Foreign Assets Management and Capital Expenditure: Firm-level Evidence from 45 Emerging Market Economies

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Abstract: This paper investigates the effects of foreign assets management (FAM), led by policymakers in emerging market economies, on companies' capital expenditure with international financial shocks (IFS). Using company-level data from 45 emerging market economies from 2005 to 2020, we employed a multiplicative regression setup for Tobin's Q ratio capital expenditure framework. First, our findings show that FAM positively affects capital expenditure; this impact is reinforced with stronger detrimental IFS. Second, the capacity to access foreign funding supports FAM policy, and more financially constrained companies are less responsive to FAM. Third, capital controls and macroprudential policies support FAM – they create a protective policy mix in the IFS context. The statistical significance of FAM's impact on companies' capital expenditure has an economic implication and is pertinent to the global economy. This study recommends coordinating macro-management policies to isolate companies' capital expenditure from IFS effectively.

Keywords: Foreign assets, financial shocks, capital expenditure
JEL classification: G31, F21, F38, F61

1. Introduction

The global financial crisis of 2008 that started in the United States created panic and chaos in countries and financial markets worldwide. Emerging markets were especially exposed and were highly affected. With sudden spikes in international financial risk, emerging market economies are susceptible to economic crises, such as sharp contraction, plummeting trade, credit supply crunch, capital flow reversals, and sudden stops. However, emerging market economies do not all experience the crisis in the same way. Accumulating many foreign assets and actively selling them during crisis periods to stabilise the financial market helps emerging market economies achieve good economic recovery post-crisis. Like a "leaning against the wind" strategy, policymakers implement a foreign assets management (FAM) policy – holding foreign assets during prosperous periods and using them during periods of stress and reversal of flows to protect the economy from financial uncertainty. Those assets are used as resources for intervening during a crisis, stabilising the financial market, and alleviating the adverse effects on the economy.

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International financial shocks (IFS) can increase uncertainty – they can raise the degree of risk perception by stakeholders and cause a high fall in domestic credit and a surge in capital outflows from emerging market economies (Voelker et al., 2008). For example, Aizenman et al. (2012) found that policymakers' FAM strategy is an efficient buffer facing IFS and typically improves emerging markets' financial conditions.

The present study examines the empirical impact of FAM on companies' capital expenditure in emerging market economies in the presence of global financial shocks. The empirical analysis was carried out through a canonical Q ratio capital expenditure model (Lima et al., 2004; Megna & Klock, 1993) and using annual data of 3,120 publicly listed companies in 45 emerging market economies from 2005 to 2020. We employ a multiplicative regression framework to examine the specific and interaction impacts of 'FAM' and 'Shock' on companies' capital expenditure (Brambor et al., 2006). Our results show that FAM has a favourable effect on companies' capital expenditure in emerging market economies and that the marginal impact is dependent on some characteristics of the IFS. In front of harmful IFS, the extent of the shock raises the marginal FAM impact. On the other hand, when the IFS is advantageous, the marginal FAM impact is oppositely correlated with the extent of the IFS. Furthermore, using alternative measures for IFS, companies' capital expenditure is reduced, although FAM alleviates its effect.

IFS may curb capital expenditure by intensifying economic doubtfulness and increasing capital cost (Kang et al., 2014). Arguably, financially constrained companies are more exposed to elevated financing costs. We prove that capital restrictions can lessen a company's reply to the FAM strategy and lower the regulating impact of FAM. Concerning the favourable FAM effect on capital expenditure, we find it weaker at about 35% for financially constrained companies than unconstrained companies.

Capital controls and a macroprudential policy are two policy tools deployed by emerging market economies to curb the adverse effects of IFS (Ostry et al., 2012). Our results show that in countries with capital controls, the impact of FAM on companies' capital expenditure is more substantial than in countries that do not impose capital controls. On the other hand, adopting a macroprudential policy reduces the adverse effects of harmful IFS. If used alone, a FAM strategy can fail to shield a financial market from external threats; both policy tools, capital controls, and the macroprudential policy play an equivalent function in mitigating the effects of detrimental IFS. Our results highlight the request for harmonised macro-management approaches to repel detrimental IFS and then support capital expenditure.

The present study contributes to previous studies in multiple ways. First, we determine the implication of FAM, IFS and their interactions in affecting capital expenditure at the company level in emerging market economies. We expand the macroeconomic foreign assets' impacts to a company-level analysis. Second, the study identifies different implications of the FAM policy on financially constrained and unconstrained companies. Third, we hypothesise and verify that FAM is related to two other restrictions policies – capital controls and macroprudential policy – as concerns of regulating capital expenditure in the context of IFS.

This paper is structured as follows. Section 2 presents the literature review. Section 3 displays the measurement for FAM and IFS. Section 4 outlines the empirical frame-

work, reports our main findings, and provides an economic interpretation. We perform some robustness checks in Section 5. The last section concludes.

2. Literature Review

In the present section, we review previous studies linked to financial uncertainty, companies' capital expenditure, and the protective function of foreign assets. Drawing on surveyed literature findings, we propose a credible theoretical linkage whereby FAM and IFS are combined to impact companies' capital expenditure.

Several influential papers outline theoretical mechanisms on a company level whereby financial incertitude panics may affect economic conditions via the financial friction channel. For example, Hwang (2012) included financial friction into a theoretical model. He showed that uncertainty impacts capital expenditure through this financial friction. Besides, he found that high uncertainty reduces the market value of companies, limits their access to credit markets, and constrains them to lower capital expenditure. Christiano et al. (2014) performed a financial friction model using the interest rate channel by authorising a company to accumulate loans with a risk premium in the event of default of payment. This risk premium will increase in the presence of random financial shocks. In a dynamic stochastic general equilibrium model setting, credit spreads fluctuate with changes in risk.

Considering potential nonperforming loans, Hennessy et al. (2007) modelled financial friction under the hypothesis of incomplete financial markets, and companies can obtain public credits without risk premium and may be insolvent. Peculiar panics happen after the employment of additional workers and before realising income expected from their hiring. The rise in incertