, lack of exchange rate flexibility or high fiscal uncertainty are associated with a less pronounced, albeit more persistent fall in private investment.

A country's trade openness also affects investment's dynamic response to fiscal shocks. Consistent with the macro literature that finds smaller multipliers in countries with a greater degree of trade openness, we find that fiscal shocks have a stronger impact on corporate investment in countries with lower levels of trade openness. At the same time, the expansionary impact of fiscal consolidations is also larger in these countries (Figure 3).

[INSERT FIGURE 3 HERE]

B. The Role of the Composition of the Fiscal Shocks

To study whether the composition of fiscal adjustments matters for corporate investment's response, we explore differences in fiscal spending adjustment between public consumption and public investment (also typically labelled current and capital spending, respectively). Table 7 shows that an unexpected adjustment in public investment has a smaller impact on

[9] This is consistent with Li and others (2021), who show the one-to-one relation from sovereign bonds to corporate bonds. A fiscal consolidation that reduces fiscal financial costs would reduce corporate funding costs, increasing private investment.

firm-level investment than that of an unexpected adjustment in public consumption. This may be due public consumption shocks having a larger (directly from the relative size of public consumption versus public investment, and indirectly from its multiplier effect) and a more immediate impact on aggregate demand. We also find that a firm's size (assets) mitigates the impact of both unexpected fiscal shocks. In the case of liabilities, however, the impact depends on the shock.

Finally, and very importantly, we observe that unexpected public consumption shocks are followed by a strong recovery in firm-level investment, while the impact of unexpected fiscal adjustments in public investment become protracted slumps in private sector investment, possibly pointing to complementarities between public and private sector investment (Figure 4), as well as the perception of more persistent fiscal adjustment when coming from current rather than capital public spending.[10]

[INSERT TABLE 7 HERE]

[INSERT FIGURE 4 HERE]

C. The Role of Sectoral and Firm Characteristics

One advantage of studying the impact of fiscal shocks on investment using firm-level data is that it allows us to explore how sectoral and firms' characteristics affect investment's response to shocks. Put differently, the use of firm-level data enables us to explore the heterogeneous impact of fiscal shocks across sectors and firms.

Our findings confirm that, when assessing the impact of fiscal shocks on firm investment, sectoral differences matter. Investment responses vary by the firm's sector of operation—tradable or non-tradable.[11] In the presence of fiscal policy surprises, investment reacts more in firms in the non-tradeable sector (Table 8).[12] This is consistent with the fact that non-tradeable firms are more dependent on the domestic cycle, which is directly affected by fiscal surprises. Moreover, and relatedly, the predictability of fiscal policy appears to be especially important for corporate investment in the tradeable sector. Local projections show that the eventual expansionary impact of fiscal shocks rests on tradeable investment, whereas firm-level investment in non-tradeable sectors returns to its pre-shock level (Figure 5). That is, in response to an unanticipated fiscal contraction, after the Keynesian contraction during the first

[10] This is consistent with Ardanaz and others (2021) who show, using aggregate data, that public investment-driven fiscal consolidations have a weaker impact on real GDP growth than public consumption-driven fiscal adjustments. Moreover, the former become eventually expansionary after three years. Also, with Izquierdo and others (2019), who show that public investment multipliers are larger when public debt is lower.

[11] Tradable sectors are defined as NACE 1 level sectors 1 through 5 (agriculture and manufacturing) and the rest are non-tradeable sectors.

[12] Table 8 also shows that, regardless of fiscal shocks and relative to firms in non-tradeable sectors, investment in tradable firms is more responsive to the signal provided by future earning (as given by Tobin's q), more financially constrained, more negatively affected by the size of their liabilities and assets, less affected by domestic growth (as non-tradable goods' dynamics hinge more on the domestic economic cycle), more sensitive to changes in the real exchange rate (owing to issues of competitiveness), less impacted by changes in the terms of trade (which suggests the importance of the income effect of the improvement in the terms of trade), and slightly less affected by unexpected fiscal contractions (which is also related to the domestic cycle).

year, investment eventually increases in the tradable goods sector—with the non-tradable goods sector replicating the fiscal dynamics.

[INSERT FIGURE 5 HERE]

[INSERT TABLE 8 HERE]

For a finer exploration of the above exercise, we partition the data according to a country's exchange rate regime. This provides a better understanding of investment's dynamics across sectors. Figure 6 shows the crucial role played by a country's exchange rate flexibility in driving a strong investment recovery in the aftermath of a fiscal shock, an effect that is more salient for firms that produce non-tradable goods. This is consistent with Table 8, which shows that the direct impact of the real exchange rate on investment is stronger for non-tradable firms, as reflected in the larger coefficient. In turn, this supports Diaz-Alejandro's point of the importance of the real purchasing power of a developing country's currency to purchase capital goods. Notice that, implicitly, the transmission channel of exchange rate flexibility differs by sector. In the non-tradable sector, the expenditure-switching implies that along the real depreciation that a fiscal adjustment triggers, domestic demand shifts to non-tradable goods. At the same time, the increase in competitiveness of the real depreciation results in stronger external demand for tradable goods.

[INSERT FIGURE 6 HERE]

Next, we study the role of firm characteristics in shaping investments response to fiscal shocks. Table 9 shows that the negative impact of unexpected fiscal adjustments on investment is smaller for larger firms (as measured by the firm's assets value). The result appears to be driven by the fact that large firms' investment is less responsive to contractionary fiscal surprises. Also, large firms are less affected by fiscal volatility. Similar results are found for firms with a smaller level of liabilities (Table 10).[13]

[INSERT TABLE 9 HERE]

[INSERT TABLE 10 HERE]

Turning to dynamics, local projection estimations show that the expansionary austerity result described earlier for the first few years post-shock appear to be driven by the response of large firms and those with low levels of liabilities (Figure 7).[14] Delving deeper into the interaction between firm-level characteristics and fiscal policy, Figure 8, Panel A, shows that in economies

[13] To study the role of assets and liabilities we split the sample according to the median value of assets and liabilities in each country. This is consistent with the findings in Espinoza and others (2020) that public investment can help boost private investment for firms with low leverage and financial constraints.

[14] In addition, we conduct state dependent local projections for vulnerable and non-vulnerable firms, where vulnerable firms as defined as those with low return on assets, low interest coverage ratios, and high leverage (see Chapter 2 of the April 2022 World Economic Outlook). Results are similar to those when we partition firms based in liabilities.

with low public debt, the negative impact on investment of an unexpected fiscal adjustment is larger and more persistent in smaller firms—investment in large firms returns to pre-shock levels after one year and becomes expansionary after 2. In high debt countries (Figure 8, Panel B), investment does not fully recover until three years after the shock in both small and large firms.

[INSERT FIGURE 7 HERE]

Fiscal policy uncertainty also appears to affect differently the investment response to fiscal shocks of firms of different size (Figure 8, Panels C and D). With higher fiscal uncertainty, the negative impact on corporate investment of unpredicted fiscal adjustment is larger in smaller firms (Panel C). Yet, both in small and large firms, investment appears to experience a sluggish response in the aftermath of fiscal shocks. With lower fiscal volatility, however, the differential response blurs on impact (Panel D), but it eventually becomes expansionary in large firms (for small firms this occurs only after three years).

[INSERT FIGURE 8 HERE]

The exchange rate regime also matters in explaining differences in the response to fiscal shocks of firms of different size (Figure 8, Panel E and F). Differences across firms in terms of investment's response to fiscal shock are only apparent in countries with low exchange rate flexibility, where small firms experience a sharper and more protracted decline in investment. Still, even large firms experience a relatively sluggish recovery in countries with low exchange rate flexibility. By contrast, in economies with flexible exchange rate regimes, ICRs in both small and large firms fall by a similar magnitude on impact and recover after one year.

IV. Extensions and Robustness Checks

This section expands the analysis of the impact of unexpected fiscal shocks on corporate investment to explore additional channels that have been highlighted in the literature and to test the robustness of the results. To direct attention to the main point and economize on space, we focus either on the panel regressions or on the local projections.

First, we study whether the impact of fiscal shocks on firm-level investment is affected by the state of the business cycle. For example, there is evidence that fiscal shocks have a larger impact on economic activity when they are preceded by recessions (Jordà and Taylor, 2015; Auerbach and Gorodnichenko, 2012; Carrière-Swallow and others 2021, among others). We find that the state of the economy[15] also affects the impact of unexpected expenditure shocks on corporate investment—expansionary austerity typically occurs when expenditure surprises occur during economic downturns, while shocks that take place during expansions tend to have a persistent effect on investment (Figure 9, Panel A).

[INSERT FIGURE 9 HERE]

[15] We define the state of the economy using the trend in a Hodrick-Prescott filter at the annual frequency.

Next, in line with the evidence provided in Table 5, we study whether unexpected fiscal contractions and expansions have a symmetric impact on investment. As shown in Figure 9, Panel B, evidence suggest that this is the case, as the local projections are, on average, roughly mirror images of each other. The symmetry result, however, depends on country characteristics. For example, when we partition the data based on the level of public indebtedness of the country, we find that, while a contractionary unexpected fiscal adjustment has an adverse effect on investment (smaller in less indebted economies), expansionary fiscal surprises have a positive impact on investment only in low debt countries (Figure 10).

[INSERT FIGURE 10 HERE]

We also find that private investment reacts more on impact in smaller firms (by assets) regardless of the direction of the fiscal policy surprise but lacks an eventual increase in investment (Figure 11, panels A and B). Additionally, we see that there are no differences by the size of firms' liability in responses on impact (Figure 11, panels C and D) and we observe some persistence probably related to macroeconomic uncertainty. Also, we do not find any substantial differences conditional on using either April or October IMF's WEO vintages for the data (Table 11 and Figure 12), albeit investment's recovery appears to be more protracted with the April forecasts.

[INSERT FIGURE 11 HERE]

[INSERT FIGURE 12 HERE]

[INSERT TABLE 11 HERE]

Next, we explore how the timing and size of fiscal shocks affects firm-level investment. Columns 1-3 in Table 12 show that, consistent with the local projection results, forecasts errors have an adverse contemporaneous (Keynesian) effect on investment, but the lagged value of the forecast error has a positive coefficient. The latter is in line with the "non-Keynesian" effect of fiscal shocks in the years following the shock. Turning to the potential non-linear impact of fiscal shocks, columns 4-6 of Table 12 show results for specifications of the baseline regressions that allow the coefficient to vary with the size of the shock. Column 4 shows the results of a regression that includes as a regressor (only) the interaction between the fiscal shocks and a dummy taking a value one if the fiscal shock lies outside the interquartile range. It can be observed that the response of the investment-capital ratio is larger (in absolute value) compared to the baseline specification, pointing to a larger marginal impact of fiscal consolidations on investment when shocks are large. This is confirmed in column 5, where we include both the forecast error and the interaction term described above. In this case, the coefficient of the forecast error is positive when it lies within the interquartile range, albeit relatively small, while the coefficient of the interaction term is negative and large. This result, however, is sensitive to the threshold used to define "large shocks." For example, when we define large shocks as forecast errors that are one standard deviation above or below the

average, the stand-alone coefficient is negative and significant, while the interaction term is negative but non-significant.

[INSERT TABLE 12 HERE]

We expand our baseline panel regressions to control for the role of crises, changes in the stance of monetary policy, and uncertainty, variables that affect investment decisions and may be directly related to unexpected fiscal shocks. To control for the impact of crises, we add a dummy variable that takes the value of one during crises periods, as identified in Laeven and Valencia (2020). Reassuringly, we find that all the baseline results remain unaltered (Table 13), both for variables at the firm level and for the exogenous macroeconomic variables (real GDP growth, real exchange rate growth, and terms-of-trade growth). Importantly, the magnitude and statistical significance of the forecast error does not appear to be affected by the inclusion of the crisis dummy. Furthermore, as expected, the investment capital ratio decreases during the year of a crisis but rebounds the year after the crisis (Table 13, column 1).

[INSERT TABLE 13 HERE]

The impact of unexpected fiscal shocks on investment does not appear to be dimmed by the inclusion of variables capturing the stance of monetary policy. The coefficient for fiscal forecast errors becomes slightly higher and remains statistically significant when we control for either changes in the monetary policy rate (Table 13, column 2) or the short-term, market interest rate (Table 13, column 3). As expected, in either case monetary policy tightening is associated with lower firm-level investment, as higher interest rates increase firms' financing costs. One problem with the two proxies of monetary policy stance used in columns 2 and 3 is that they are not available for all countries in our sample. For this reason, columns 4-6 show the results of an indirect exercise to test the impact of monetary policy on firm-level investment, proxied by inflation deviations from average past inflation[16]—a gauge of "excess" inflation. The results of the exercise show that the impact of fiscal forecast errors remains similar in magnitude relative to the baseline estimation. Consistent with columns 2 and 3, we find that tighter (expected) monetary policy—associated with "excess" inflation—results in lower investment-capital ratios, regardless of the whether we focus on contemporaneous or lagged inflation deviations (Table 13, columns 4-6).

Lastly, columns 7 and 8 in Table 13 show that the results in the baseline specification are not driven by country-specific uncertainty. The coefficient for fiscal forecast errors is of similar magnitude as in the baseline exercise both when we include the past level of the (country-level) world uncertainty index (WUI), as computed by Ahir, Bloom and Furceri (2022),[17] or when we include the lagged value of the change in the index. Consistent with Baker, Bloom, and Davies (2016) and Li, Magud, and Valencia (2020), our results point to the detrimental impact of uncertainty on investment.

[16] Specifically, 5-year moving averages.

[17] Even though the index is called "world uncertainty index," it provides a country-specific measure of uncertainty. The index is constructed through a text-mining approach that searches for the word "uncertainty" (or variations of it) in the quarterly Economist Intelligence Unit country reports. The raw count is then normalized by the total word count of each quarterly country report. In the analysis, we take the yearly average of the index for each country.

Finally, we assess the strength of our observed fiscal shocks to direct fiscal adjustment, as measured by levels and changes in primary fiscal balances and the cost of financing (Table 14). The former aims at controlling for "planned" and/or protracted fiscal adjustment programs. Regarding the fiscal balance, column 1 shows that a stronger fiscal position is associated with higher firm-level investment, and that this is in fact driven by previous period's stronger primary balances (columns 2-3). Moreover, in terms of dynamics, note that fiscal tightening results in lower investment ratios (owing to fiscal multipliers, column 4), but protracted adjustments increase investment (column 5). Additionally, stronger credit ratings are associated with higher levels of corporate investment (column 6).[18] Importantly, regardless of all these controls, fiscal shocks impact on firm-level investment-capital ratios remain as in the baseline results presented above.

The fact that better credit ratings improve investment may be one channel through which fiscal consolidations boost investment in the medium-term. The link between fiscal consolidations and reduced sovereign costs is documented in David and others (2022), who show that sovereign spreads decline when fiscal adjustment is approved—rather than simply announced—that is, effective adjustment being enacted. Moreover, they show that approved adjustment results in a less contractionary toll on the economy owing to the reduction in the cost of credit coming from lower sovereign spreads.

[INSERT TABLE 14 HERE]

V. DISCUSSION

We have documented that, in response to an unanticipated fiscal adjustment, firm-level investment decreases on impact but subsequently increases, surpassing pre-shock levels. This speaks of the expansionary effect of the fiscal shock on investment-capital ratios, although after a short-lived contraction. That is, even though it may be worth to go through a fiscal adjustment process to improve medium-term economic prospects, it is not cost-free as activity may remain depressed for some time. Thus, to get a better sense of the potential costs and benefits of fiscal consolidations it is important to gauge the impact of fiscal shocks on other variables affecting/affected by activity.

To address this question, we exploit the firm-level data as follows. To complement the results from the "standard" corporate investment regressions presented above, we study the behavior of our firm-level proxy for economic activity—firm's sales growth. We estimate an econometric model where firm sales growth is regressed on lagged investment-capital ratio and fiscal shock, plus firm-level and macro controls. The idea is to study how the ICR dynamics documented above map onto sales dynamics. Specifically, we run the following panel (equation (3)) and local projection specifications (equation (4)), respectively:

[18] Ideally, we could use country-risk premia instead of credit ratings. Unfortunately, however, risk premia data availability for the countries in our dataset is limited, which results in losing too many observations. See Li and others (2021) for the direct impact of sounder fiscal policy, as reflected in lower sovereign bond spreads reducing corporate bond spreads one-to-one.

$$Sales\_GR_{f,i,t} = \alpha_f + \gamma_t + \mu_s + \mu\, ICR_{f,i,t-1} + \beta FE_{i,t} + \delta X_{i,t} + \theta Z_{f,t} + \varepsilon_{f,i,t} \quad (5)$$

$$Sales\_GR_{f,i,t+h} = \alpha_f^h + \gamma_t^h + \mu_s^h + \beta^h FE_{i,t} + \vartheta^h FE_{i,t-1} + \sigma^h ICR_{f,i,t-1} + \delta^h X_{i,t} + \theta^h Z_{f,t} + \varepsilon_{f,i,t+h} \quad (6)$$

Aside from an accelerator model of investment, panel results (Table 15) show a strong association between the previous period's investment-capital ratio and sales growth. This points to increases in investment contributing to explain future higher growth rates of firm-level sales. Note that sales growth is also associated with past GDP growth, terms-of-trade growth, and with real depreciations, all of which are intuitive. Also note that when firm-level controls are included (column 2), unexpected fiscal adjustment in the previous period increases the growth rate of firms' sales. The latter seems to support the "expansionary" nature of the fiscal adjustment.

[INSERT TABLE 15 HERE]

The results from the local projection's dynamics confirm the dynamic response of sales predicted by the panel regressions (Figure 13). After a year of negative growth, sales recover fast, starting in the second year after the fiscal shock. They remain positive into a 4-year horizon. This suggests a persistent expansionary impact of the fiscal adjustment after the contraction during the first year, which seems to indicate that the expansionary force behind fiscal prudence may materialize relatively quickly, thus mitigating the costs of adjustments.

[INSERT FIGURE 13 HERE]

To further document this point, Figure 14 shows the temporal trajectory of firms' sales as the ratio~~s~~ to its pre-shock level predicted by the estimated regression coefficients from the local projections presented above. Note that, after the reduction in sales that results from the fiscal adjustment, sales levels surpass their pre-shock levels in the second year after the shock and remains permanently above pre-shock levels thereafter. This seems to suggest an eventual more permanent effect, despite the temporary lower than pre-shock levels, which may be indicating an increase in potential growth stemming from a more sustainable fiscal position. In turn, this seems consistent with David and others (2021) given that only effective fiscal adjustment results in lower sovereign spreads which could be associated with higher potential growth. All in all, the overall conclusion seems to be that the long-term outweigh the short-run (and temporary) costs of unexpected fiscal adjustment—in other words, it is a cost worth incurring.

[INSERT FIGURE 14 HERE]

VI. CONCLUSIONS

In this paper we study the impact of unexpected fiscal shocks on firm-level investment. We find that although, on impact, corporate investment drops in response to a contractionary fiscal shock, investment rapidly recovers and surpasses pre-shock levels. Hence, we observe that fiscal adjustment is expansionary after just one year of contraction.

We also find that expansionary firm-level investment is enhanced in countries with more ample fiscal space, more fiscal policy predictability, and with more exchange rate flexibility. Corporate investment is also supported by stronger economic activity, stronger terms of trade growth, and the real appreciation of a country's currency (à la Diaz-Alejandro). Firms in the tradable sector are a key driver of achieving investment-capital ratios above pre-fiscal adjustment level.

We show that the composition of fiscal adjustment matters. Compared to public investment adjustments, reductions in public consumption lead to larger private investment contractions on impact. However, they also drive private investment to above pre-shock levels, unlike cuts in public investment.

We also exploit firm-level heterogeneity. We find that, beyond the standard firm-level investment explanatory variables, larger and less indebted firms help support the eventual increase in investment more than smaller firms. Moreover, we show that economic activity, as proxied by firm-level sales growth point to the long-term benefits of unexpected fiscal adjustment being larger than its short-term cost, as the increase investment's rebound following contractionary fiscal shocks appears to result in higher sales growth.

All the above results are robust to the state of business cycle (that is, being above or below trend growth) and are symmetric in regard to expansionary vs. contractionary shocks. Results hold when controlling for periods of crises, the stance of monetary policy, and country-specific uncertainty.

From a normative perspective, in the context of the necessary fiscal support observed in response to the COVID-19 crisis, these results are supportive of fiscal prudence going forward, which will facilitate a private sector-led recovery, along with mitigating the emerging inflationary pressures and explosive public debt paths.

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TABLES AND FIGURES

Table 1. Descriptive Statistics of Main Variables used in the Analysis

Forecast Errors				
Variable	**N (country-year)**	**mean**	**st.dev.**	**Sample range**
Government Expenditure FEs	551	-0.17	1.43	[-5.77,7.59]
Public Investment FEs	551	-0.19	0.97	[-4.49,4.14]
Government Consumption FEs	551	-0.02	0.89	[-4.79,3.61]

Macro Variables				
Variable	**N (country-year)**	**mean**	**st.dev.**	**Sample range**
GDP growth (in percent)	551	4.01	3.44	[-16,13.3]
ToT growth (in percent)	551	0.38	7.69	[-62.41,26.23]
REER growth (in percent)	551	0.88	9.97	[-66.06,44.19]
Debt/GDP (percent)	551	41.63	21.34	[3.66,137.71]
Govt. Exp./GDP (percent)	551	29.77	7.98	[16.02,52.77]
Change in policy rate (in percent)	442	-0.38	3.07	[19.39,19.61]
Change in short-term rate (in percentage points)	345	-0.81	3.8	[-27.84,21.19]
Inflation deviation (in percentage points)	526	-6.95	46.89	[-815.18,16.03]

Firm Level Data				
Variable	**N (firm-year)**	**mean**	**st. dev.**	**Sample range**
ICR	4,462,156	0.16	0.94	[-0.99,7.37]
lagged Sales growth	4,462,156	0.11	0.58	[-2.68, 2.95]
lagged EBITDA/Fixed Assets	4,462,156	0.08	0.27	[-5.89,2.81]
Cash Flow to assets	4,462,156	0.11	0.24	[-2.15, 1.17]
lagged liability to asset ratio	4,462,156	0.61	0.51	[.001 5.11]
lagged log total assets	4,462,156	12.93	2.27	[5.68,19]

Table 2. Government Expenditure Forecast Errors and Primary Balances

Dependent variable: Change in primary balance	(1) Pooled OLS	(2) Fixed Effects	(3) Pooled Robust Estimation	(4) Fixed Effects Robust Estimation
Government expenditure forecast error (t)	0.0810	0.0757	0.113**	0.102**
	(0.0599)	(0.0641)	(0.0468)	(0.0509)
Constant	-0.0390	-0.0399	0.0389	-0.181
	(0.0850)	(0.0869)	(0.0664)	(0.374)
Country FE	NO	YES	NO	YES
Observations	514	514	514	514
R-squared	0.004	0.015	0.011	0.033

Standard errors in parentheses. Robust estimation refers to outlier-robust regressions following Li (1985).
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Country and Time Coverage

Countries by IMF Regions									
Africa		Asia and Pacific		Europe		Middle East and Central Asia		Western Hemisphere	
Country	Time coverage	Country	Time coverage	Country	Time coverage	Country	Time coverage	Country	Time coverage
South Africa	2000-2018	China	2003-2018	Bulgaria	2000-2018	Egypt	2000-2017	Argentina	2000-2013;2017-2018
		Indonesia	2002-2018	Czech Republic	2000-2018	Kazakhstan	2004-2018	Brazil	2000-2018
		India	2000-2018	Estonia	2000-2018	Morocco	2000-2018	Chile	2000-2018
		Korea, Rep. of	2000-2002;2009-2018	Israel	2000-2002;2009-2018			Colombia	2000-2018
		Malaysia	2000-2018	Lithuania	2000-2018			Mexico	2000-2018
		Philippines	2000-2018	Latvia	2000-2003;2016-2018			Peru	2000-2018
		Thailand	2000-2018	Poland	2000-2001;2012-2018				
		Vietnam	2003-2011;2014-2018	Romania	2000-2018				
				Russia	2000-2018				
				Slovakia	2000-2018				
				Turkey	2000-2018				

Table 4. Firm and Country-level Determinants of Investment

VARIABLES	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR	(7) ICR
Earnings to Assets ratio (t-1)	0.254***	0.252***	0.254***	0.253***	0.252***	0.253***	0.252***
	(0.00352)	(0.00352)	(0.00352)	(0.00365)	(0.00365)	(0.00352)	(0.00365)
Sales growth (t-1)	0.0564***	0.0548***	0.0566***	0.0579***	0.0571***	0.0548***	0.0570***
	(0.00102)	(0.00103)	(0.00102)	(0.00107)	(0.00108)	(0.00103)	(0.00108)
Cash Flow (t-1)	0.0539***	0.0526***	0.0546***	0.0450***	0.0440***	0.0532***	0.0441***
	(0.00302)	(0.00302)	(0.00301)	(0.00314)	(0.00314)	(0.00301)	(0.00314)
Liabilities to Capital ratio (t-1)	-0.0427***	-0.0429***	-0.0424***	-0.0433***	-0.0434***	-0.0425***	-0.0433***
	(0.00227)	(0.00227)	(0.00227)	(0.00236)	(0.00236)	(0.00227)	(0.00236)
log Fixed Assets (t-1)	-0.268***	-0.267***	-0.269***	-0.266***	-0.265***	-0.268***	-0.265***
	(0.00143)	(0.00144)	(0.00144)	(0.00158)	(0.00158)	(0.00144)	(0.00159)
GDP growth (t-1)		0.826***			0.589***	0.910***	0.618***
		(0.0271)			(0.0278)	(0.0272)	(0.0280)
REER growth (t-1)			0.294***			0.330***	0.0935***
			(0.0110)			(0.0110)	(0.0118)
ToT growth (t-1)				0.447***	0.432***		0.411***
				(0.0152)	(0.0152)		(0.0154)
Constant	3.082***	3.069***	3.125***	3.579***	3.528***	3.117***	3.528***
	(0.0194)	(0.0194)	(0.0195)	(0.0320)	(0.0320)	(0.0195)	(0.0321)
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Observations	5,911,477	5,911,477	5,911,477	5,737,090	5,737,090	5,911,477	5,737,090
Adj. R-squared	0.1	0.1	0.1	0.099	0.1	0.1	0.099

Note: Standard Errors clustered at the firm level in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Table 5. Fiscal Variables and Investment

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable:	ICR	ICR	ICR	ICR	ICR	ICR
Earnings to Assets ratio (t-1)	0.257***	0.258***	0.257***	0.258***	0.258***	0.258***
	(0.00400)	(0.00400)	(0.00400)	(0.00418)	(0.00418)	(0.00418)
Sales growth (t-1)	0.0526***	0.0523***	0.0522***	0.0544***	0.0544***	0.0544***
	(0.00118)	(0.00118)	(0.00118)	(0.00125)	(0.00125)	(0.00125)
Cash Flow (t-1)	0.0449***	0.0444***	0.0442***	0.0331***	0.0327***	0.0327***
	(0.00344)	(0.00344)	(0.00344)	(0.00362)	(0.00362)	(0.00362)
Liabilities to Capital ratio (t-1)	-0.0404***	-0.0395***	-0.0396***	-0.0409***	-0.0402***	-0.0402***
	(0.00252)	(0.00252)	(0.00252)	(0.00264)	(0.00264)	(0.00264)
log Fixed Assets (t-1)	-0.277***	-0.278***	-0.277***	-0.277***	-0.277***	-0.277***
	(0.00168)	(0.00168)	(0.00168)	(0.00190)	(0.00190)	(0.00190)
GDP growth (t-1)				0.298***	0.299***	0.304***
				(0.0343)	(0.0343)	(0.0369)
REER growth (t-1)				0.194***	0.169***	0.170***
				(0.0138)	(0.0141)	(0.0143)
ToT growth (t-1)				0.111***	0.106***	0.105***
				(0.0169)	(0.0168)	(0.0169)
Government Expenditure Forecast Error (t)	-0.00577***	-0.00569***	-0.00517***	-0.00980***	-0.00978***	-0.00985***
	(0.000712)	(0.000712)	(0.000720)	(0.000739)	(0.000739)	(0.000754)
Public Debt to GDP ratio (t-1)		-0.00191***	-0.00182***		-0.00138***	-0.00139***
		(0.000147)	(0.000150)		(0.000156)	(0.000158)
Government Expenditure to GDP ratio (t-1)			-0.00189***			0.000192
			(0.000411)			(0.000456)
Constant	3.151***	3.221***	3.280***	3.674***	3.711***	3.707***
	(0.0228)	(0.0234)	(0.0264)	(0.0349)	(0.0352)	(0.0389)
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	4,617,458	4,617,458	4,617,332	4,462,254	4,462,254	4,462,156
Adj. R-squared	0.097	0.097	0.097	0.095	0.095	0.095

Note: Standard Errors clustered at the firm level in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Interactions with Policy Variables and Heterogenous Effects of Fiscal Shocks

Dep. Variable:	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR
Earnings to Assets ratio (t-1)	0.258***	0.257***	0.257***	0.266***	0.258***	0.258***
	(0.00418)	(0.00436)	(0.00436)	(0.00482)	(0.00418)	(0.00418)
Sales growth (t-1)	0.0544***	0.0561***	0.0561***	0.0553***	0.0544***	0.0544***
	(0.00125)	(0.00133)	(0.00134)	(0.00147)	(0.00125)	(0.00125)
Cash Flow (t-1)	0.0327***	0.0334***	0.0326***	0.0385***	0.0331***	0.0327***
	(0.00362)	(0.00379)	(0.00379)	(0.00416)	(0.00362)	(0.00362)
Liabilities to Capital ratio (t-1)	-0.0400***	-0.0385***	-0.0373***	-0.0304***	-0.0409***	-0.0402***
	(0.00265)	(0.00276)	(0.00277)	(0.00308)	(0.00264)	(0.00264)
log Fixed Assets (t-1)	-0.277***	-0.281***	-0.281***	-0.296***	-0.277***	-0.277***
	(0.00190)	(0.00206)	(0.00206)	(0.00227)	(0.00190)	(0.00190)
GDP growth (t-1)	0.266***	0.417***	0.362***	0.405***	0.299***	0.310***
	(0.0372)	(0.0380)	(0.0408)	(0.0404)	(0.0344)	(0.0370)
REER growth (t-1)	0.168***	0.255***	0.203***	0.149***	0.193***	0.165***
	(0.0143)	(0.0223)	(0.0227)	(0.0152)	(0.0139)	(0.0145)
ToT growth (t-1)	0.129***	-0.0169	-0.0131	0.169***	0.111***	0.104***
	(0.0170)	(0.0202)	(0.0203)	(0.0183)	(0.0169)	(0.0170)
Government Expenditure Forecast Error (t)	-0.0194***	-0.0113***	-0.0109***	-0.00717***		
	(0.00129)	(0.00105)	(0.00106)	(0.000935)		
Public Debt to GDP ratio (t-1)	-0.00123***		-0.00216***	0.000176		-0.00142***
	(0.000159)		(0.000176)	(0.000180)		(0.000159)
Government Expenditure to GDP ratio (t-1)	0.000156		-0.000838*	-0.00248***		0.000224
	(0.000456)		(0.000478)	(0.000512)		(0.000457)
Government Expenditure Forecast Error (t)*Public Debt to GDP ratio (t-1)	0.000356***					
	(3.63e-05)					
Govt. Forecast Error Variance (t-1)		-0.00154***	-0.00206***			
		(0.000497)	(0.000500)			
Government Expenditure Forecast Error (t)*Govt. Forecast Error Variance (t-1)		0.000240	0.000462			
		(0.000428)	(0.000428)			
Flexible Exchange Rate Regime				0.108***		
				(0.00494)		
Government Expenditure Forecast Error (t)*Flexible Exchange Rate Regime				-0.00107		
				(0.00166)		
Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)>0)					-0.00925***	-0.00759***
					(0.00151)	(0.00152)
Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)<0)					-0.0101***	-0.0111***
					(0.00114)	(0.00116)
Constant	3.708***	3.665***	3.757***	3.932***	3.674***	3.706***
	(0.0389)	(0.0364)	(0.0407)	(0.0430)	(0.0349)	(0.0389)
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	4,462,156	3,992,846	3,992,748	3,521,109	4,462,254	4,462,156
Adj. R-squared	0.095	0.092	0.092	0.096	0.095	0.095

Note: Standard Errors clustered at the firm level in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Table 7. Public Investment vs. Public Consumption Shocks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Variable:	ICR	ICR	ICR	ICR	ICR	ICR	ICR	ICR
Earnings to Assets ratio (t-1)	0.258***	0.258***	0.258***	0.258***	0.252***	0.252***	0.251***	0.252***
	(0.00418)	(0.00418)	(0.00418)	(0.00418)	(0.00365)	(0.00365)	(0.00365)	(0.00365)
Sales growth (t-1)	0.0546***	0.0546***	0.0546***	0.0547***	0.0568***	0.0566***	0.0567***	0.0566***
	(0.00125)	(0.00125)	(0.00125)	(0.00125)	(0.00108)	(0.00108)	(0.00108)	(0.00108)
Cash Flow (t-1)	0.0332***	0.0327***	0.0328***	0.0325***	0.0441***	0.0432***	0.0430***	0.0433***
	(0.00362)	(0.00362)	(0.00362)	(0.00362)	(0.00314)	(0.00314)	(0.00314)	(0.00314)
Liabilities to Capital ratio (t-1)	-0.0411***	-0.0404***	-0.0403***	-0.0414***	-0.0432***	-0.0421***	-0.0423***	-0.0418***
	(0.00264)	(0.00265)	(0.00264)	(0.00265)	(0.00236)	(0.00236)	(0.00236)	(0.00236)
log Total Assets (t-1)	-0.277***	-0.277***	-0.277***	-0.277***	-0.265***	-0.266***	-0.265***	-0.266***
	(0.00190)	(0.00190)	(0.00190)	(0.00190)	(0.00159)	(0.00160)	(0.00159)	(0.00160)
GDP growth (t-1)	0.272***	0.251***	0.243***	0.253***	0.648***	0.547***	0.564***	0.546***
	(0.0344)	(0.0368)	(0.0369)	(0.0368)	(0.0280)	(0.0299)	(0.0299)	(0.0299)
REER growth (t-1)	0.195***	0.168***	0.165***	0.167***	0.108***	0.0592***	0.0551***	0.0593***
	(0.0138)	(0.0143)	(0.0143)	(0.0143)	(0.0119)	(0.0121)	(0.0121)	(0.0121)
ToT growth (t-1)	0.117***	0.114***	0.111***	0.114***	0.385***	0.372***	0.380***	0.373***
	(0.0168)	(0.0169)	(0.0169)	(0.0169)	(0.0155)	(0.0155)	(0.0155)	(0.0155)
Public Investment Forecast Error (t)	-0.00743***	-0.00674***	-0.0277***	-0.00352***				
	(0.000932)	(0.000941)	(0.00454)	(0.00126)				
Public Debt to GDP ratio (t-1)		-0.00130***	-0.00129***	-0.00130***		-0.00216***	-0.00219***	-0.00216***
		(0.000158)	(0.000158)	(0.000158)		(9.42e-05)	(9.43e-05)	(9.43e-05)
Government Expenditure to GDP ratio (t-1)		-0.000706	-0.000688	-0.000681		-0.00192***	-0.00166***	-0.00193***
		(0.000451)	(0.000450)	(0.000451)		(0.000316)	(0.000316)	(0.000316)
Public Investment Forecast Error (t)*log Total Assets (t-1)			0.00167***					
			(0.000335)					
Public Investment Forecast Error (t)*Liability to Assets ratio (t-1)				-0.00558***				
				(0.00147)				
Public Consumption Forecast Error (t)					-0.0233***	-0.0246***	-0.0801***	-0.0280***
					(0.00106)	(0.00107)	(0.00625)	(0.00166)
Public Consumption Forecast Error (t)*log Total Assets (t-1)							0.00431***	
							(0.000450)	
Public Consumption Forecast Error (t)*Liability to Assets ratio (t-1)								0.00628**
								(0.00244)
Constant	3.680***	3.740***	3.735***	3.740***	3.517***	3.665***	3.655***	3.666***
	(0.0349)	(0.0387)	(0.0387)	(0.0387)	(0.0321)	(0.0350)	(0.0350)	(0.0350)
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	4,462,252	4,462,154	4,462,154	4,462,154	5,736,952	5,736,854	5,736,854	5,736,854
Adj. R-squared	0.095	0.095	0.095	0.095	0.100	0.100	0.100	0.100

Note: Standard Errors clustered at the firm level in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Table 8. Sectoral Differences

Dep. Variable:	(1) Tradeable ICR	(2) Non-tradeable ICR	(3) Tradeable ICR	(4) Non-tradeable ICR	(5) Tradeable ICR	(6) Non-tradeable ICR	(7) Tradeable ICR	(8) Non-tradeable ICR	(9) Tradeable ICR	(10) Non-tradeable ICR	(11) Tradeable ICR	(12) Non-tradeable ICR
Earnings to Assets ratio (t-1)	0.335***	0.241***	0.334***	0.241***	0.334***	0.241***	0.334***	0.241***	0.334***	0.241***	0.332***	0.242***
	(0.00965)	(0.00465)	(0.00965)	(0.00465)	(0.00965)	(0.00465)	(0.00965)	(0.00465)	(0.00965)	(0.00465)	(0.0104)	(0.00481)
Sales growth (t-1)	0.0527***	0.0538***	0.0528***	0.0538***	0.0528***	0.0538***	0.0528***	0.0538***	0.0527***	0.0538***	0.0533***	0.0557***
	(0.00243)	(0.00145)	(0.00243)	(0.00145)	(0.00243)	(0.00145)	(0.00243)	(0.00145)	(0.00243)	(0.00145)	(0.00272)	(0.00153)
Cash Flow (t-1)	0.0415***	0.0300***	0.0411***	0.0297***	0.0411***	0.0298***	0.0408***	0.0297***	0.0410***	0.0297***	0.0445***	0.0293***
	(0.00783)	(0.00408)	(0.00783)	(0.00408)	(0.00783)	(0.00408)	(0.00783)	(0.00408)	(0.00783)	(0.00408)	(0.00853)	(0.00423)
Liabilities to Capital ratio (t-1)	-0.0928***	-0.0283***	-0.0922***	-0.0277***	-0.0921***	-0.0277***	-0.0932***	-0.0279***	-0.0923***	-0.0278***	-0.0809***	-0.0278***
	(0.00569)	(0.00298)	(0.00569)	(0.00299)	(0.00569)	(0.00299)	(0.00569)	(0.00300)	(0.00569)	(0.00299)	(0.00619)	(0.00309)
log Total Assets (t-1)	-0.328***	-0.262***	-0.329***	-0.262***	-0.329***	-0.261***	-0.329***	-0.262***	-0.329***	-0.262***	-0.335***	-0.267***
	(0.00368)	(0.00222)	(0.00369)	(0.00222)	(0.00369)	(0.00222)	(0.00369)	(0.00222)	(0.00369)	(0.00222)	(0.00425)	(0.00235)
GDP growth (t-1)	0.158***	0.323***	0.134**	0.336***	0.131**	0.332***	0.141**	0.336***	0.142**	0.341***	0.188***	0.385***
	(0.0554)	(0.0432)	(0.0591)	(0.0467)	(0.0591)	(0.0467)	(0.0591)	(0.0467)	(0.0590)	(0.0468)	(0.0666)	(0.0508)
REER growth (t-1)	0.218***	0.166***	0.181***	0.149***	0.178***	0.139***	0.179***	0.149***	0.173***	0.144***	0.285***	0.159***
	(0.0194)	(0.0192)	(0.0202)	(0.0198)	(0.0202)	(0.0198)	(0.0203)	(0.0198)	(0.0204)	(0.0201)	(0.0334)	(0.0294)
ToT growth (t-1)	0.0859***	0.126***	0.0868***	0.119***	0.0856***	0.120***	0.0864***	0.119***	0.0845***	0.118***	-0.0913***	0.0289
	(0.0254)	(0.0222)	(0.0254)	(0.0224)	(0.0254)	(0.0224)	(0.0254)	(0.0224)	(0.0255)	(0.0224)	(0.0321)	(0.0259)
Government Expenditure Forecast Error (t)	-0.00834***	-0.0109***	-0.00799***	-0.0111***	-0.0312***	-0.0381***	-0.00462***	-0.0107***			-0.0105***	-0.0110***
	(0.00120)	(0.000925)	(0.00121)	(0.000950)	(0.00692)	(0.00458)	(0.00179)	(0.00123)			(0.00172)	(0.00133)
Public Debt to GDP ratio (t-1)			-0.00188***	-0.00107***	-0.00186***	-0.00105***	-0.00188***	-0.00107***	-0.00193***	-0.00110***	-0.00242***	-0.00192***
			(0.000250)	(0.000198)	(0.000250)	(0.000198)	(0.000250)	(0.000198)	(0.000251)	(0.000200)	(0.000281)	(0.000219)
Government Expenditure to GDP ratio (t-1)			-0.000534	0.000411	-0.000371	0.000518	-0.000516	0.000414	-0.000494	0.000444	-0.00229***	-0.000380
			(0.000739)	(0.000571)	(0.000739)	(0.000571)	(0.000739)	(0.000571)	(0.000740)	(0.000572)	(0.000785)	(0.000595)
Government Expenditure Forecast Error (t)*log Total Assets (t-1)					0.00170***	0.00219***						
					(0.000464)	(0.000348)						
Government Expenditure Forecast Error (t)*Liabilities to Capital ratio (t-1)							-0.00646**	-0.000583				
							(0.00265)	(0.00140)				
Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)>0)									-0.0109***	-0.0121***		
									(0.00195)	(0.00142)		
Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)<0)									-0.00300	-0.00917***		
									(0.00251)	(0.00187)		
Govt. Forecast Error Variance (t-1)											-0.000982	-0.00268***
											(0.000838)	(0.000621)
Government Expenditure Forecast Error (t)*Govt. Forecast Error Variance (t-1)											0.00196***	-0.000277
											(0.000683)	(0.000539)
Constant	4.625***	3.497***	4.695***	3.517***	4.687***	3.505***	4.696***	3.517***	4.694***	3.516***	4.766***	3.586***
	(0.0562)	(0.0634)	(0.0605)	(0.0688)	(0.0605)	(0.0689)	(0.0605)	(0.0688)	(0.0605)	(0.0688)	(0.0672)	(0.0704)
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,209,904	3,252,350	1,209,839	3,252,317	1,209,839	3,252,317	1,209,839	3,252,317	1,209,839	3,252,317	1,017,858	2,974,890
Adj. R-squared	0.132	0.082	0.132	0.082	0.132	0.082	0.132	0.082	0.132	0.082	0.130	0.081

Note: Standard Errors clustered at the firm level in parenthesis

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

Table 9. The Role of Firm Size

Dep. Variable:	(1) ICR	(2) ICR	(3) ICR	(4) ICR
Earnings to Assets ratio (t-1)	0.257***	0.257***	0.257***	0.255***
	(0.00418)	(0.00418)	(0.00418)	(0.00436)
Sales growth (t-1)	0.0545***	0.0544***	0.0544***	0.0561***
	(0.00125)	(0.00125)	(0.00125)	(0.00134)
Cash Flow (t-1)	0.0331***	0.0328***	0.0327***	0.0337***
	(0.00362)	(0.00362)	(0.00362)	(0.00379)
Liabilities to Capital ratio (t-1)	-0.0409***	-0.0402***	-0.0402***	-0.0383***
	(0.00264)	(0.00264)	(0.00264)	(0.00277)
log Total Assets (t-1)	-0.276***	-0.277***	-0.276***	-0.285***
	(0.00190)	(0.00190)	(0.00193)	(0.00209)
GDP growth (t-1)	0.290***	0.300***	0.310***	0.365***
	(0.0344)	(0.0369)	(0.0372)	(0.0408)
REER growth (t-1)	0.186***	0.163***	0.159***	0.198***
	(0.0138)	(0.0143)	(0.0145)	(0.0227)
ToT growth (t-1)	0.111***	0.105***	0.108***	-0.0105
	(0.0169)	(0.0169)	(0.0170)	(0.0203)
Government Expenditure Forecast Error (t)	-0.0346***	-0.0343***		-0.0223***
	(0.00367)	(0.00368)		(0.00471)
Public Debt to GDP ratio (t-1)		-0.00138***	-0.00139***	-0.00197***
		(0.000158)	(0.000159)	(0.000177)
Government Expenditure to GDP ratio (t-1)		0.000328	0.000265	-0.00106**
		(0.000456)	(0.000458)	(0.000479)
Government Expenditure Forecast Error (t)*log Total Assets (t-1)	0.00197***	0.00194***		0.000845**
	(0.000268)	(0.000268)		(0.000348)
Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)>0)			-0.0164**	
			(0.00833)	
Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)<0)			-0.0427***	
			(0.00567)	
log Total Assets (t-1)*Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)>0)			0.000588	
			(0.000594)	
log Total Assets (t-1)*Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)<0)			0.00260***	
			(0.000426)	
Govt. Forecast Error Variance (t-1)				-0.0166***
				(0.00184)
Government Expenditure Forecast Error (t)*Govt. Forecast Error Variance (t-1)				-0.00280
				(0.00195)
log Total Assets (t-1)*Govt. Forecast Error Variance (t-1)				0.00134***
				(0.000150)
log Total Assets (t-1)*Govt. Forecast Error Variance (t-1)*Government Exenditure Forecast Error (t)				0.000301**
				(0.000149)
Constant	3.668***	3.697***	3.687***	3.810***
	(0.0349)	(0.0389)	(0.0392)	(0.0412)
Firm Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES
Observations	4,462,254	4,462,156	4,462,156	3,992,748
adj. R-squared	0.095	0.095	0.095	0.092

Note: Standard Errors clustered at the firm level in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Table 10. The Role of Firm Liabilities

Dep. Variable:	(1) ICR	(2) ICR	(3) ICR	(4) ICR
Earnings to Assets ratio (t-1)	0.258***	0.258***	0.258***	0.260***
	(0.00418)	(0.00418)	(0.00418)	(0.00437)
Sales growth (t-1)	0.0545***	0.0544***	0.0544***	0.0559***
	(0.00125)	(0.00125)	(0.00125)	(0.00134)
Cash Flow (t-1)	0.0330***	0.0326***	0.0326***	0.0337***
	(0.00362)	(0.00362)	(0.00362)	(0.00379)
Liabilities to Capital ratio (t-1)	-0.0413***	-0.0406***	-0.0417***	-0.0501***
	(0.00265)	(0.00265)	(0.00315)	(0.00295)
log Total Assets (t-1)	-0.277***	-0.277***	-0.277***	-0.281***
	(0.00190)	(0.00190)	(0.00190)	(0.00206)
GDP growth (t-1)	0.299***	0.305***	0.311***	0.359***
	(0.0343)	(0.0369)	(0.0370)	(0.0408)
REER growth (t-1)	0.193***	0.169***	0.164***	0.205***
	(0.0138)	(0.0143)	(0.0145)	(0.0227)
ToT growth (t-1)	0.110***	0.105***	0.104***	-0.0177
	(0.0169)	(0.0169)	(0.0170)	(0.0203)
Government Expenditure Forecast Error (t)	-0.00877***	-0.00879***		-0.00796***
	(0.00100)	(0.00101)		(0.00140)
Public Debt to GDP ratio (t-1)		-0.00139***	-0.00143***	-0.00223***
		(0.000158)	(0.000159)	(0.000176)
Government Expenditure to GDP ratio (t-1)		0.000200	0.000222	-0.000726
		(0.000456)	(0.000457)	(0.000478)
Government Expenditure Forecast Error (t)*Liabilities to Capital ratio (t-1)	-0.00184	-0.00190		-0.00467***
	(0.00124)	(0.00124)		(0.00160)
Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)>0)			-0.00772***	
			(0.00225)	
Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)<0)			-0.00951***	
			(0.00159)	
Liabilities to Capital ratio (t-1)*Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)>0)			0.000103	
			(0.00303)	
Liabilities to Capital ratio (t-1)*Government Expenditure Forecast Error (t)*1(Government Expenditure Forecast Error (t)<0)			-0.00268	
			(0.00191)	
Govt. Forecast Error Variance (t-1)				-0.00588***
				(0.000650)
Government Expenditure Forecast Error (t)*Govt. Forecast Error Variance (t-1)				-0.000134
				(0.000637)
Liabilities to Capital ratio (t-1)*Govt. Forecast Error Variance (t-1)				0.00527***
				(0.000623)
Liabilities to Capital ratio (t-1)*Govt. Forecast Error Variance (t-1)*Government Exenditure Forecast Error (t)				0.000708
				(0.000826)
Constant	3.674***	3.707***	3.707***	3.759***
	(0.0349)	(0.0389)	(0.0389)	(0.0407)
Firm Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES
Observations	4,462,254	4,462,156	4,462,156	3,992,748
Adj. R-squared	0.095	0.095	0.095	0.092

Note: Standard Errors clustered at the firm level in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Table 11. Fiscal Variables and Investment—October versus April Forecast Errors

	Using October Forecasts			Using April Forecasts		
	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Variable:	ICR	ICR	ICR	ICR	ICR	ICR
Earnings to Assets ratio (t-1)	0.258***	0.258***	0.258***	0.257***	0.256***	0.256***
	(0.00418)	(0.00418)	(0.00418)	(0.00427)	(0.00427)	(0.00428)
Sales growth (t-1)	0.0544***	0.0544***	0.0544***	0.0550***	0.0550***	0.0550***
	(0.00125)	(0.00125)	(0.00125)	(0.00128)	(0.00128)	(0.00128)
Cash Flow (t-1)	0.0331***	0.0327***	0.0327***	0.0302***	0.0300***	0.0296***
	(0.00362)	(0.00362)	(0.00362)	(0.00372)	(0.00372)	(0.00372)
Liabilities to Capital ratio (t-1)	-0.0409***	-0.0402***	-0.0402***	-0.0419***	-0.0415***	-0.0415***
	(0.00264)	(0.00264)	(0.00264)	(0.00273)	(0.00273)	(0.00273)
log Fixed Assets (t-1)	-0.277***	-0.277***	-0.277***	-0.279***	-0.279***	-0.278***
	(0.00190)	(0.00190)	(0.00190)	(0.00196)	(0.00196)	(0.00196)
GDP growth (t-1)	0.298***	0.299***	0.304***	0.239***	0.239***	0.191***
	(0.0343)	(0.0343)	(0.0369)	(0.0354)	(0.0354)	(0.0371)
REER growth (t-1)	0.194***	0.169***	0.170***	0.227***	0.201***	0.198***
	(0.0138)	(0.0141)	(0.0143)	(0.0186)	(0.0190)	(0.0191)
ToT growth (t-1)	0.111***	0.106***	0.105***	0.170***	0.159***	0.169***
	(0.0169)	(0.0168)	(0.0169)	(0.0173)	(0.0173)	(0.0174)
Government Expenditure Forecast Error (t)	-0.00980***	-0.00978***	-0.00985***	-0.00618***	-0.00528***	-0.00620***
	(0.000739)	(0.000739)	(0.000754)	(0.000530)	(0.000546)	(0.000577)
Public Debt to GDP ratio (t-1)		-0.00138***	-0.00139***		-0.00104***	-0.000903***
		(0.000156)	(0.000158)		(0.000166)	(0.000170)
Government Expenditure to GDP ratio (t-1)			0.000192			-0.00260***
			(0.000456)			(0.000483)
Constant	3.674***	3.711***	3.707***	3.686***	3.715***	3.791***
	(0.0349)	(0.0352)	(0.0389)	(0.0356)	(0.0359)	(0.0394)
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	4,462,254	4,462,254	4,462,156	4,307,390	4,307,390	4,307,292
Adj. R-squared	0.095	0.095	0.095	0.097	0.097	0.097

Note: Standard Errors clustered at the firm level in parenthesis

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

Table 12. Past Forecast Errors and Size of the Shock

Dep. Variable:	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR
Earnings to Assets ratio (t-1)	0.257***	0.257***	0.257***	0.258***	0.258***	0.258***
	(0.00421)	(0.00421)	(0.00421)	(0.00418)	(0.00418)	(0.00418)
Sales growth (t-1)	0.0549***	0.0549***	0.0549***	0.0544***	0.0544***	0.0544***
	(0.00126)	(0.00126)	(0.00126)	(0.00125)	(0.00125)	(0.00125)
Cash Flow (t-1)	0.0323***	0.0318***	0.0318***	0.0328***	0.0329***	0.0328***
	(0.00365)	(0.00365)	(0.00365)	(0.00362)	(0.00362)	(0.00362)
Liabilities to Capital ratio (t-1)	-0.0408***	-0.0400***	-0.0400***	-0.0400***	-0.0399***	-0.0402***
	(0.00267)	(0.00267)	(0.00267)	(0.00265)	(0.00265)	(0.00264)
log Fixed Assets (t-1)	-0.278***	-0.278***	-0.278***	-0.277***	-0.277***	-0.277***
	(0.00193)	(0.00193)	(0.00193)	(0.00190)	(0.00190)	(0.00190)
GDP growth (t-1)	0.286***	0.280***	0.283***	0.285***	0.262***	0.303***
	(0.0348)	(0.0348)	(0.0378)	(0.0366)	(0.0375)	(0.0369)
REER growth (t-1)	0.209***	0.177***	0.177***	0.161***	0.156***	0.169***
	(0.0178)	(0.0181)	(0.0181)	(0.0143)	(0.0144)	(0.0143)
ToT growth (t-1)	0.104***	0.0952***	0.0947***	0.115***	0.122***	0.106***
	(0.0172)	(0.0171)	(0.0173)	(0.0169)	(0.0171)	(0.0169)
Government Expenditure Forecast Error (t)	-0.00916***	-0.00904***	-0.00907***		0.00735***	-0.00849***
	(0.000762)	(0.000762)	(0.000770)		(0.00254)	(0.00111)
Public Debt to GDP ratio (t-1)		-0.00158***	-0.00159***	-0.00144***	-0.00146***	-0.00144***
		(0.000159)	(0.000161)	(0.000158)	(0.000158)	(0.000161)
Government Expenditure to GDP ratio (t-1)			0.000140	0.000191	5.38e-05	0.000257
			(0.000506)	(0.000455)	(0.000456)	(0.000459)
Government Expenditure Forecast Error (t-1)	0.00161**	0.00198***	0.00207***			
	(0.000722)	(0.000722)	(0.000789)			
Government Expenditure Forecast Error (t)*				-0.0106***	-0.0175***	
Dummy (FE>75th pctile or FE<25th pctile)				(0.000747)	(0.00252)	
Government Expenditure Forecast Error (t)*						-0.00187
Dummy (FE>mean + one st.dev. or FE<mean - one st.dev)						(0.00122)
Constant	3.683***	3.726***	3.724***	3.709***	3.716***	3.705***
	(0.0352)	(0.0355)	(0.0397)	(0.0388)	(0.0389)	(0.0389)
Firm Fixed Effects						
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	4,393,523	4,393,523	4,393,425	4,462,156	4,462,156	4,462,156
Adj. R-squared	0.095	0.095	0.095	0.095	0.095	0.095

Note: Standard Errors clustered at the firm level in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Table 13. Controlling for Banking Crises, Monetary Policy, and for Country-Specific Uncertainty

Dep. Variable:	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR	(7) ICR	(8) ICR
Earnings to Assets ratio (t-1)	0.258***	0.262***	0.261***	0.257***	0.257***	0.257***	0.257***	0.257***
	(0.00418)	(0.00429)	(0.00639)	(0.00418)	(0.00418)	(0.00419)	(0.00438)	(0.00438)
Sales growth (t-1)	0.0544***	0.0553***	0.0435***	0.0542***	0.0542***	0.0542***	0.0543***	0.0543***
	(0.00125)	(0.00131)	(0.00166)	(0.00125)	(0.00125)	(0.00125)	(0.00129)	(0.00129)
Cash Flow (t-1)	0.0327***	0.0300***	0.0534***	0.0321***	0.0321***	0.0323***	0.0252***	0.0258***
	(0.00362)	(0.00373)	(0.00570)	(0.00362)	(0.00362)	(0.00363)	(0.00379)	(0.00379)
Liabilities to Capital ratio (t-1)	-0.0402***	-0.0407***	-0.0790***	-0.0395***	-0.0391***	-0.0391***	-0.0349***	-0.0352***
	(0.00264)	(0.00271)	(0.00423)	(0.00265)	(0.00265)	(0.00265)	(0.00270)	(0.00270)
log Fixed Assets (t-1)	-0.277***	-0.282***	-0.288***	-0.276***	-0.276***	-0.277***	-0.280***	-0.280***
	(0.00190)	(0.00196)	(0.00280)	(0.00190)	(0.00190)	(0.00191)	(0.00200)	(0.00200)
GDP growth (t-1)	0.320***	0.169***	0.542***	0.366***	0.345***	0.334***	0.184***	0.0831*
	(0.0369)	(0.0396)	(0.0588)	(0.0371)	(0.0370)	(0.0370)	(0.0478)	(0.0471)
REER growth (t-1)	0.142***	0.179***	0.213***	0.107***	0.0846***	0.0825***	0.213***	0.220***
	(0.0172)	(0.0145)	(0.0163)	(0.0169)	(0.0170)	(0.0170)	(0.0147)	(0.0147)
ToT growth (t-1)	0.168***	0.102***	0.195***	0.159***	0.174***	0.168***	0.00429	0.0511***
	(0.0143)	(0.0199)	(0.0232)	(0.0143)	(0.0143)	(0.0143)	(0.0179)	(0.0178)
Government Expenditure Forecast Error (t)	-0.00978***	-0.0114***	-0.0191***	-0.0102***	-0.00935***	-0.00895***	-0.0135***	-0.0120***
	(0.000755)	(0.000794)	(0.00111)	(0.000755)	(0.000754)	(0.000759)	(0.000876)	(0.000866)
Public Debt to GDP ratio (t-1)	-0.00136***	-0.00117***	0.000728***	-0.00133***	-0.00146***	-0.00153***	-0.00166***	-0.00156***
	(0.000158)	(0.000161)	(0.000210)	(0.000158)	(0.000158)	(0.000162)	(0.000165)	(0.000166)
Government Expenditure to GDP ratio (t-1)	2.03e-05	-0.000889*	-0.00252***	0.000282	0.000197	7.45e-05	0.00301***	0.00130***
	(0.000457)	(0.000488)	(0.000638)	(0.000457)	(0.000457)	(0.000457)	(0.000497)	(0.000483)
Banking Crisis (t)	-0.137***							
	(0.0182)							
Banking Crisis (t-1)	0.177***							
	(0.0157)							
Change in policy rate (t)		-0.00319***						
		(0.000443)						
Change in short-term rate (t)			-0.00431***					
			(0.00120)					
Inflation deviation (t)				-0.00157***				
				(0.000129)				
Inflation deviation (t-1)					-0.00160***	-0.00145***		
					(0.000101)	(0.000117)		
Inflation deviation (t-2)						-0.000236***		
						(7.80e-05)		
World Uncertainty Index (t-1)							-0.100***	
							(0.00569)	
Change in World Uncertainty Index (t-1)								-0.0423***
								(0.00422)
Constant	3.625***	3.825***	4.123***	3.667***	3.664***	3.672***	3.696***	3.729***
	(0.0398)	(0.0403)	(0.0508)	(0.0390)	(0.0391)	(0.0391)	(0.0399)	(0.0398)
Firm Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	4,462,156	4,193,262	2,399,409	4,462,254	4,462,156	4,462,156	4,243,479	4,243,479
Adj. R-squared	0.095	0.097	0.078	0.095	0.095	0.095	0.096	0.096

Note: Standard Errors clustered at the firm level in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Table 14. Controlling for General Government Primary Balances and Sovereign Ratings

Dep. Variable:	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR
Earnings to Assets ratio (t-1)	0.258***	0.258***	0.258***	0.258***	0.258***	0.262***
	(0.00418)	(0.00418)	(0.00418)	(0.00418)	(0.00418)	(0.00425)
Sales growth (t-1)	0.0544***	0.0543***	0.0543***	0.0544***	0.0544***	0.0556***
	(0.00125)	(0.00125)	(0.00125)	(0.00125)	(0.00125)	(0.00129)
Cash Flow (t-1)	0.0327***	0.0325***	0.0325***	0.0327***	0.0327***	0.0309***
	(0.00362)	(0.00362)	(0.00362)	(0.00362)	(0.00362)	(0.00368)
Liabilities to Capital ratio (t-1)	-0.0401***	-0.0400***	-0.0400***	-0.0402***	-0.0402***	-0.0409***
	(0.00265)	(0.00265)	(0.00265)	(0.00264)	(0.00265)	(0.00269)
log Fixed Assets (t-1)	-0.277***	-0.277***	-0.277***	-0.277***	-0.277***	-0.280***
	(0.00191)	(0.00191)	(0.00191)	(0.00190)	(0.00190)	(0.00193)
GDP growth (t-1)	0.287***	0.299***	0.296***	0.318***	0.319***	0.173***
	(0.0373)	(0.0370)	(0.0373)	(0.0370)	(0.0370)	(0.0384)
REER growth (t-1)	0.172***	0.164***	0.164***	0.165***	0.166***	0.141***
	(0.0144)	(0.0143)	(0.0144)	(0.0144)	(0.0144)	(0.0144)
ToT growth (t-1)	0.105***	0.117***	0.117***	0.110***	0.107***	0.0693***
	(0.0169)	(0.0171)	(0.0171)	(0.0170)	(0.0170)	(0.0195)
Government Expenditure Forecast Error (t)	-0.00995***	-0.0100***	-0.0100***	-0.00982***	-0.00989***	-0.00846***
	(0.000757)	(0.000756)	(0.000758)	(0.000755)	(0.000758)	(0.000765)
Public Debt to GDP ratio (t-1)	-0.00156***	-0.00168***	-0.00171***	-0.00134***	-0.00144***	-0.00115***
	(0.000171)	(0.000167)	(0.000174)	(0.000159)	(0.000162)	(0.000158)
Government Expenditure to GDP ratio (t-1)	0.000271	0.00177***	0.00174***	0.000717	0.000896*	-0.000744
	(0.000457)	(0.000545)	(0.000551)	(0.000506)	(0.000510)	(0.000473)
General Govt. Primary Balance (t)	0.00135**		0.000262			
	(0.000543)		(0.000583)			
General Government Primary Balance (t-1)		0.00333***	0.00323***			
		(0.000604)	(0.000648)			
Change in General Government Primary Balance (t)				-0.00125**	-0.000938*	
				(0.000505)	(0.000516)	
Change in General Government Primary Balance (t-1)					0.00134***	
					(0.000442)	
Fitch rating						0.0232***
						(0.00155)
Constant	3.708***	3.669***	3.670***	3.697***	3.695***	3.444***
	(0.0389)	(0.0406)	(0.0408)	(0.0403)	(0.0403)	(0.0439)
Firm Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Sector Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	4,462,156	4,462,117	4,462,117	4,462,117	4,461,964	4,280,275
Adj. R-squared	0.095	0.095	0.095	0.095	0.095	0.097

Note: Standard Errors clustered at the firm level in parenthesis. Fitch ratings are ordered numerically. A higher number is a higher credit rating with AAA taking value 26.

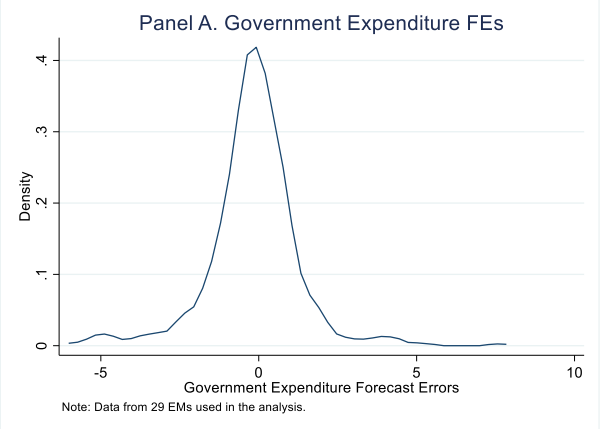
*** p<0.01, ** p<0.05, * p<0.1

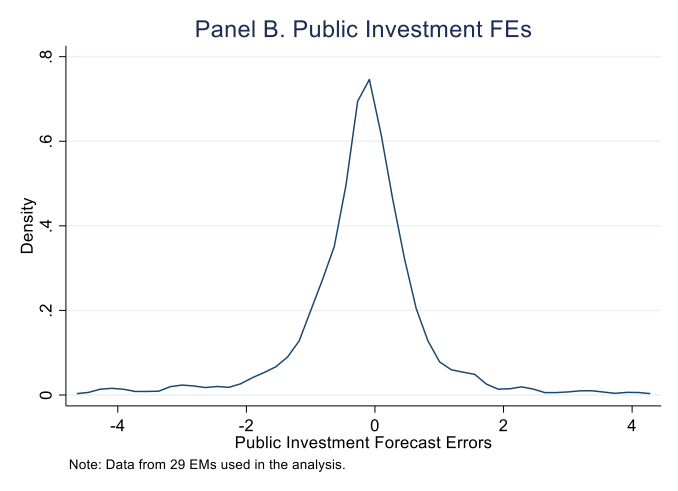
Table 15. Sales Growth and Investment-Capital Ratios

	(1)	(2)
Dep. Variable:	Sales growth	Sales growth
Earnings to Assets ratio (t-1)		-0.264***
		(0.00272)
Sales growth (t-1)		-0.210***
		(0.00104)
Cash Flow (t-1)		0.713***
		(0.00298)
Liabilities to Capital ratio (t-1)		0.000139
		(0.00164)
log Tangible Fixed Assets (t-1)	-0.0353***	-0.0402***
	(0.000543)	(0.000565)
ICR (t-1)	0.0108***	0.0235***
	(0.000385)	(0.000363)
GDP growth (t-1)	0.344***	0.601***
	(0.0217)	(0.0212)
REER growth (t-1)	-0.0359***	-9.01e-05
	(0.0101)	(0.00944)
ToT growth (t-1)	0.0413***	0.0723***
	(0.0108)	(0.0102)
Government Expenditure Forecast Error (t-1)	0.00343***	0.00171***
	(0.000453)	(0.000425)
Public Debt to GDP ratio (t-1)	0.000239***	0.000225**
	(8.77e-05)	(9.28e-05)
Government Expenditure to GDP ratio (t-1)	-0.00512***	-0.00332***
	(0.000273)	(0.000271)
Constant	0.644***	0.594***
	(0.0193)	(0.0195)
Firm Fixed Effects	YES	YES
Year Fixed Effects	YES	YES
Sector Fixed Effects	YES	YES
Observations	4,073,954	4,073,954
adj. R-squared	0.355	0.441

Note: Standard Errors clustered at the firm level in parenthesis.
*** p<0.01, ** p<0.05, * p<0.1

Figure 1. Kernel Density of Forecast Errors (FEs)





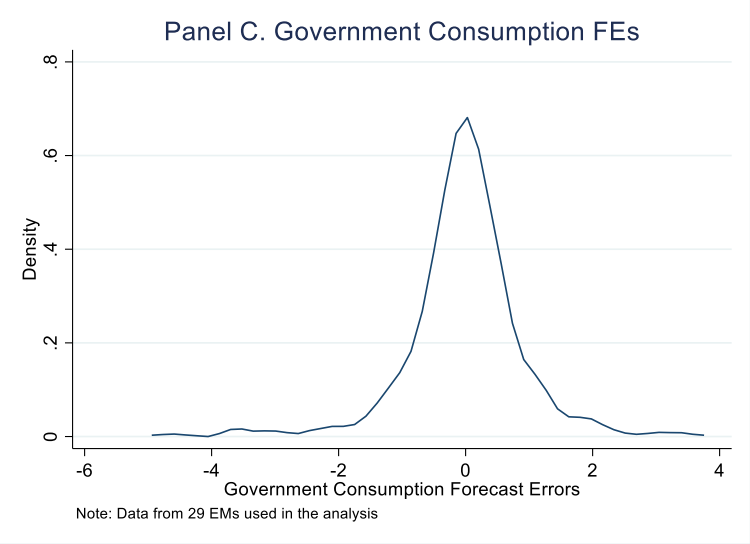
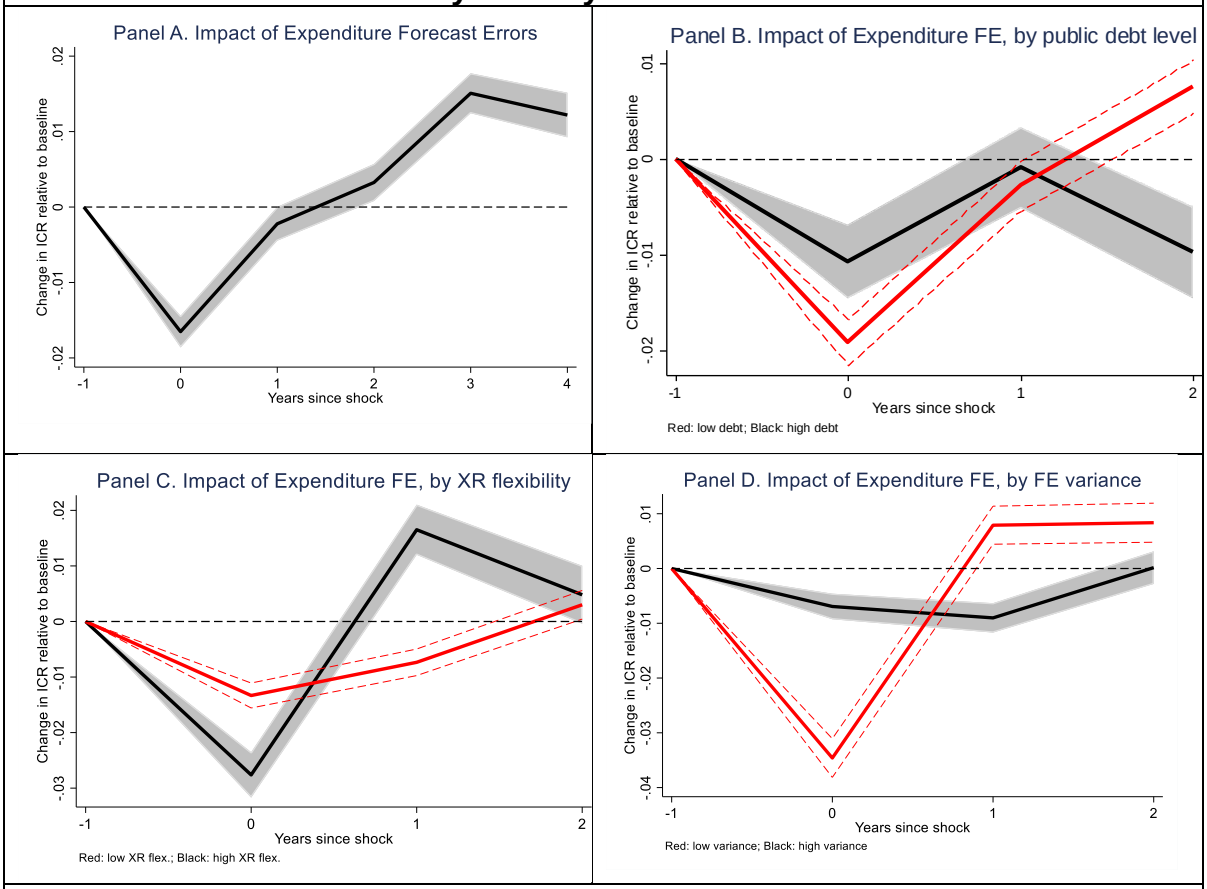
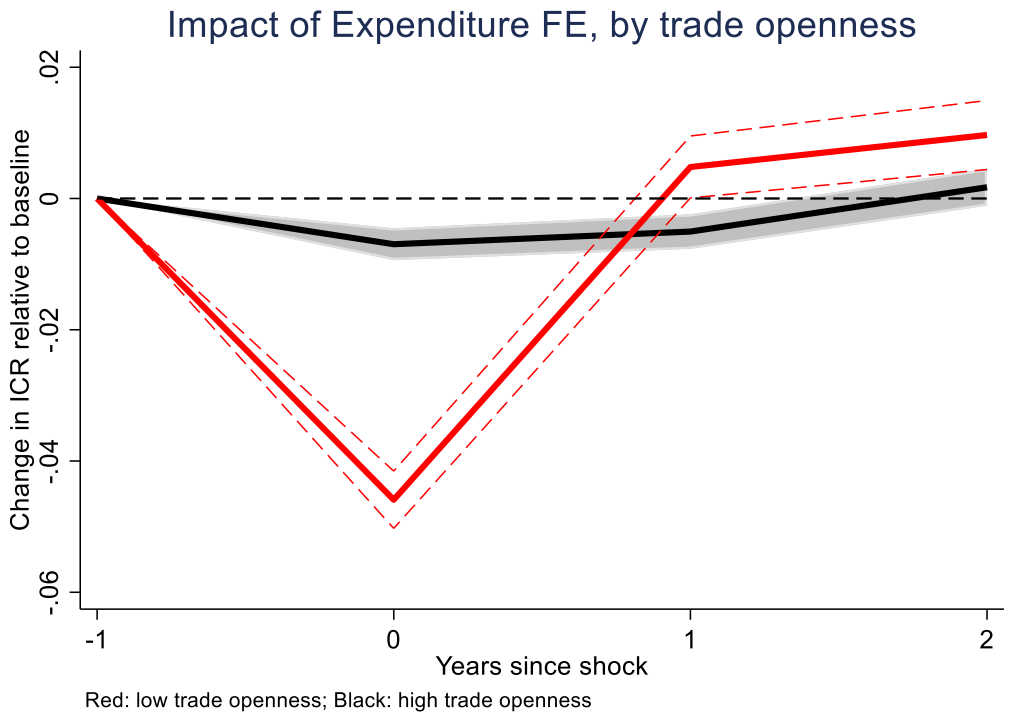


Figure 2. Dynamic Response of Investment Capital Ratios—Average Effects and by Country Characteristics



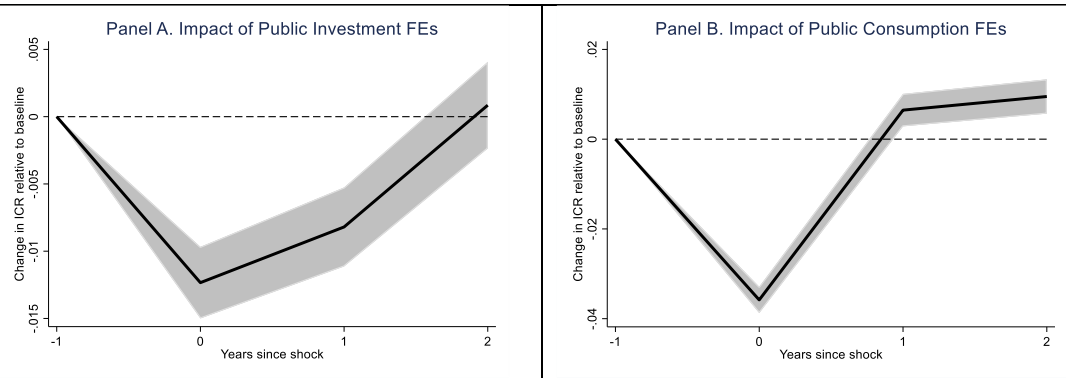
Note: Shaded area (dashed lines) indicates 95 percent confidence interval with standard errors clustered at the firm level.

Figure 3. Dynamic Response of Investment Capital Ratios—by Trade Openness



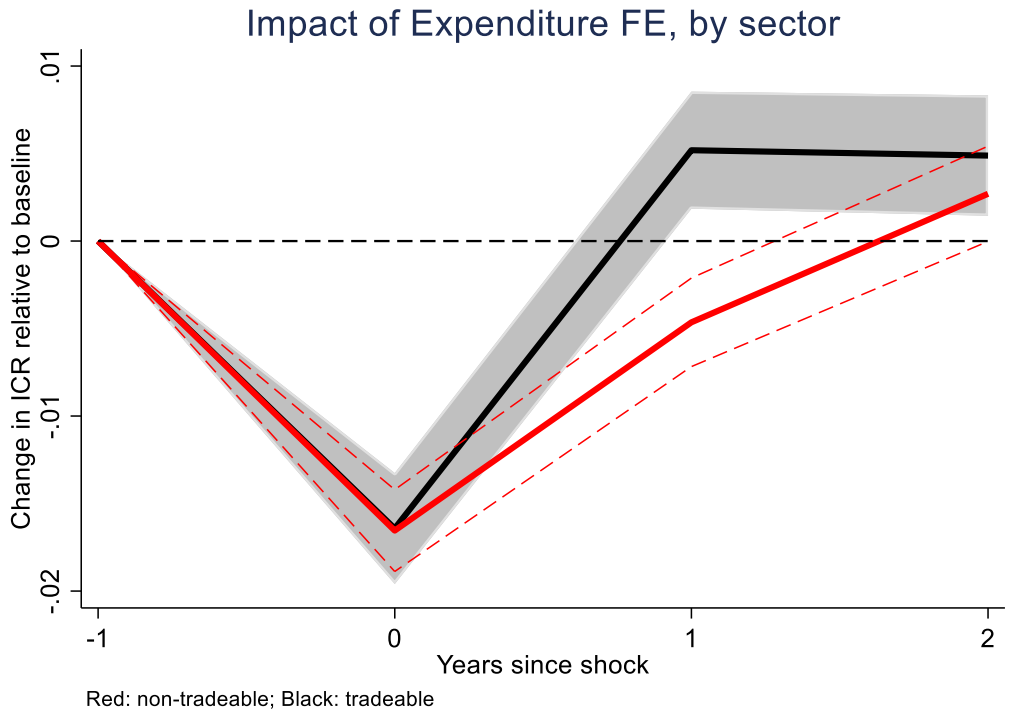
Note: Shaded area (dashed lines) indicates 95 percent confidence interval with standard errors clustered at the firm level.

Figure 4. Dynamic Response of Investment Capital Ratios—by Type of Government Expenditure Shock



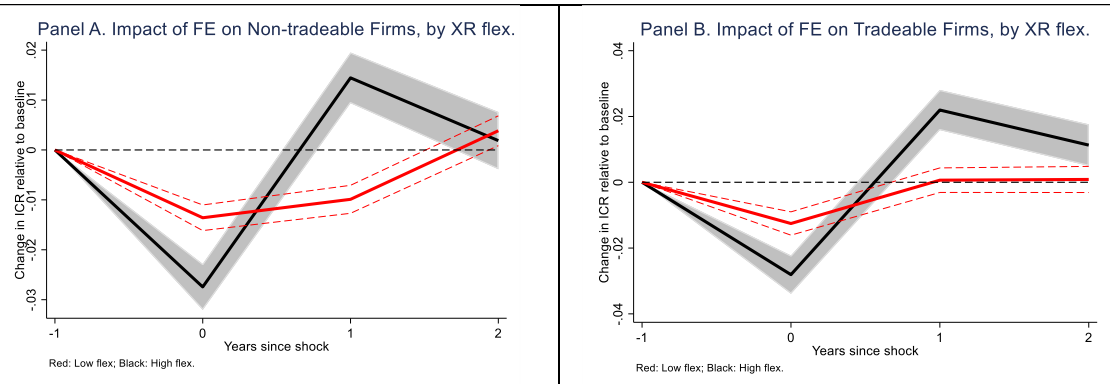
Note: Shaded area indicates 95 percent confidence interval with standard errors clustered at the firm level."

Figure 5. Dynamic Response of Investment Capital Ratios—by Sector of Operation



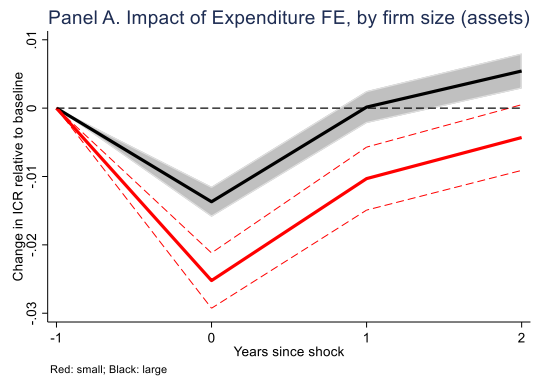
Note: Shaded area (dashed lines) indicates 95 percent confidence interval with standard errors clustered at the firm level.

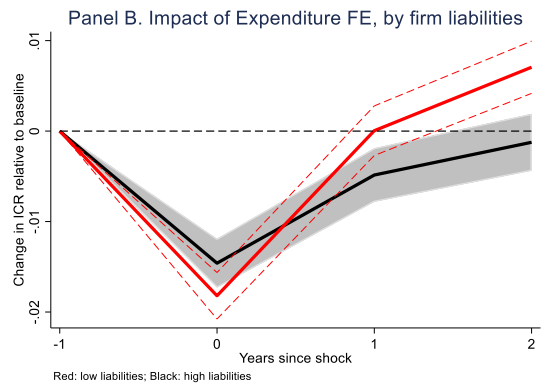
Figure 6. Dynamic Response of Investment Capital Ratios—by Sector of Operation and Exchange Rate Regime



Note: Shaded area (dashed lines) indicates 95 percent confidence interval with standard errors clustered at the firm level.

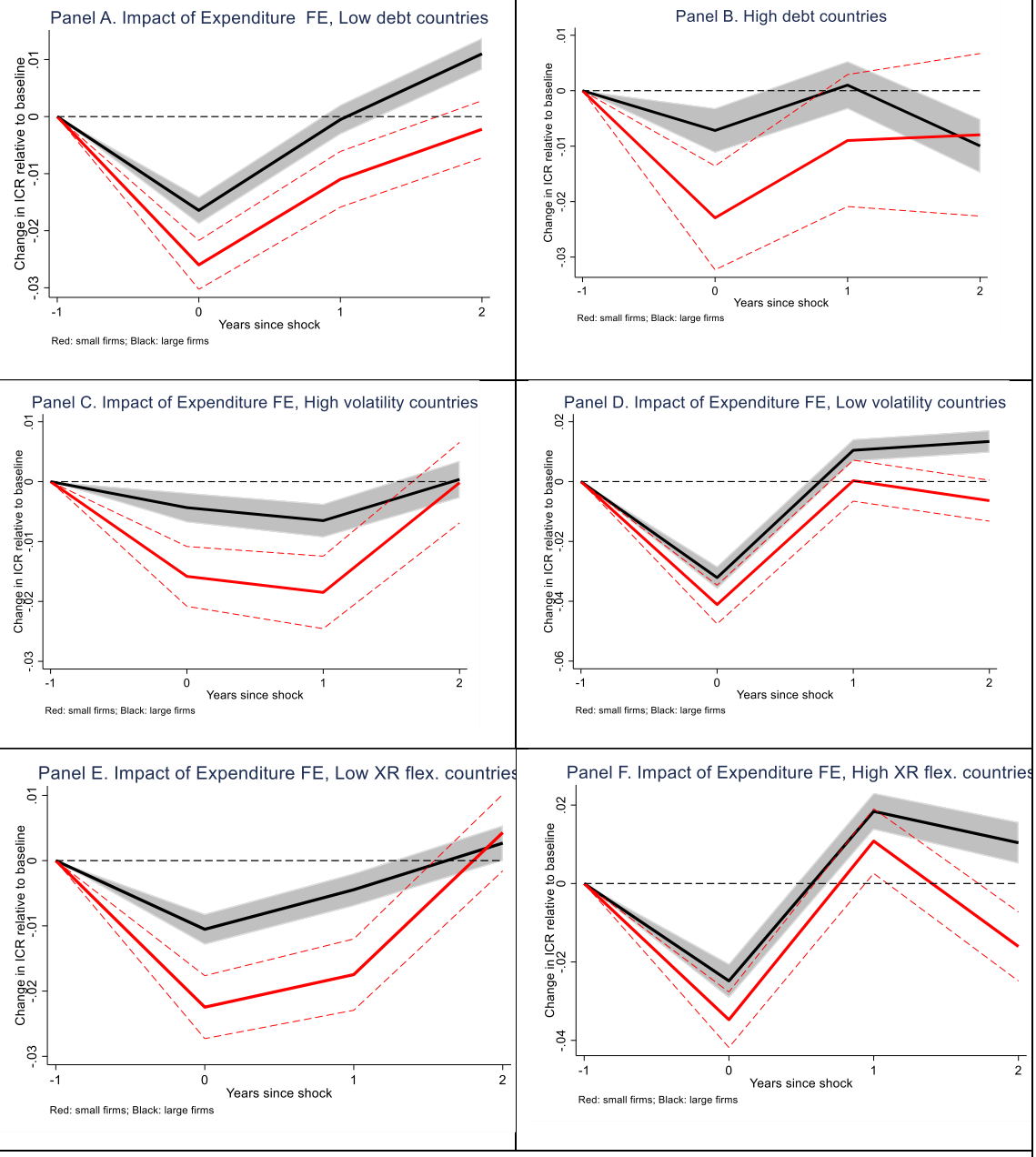
Figure 7. Dynamic Response of Investment Capital Ratios—by Firm Assets and Liabilities





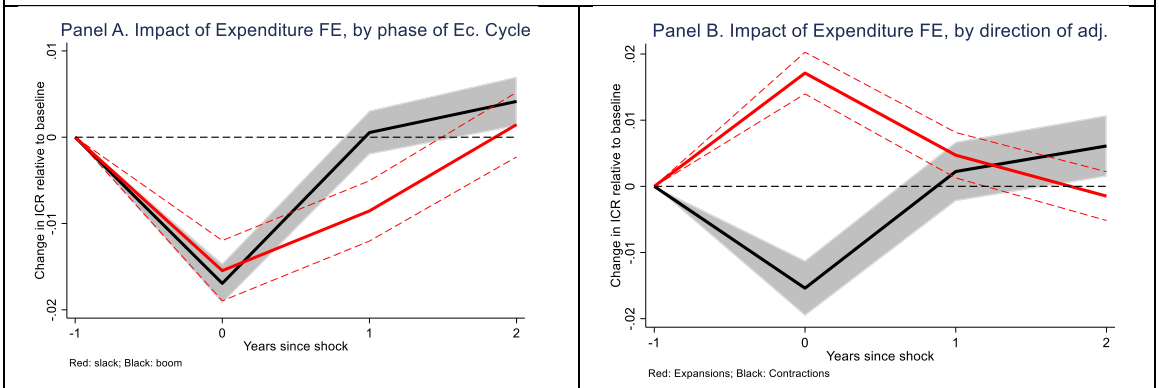
Note: Shaded area (dashed lines) indicates 95 percent confidence interval with standard errors clustered at the firm level.

Figure 8. Dynamic Response of Investment Capital Ratios—by Firm Assets and Country Characteristics



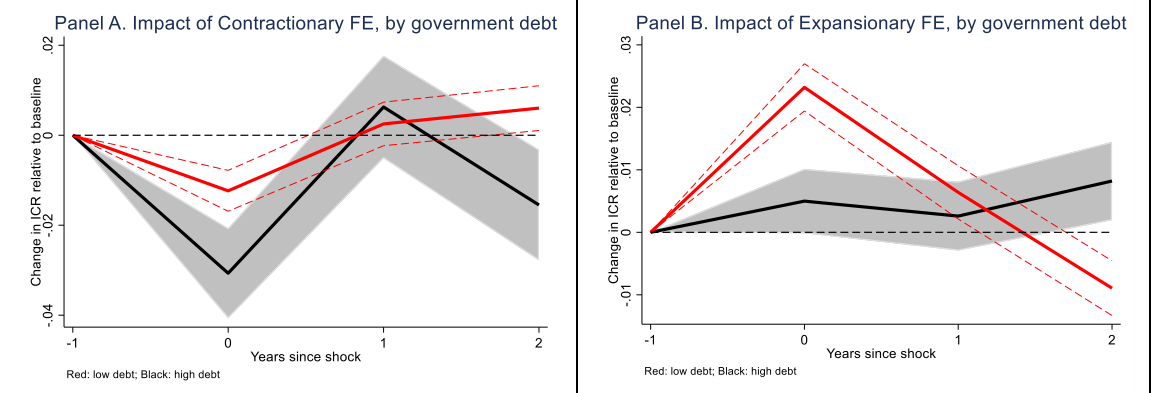
Note: Shaded area (dashed lines) indicates 95 percent confidence interval with standard errors clustered at the firm level.

Figure 9. Dynamic Response of Investment Capital Ratios—by Phase of the Cycle and by Direction of the Shock



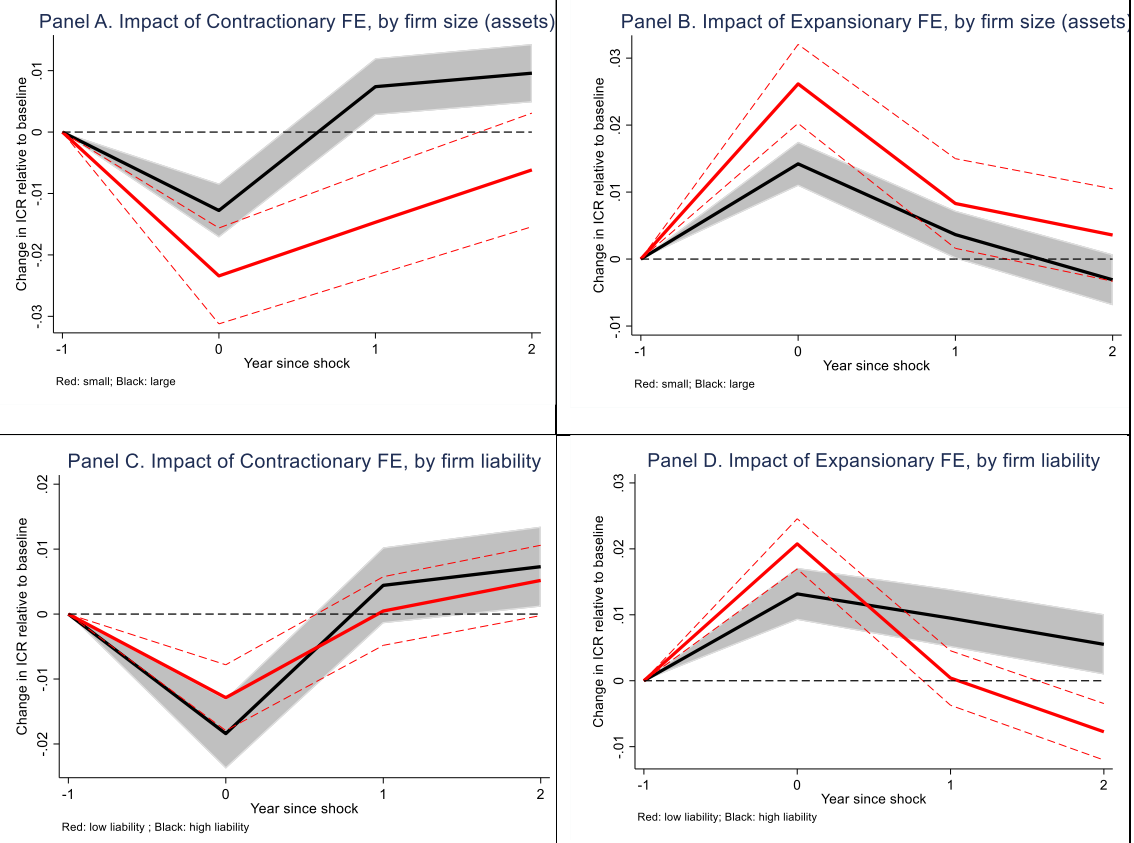
Note: Shaded area (dashed lines) indicates 95 percent confidence interval with standard errors clustered at the firm level.

Figure 10. Dynamic Response of Investment Capital Ratios—by Public Debt Levels and by Direction of the Shock



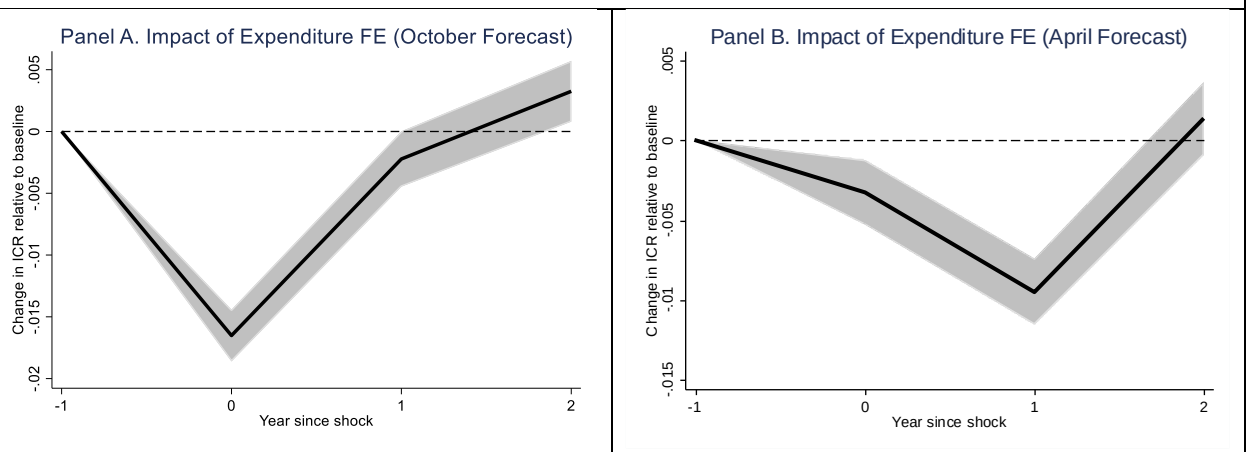
Note: Shaded area (dashed lines) indicates 95 percent confidence interval with standard errors clustered at the firm level.

Figure 11. Dynamic Response of Investment Capital Ratios—by Firm Characteristics and by Direction of the Shock



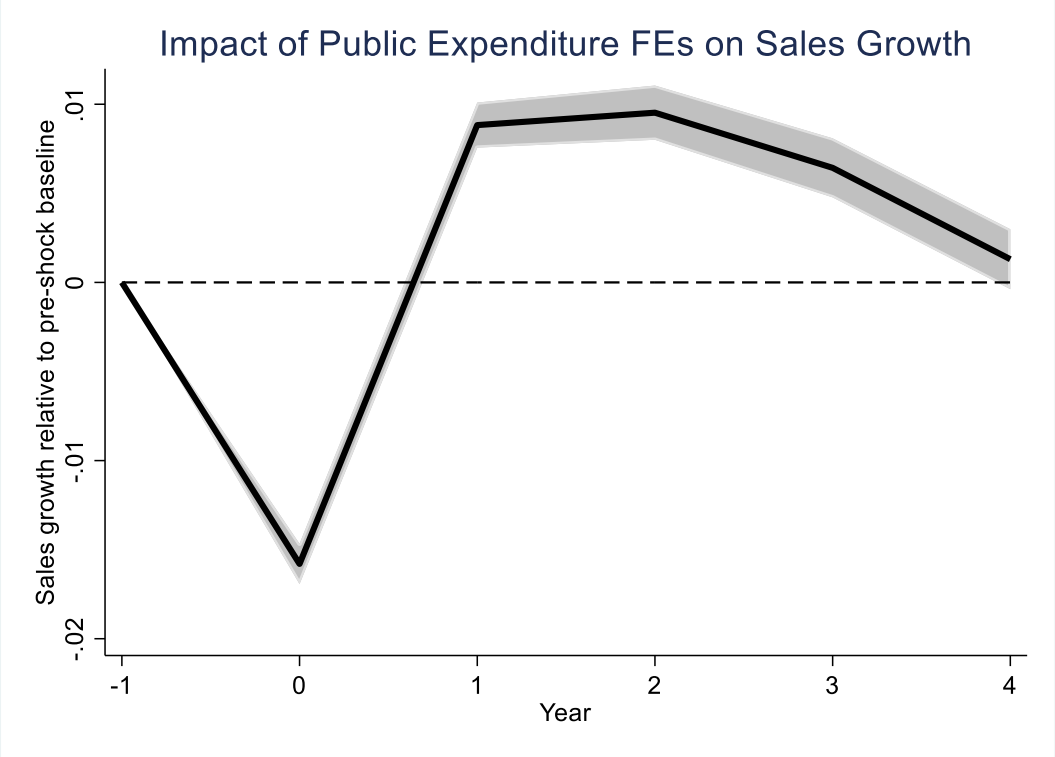
Note: Shaded area (dashed lines) indicates 95 percent confidence interval with standard errors clustered at the firm level.

Figure 12. Dynamic Response of Investment Capital Ratios—by WEO vintage



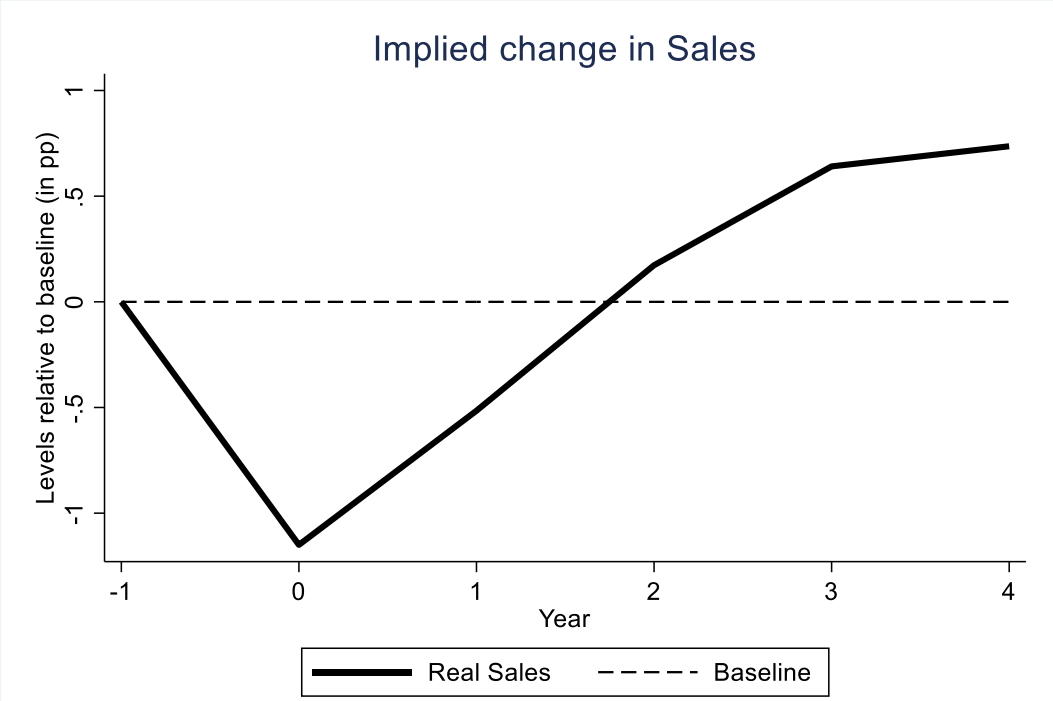
Note: Shaded area indicates 95 percent confidence interval with standard errors clustered at the firm level.

Figure 13. The dynamic response of Sales Growth in the Aftermath of Fiscal Shocks



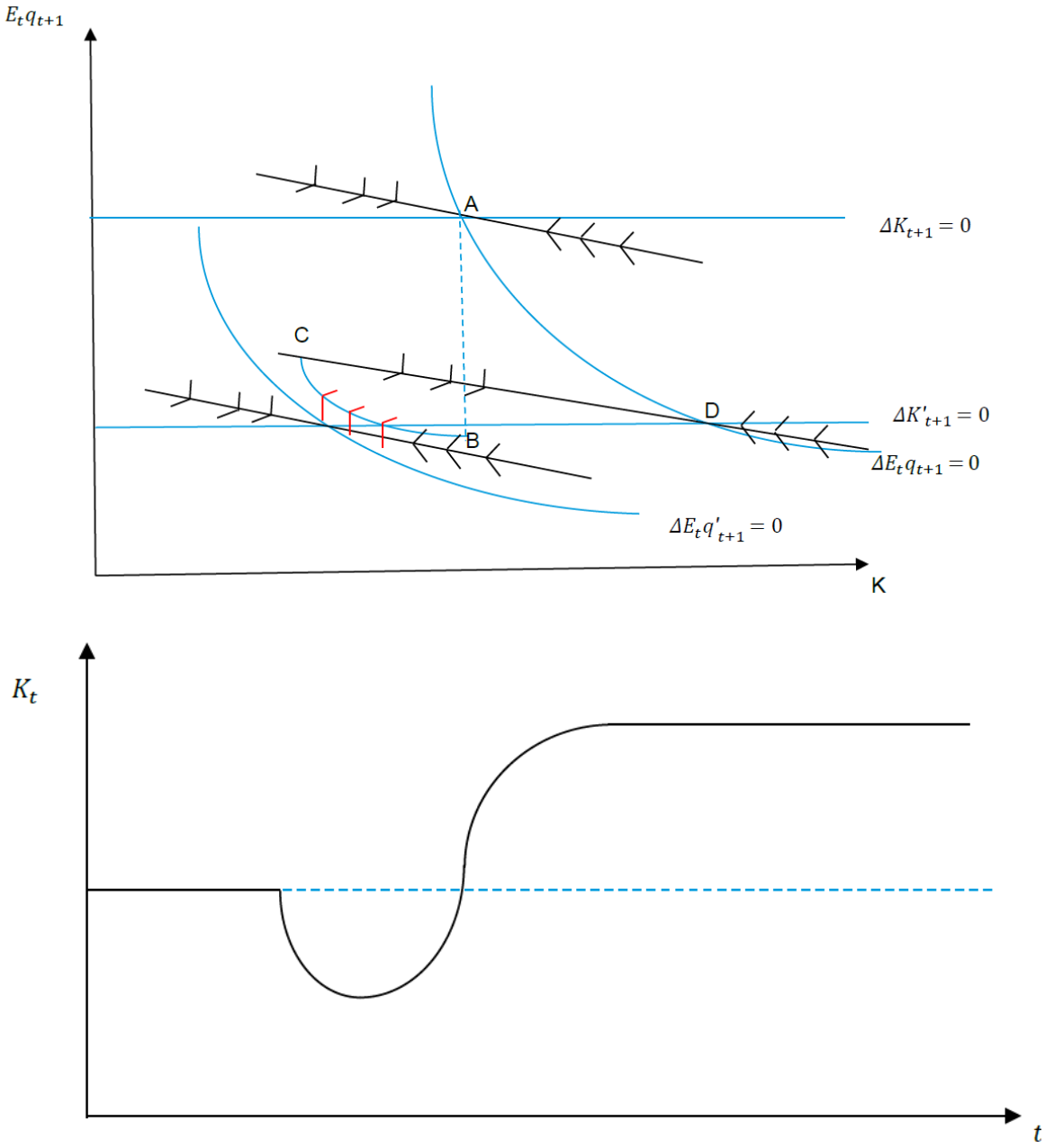
Note: Shaded area indicates 95 percent confidence interval with standard errors clustered at the firm level.

Figure 14. Implied Change in Sales



Note: Changes are calculated using the estimated sales growth Local projections in Figure 13.

Figure A.1. Dynamic Response to Fiscal Adjustments



APPENDIX: CORPORATE INVESTMENT AND FISCAL SHOCKS—A SIMPLE MODEL

The contribution of the paper is empirical. However, to motivate the empirical analysis above, this Appendix presents a modified *q* model of investment. The model illustrates the different channels through which fiscal policies could affect corporate investment decisions and underpins the expected dynamic response to these shocks.

We assume that the objective of a representative firm *f* in period *t* is to maximize the present discounted of the dividend flow, D_{t+i}:

$$max\, E_t \left[\sum_{i=0}^{\infty} \frac{D_{t+i}}{R^i}\right]$$

where R is the exogenous gross interest rate, which for simplicity we assume constant. In each period, the dividend flow is given by:

$$D_t = \pi(K_t, \theta_t) - p_t I_t - C(I_t, K_t)$$

such that the firm's profit function, π, depends on the stock of capital (*K*) and an exogenous demand shock, θ (which could be affected, for example, by unanticipated changes in the fiscal balance). Dividends also hinge on the cost of investment (*I*), which depends on the price of purchasing each additional unit of new capital, p, and on an adjustment cost function that is a function of the level of investment and the capital stock, $C(I_t, K_t)$. The profit function is assumed to be increasing and concave in the stock of capital, that is $\pi_K > 0$; $\pi_{KK} < 0$. We also assume that the profit function is monotonically increasing in the demand shifter, θ_t. The adjustment cost of installing new capital is an increasing and convex function of the investment-capital ratio (I_t/K_t). Given a constant rate of depreciation, δ, the stock of capital changes over time, given by

$$K_{t+1} = I_t + (1 - \delta)K_t$$

Fiscal policy can affect a firm's investment decision in two ways. First, a contractionary fiscal policy has an adverse effect on a firm's profit, by reducing demand, which in this case will be reflected in a downward movement in the demand shifter, θ_t. Second, we assume that the price of investment, p_t, is a decreasing function of the forecast error in the fiscal deficit (that is, an unexpected fiscal adjustment decreases the price of capital, and vice versa) as given by the standard crowding-out effect, such that:

$$p(FB_t); p'(.) < 0$$

Therefore, the firm's investment problem can be stated as solving the following Bellman's programing problem

$$V(K_t, \theta_t, p_t) = max_{I_t, K_{t+1}} \left\{\pi(K_t, \theta_t) - p_t I_t - C(I_t, K_t) + \frac{1}{R} E_t V(K_{t+1}, \theta_{t+1}, p_{t+1})\right\}$$

Plugging in the law of motion of capital and differentiating with respect to I_t (which is the control variable, K_t being the state variable), we get the following F.O.C.:

$$\frac{1}{R_t} E_t[V_K(K_{t+1}, \theta_{t+1}, p_{t+1})] - p_t = C_I(K_t, I_t)$$

The latter implies that the present value of the net marginal benefit (marginal gain minus the cost of an additional unit of capital) has to be equal to the marginal increase in the adjustment cost. Alternatively,

$$\frac{1}{R_t} E_t[V_K(K_{t+1}, \theta_{t+1}, p_{t+1})] = E_t q_{t+1} = p_t + C_I(K_t, I_t)$$

which equates the (marginal) Tobin's q—the presented discounted value of the shadow price of capital—with the replacement cost of capital plus the adjustment cost of installing new capital, that is, the effective price of new capital.

Assume a constant returns-to-scale adjustment cost of capital, given by the following quadratic function:

$$C(I_t, K_t) = \frac{b}{2}\left(\frac{I_t}{K_t} - \mu\right)^2 K_t$$

in which μ denotes the investment-to-capital ratio in steady state, which is associated with no adjustment costs. Intuitively, μK is the level of investment necessary to maintain a constant stock of capital in steady state. Based on this cost function and after plugging in the F.O.C., some reorganizing yields the following policy function for the investment-capital ratio:

$$\frac{I_t}{K_t} = \frac{1}{b}(E_t q_{t+1} - p_t) + \mu$$

Where q is the expected value of the firm of increasing the capital stock (that is, the shadow price of relaxing the constraint). Optimally, a higher q relative to the replacement cost of capital results in increased investment.

Using the envelope condition, we get,

$$q_t = \pi_K(K_t, \theta_t) - C_K(I_t, K_t) + (1 - \delta)E_t q_{t+1}$$

Or

$$\Delta q_{t+1} = \delta E_t q_{t+1} - \pi_K(K_t, \theta_t) + C_K(I_t, K_t)$$

In steady state $\Delta q_{t+1} = 0$, which implies

$$\delta E_t q_{t+1} = \pi_K(K_t, \theta_t) - C_K(I_t, K_t)$$

Thus, in steady state the slope of the $\Delta q_{t+1} = 0$ locus is negative in the (K, q) space (Figure A.1): $\partial q/\partial K < 0$, since $\pi_{KK}(K_t, \theta_t)$ <0 and $C_{KK}(I_t, K_t) > 0$.

Also, given the flow constraint for capital accumulation and the policy function for the investment-capital ratio:

$$\Delta K_{t+1} = K_{t+1} - K_t = I_t - \delta K_t = \left[\frac{1}{b}(E_t q_{t+1} - p_t) + \mu\right] K_t - \delta K_t$$

$$\Delta K_{t+1} = 0 \Leftrightarrow \mu - \delta + \frac{1}{b}[E_t q_{t+1} - p_t] = 0.$$

This implies that the locus $\Delta K_{t+1} = 0$ is represented by $E_t q_{t+1} = p_t + b[\delta - \mu]$, which has a zero slope in the (K, q) space.

To find the saddle-path, note that

$$\left.\frac{\partial \Delta E_t q_{t+1}}{\partial K_t}\right|_{\Delta q_{t+1}=0} = -\pi_{KK}(K_t, \theta_t) + C_{KK}(I_t, K_t) > 0$$

which means that any movement above the $\Delta q_{t+1} = 0$ locus points up. Also, given the ΔK_{t+1} equation,

$$\left.\frac{\partial \Delta K_{t+1}}{\partial \Delta E_t q_{t+1}}\right|_{\Delta K_{t+1}=0} = \frac{K_t}{b}$$

implying that the values of $E_t q_{t+1}$ above the $\Delta K_{t+1} = 0$ line are associated with K increasing (and vice versa). As a consequence, the saddle path has a negative slope (see Figure 1 for a graphical illustration).

Based on this set up, let's focus on the following policy experiment: an unanticipated fiscal adjustment. The latter has two effects:

1. It shifts the $\Delta K_{t+1} = 0$ locus down owing to the decrease in the price of capital, p; and

2. It temporarily shifts the $\Delta E_t q_{t+1} = 0$ locus down (for one period), given that the adjustment is contractionary, temporarily decreasing domestic demand, lowering θ_t and through that the marginal profitability of the existing capital stock, π_{KK}.

Our experiment will assume that the temporary decline in $\Delta E_t q_{t+1} = 0$ locus is short-lived, while the decline in the $\Delta K_{t+1} = 0$ locus is protracted due to stickiness in the price of capital (for example, because of slow adjustments in investment).[19] Thus, on impact the economy jumps A to B, which is consistent with the temporary equilibrium (Figure A.1). Once the $\Delta E_t q_{t+1} = 0$ locus returns to its original position after one period, the economy moves to point C, which is in the saddle-path corresponding to the new long-term equilibrium D, the point to which the economy converges.[20]

As can be seen in Figure A.1, after decreasing on impact, the stock of capital eventually reaches a higher steady state level. The latter result supports that, despite the short-run contraction, the expansionary impact of fiscal adjustment on corporate investment dominates.

[INSERT FIGURE A.1 HERE]

[19] We could further assume that in the long-run the price of capital decreases over time, even in the absence of fiscal adjustments, due to capital-biased technological change. If this is the case, we would have that investment stays above pre-shock levels.

[20] Note that since the new equilibrium is temporary, point B is on a divergent path. The latter is only path that will land the economy on point C, the instant the economy's steady state is given by point D.

PUBLICATIONS

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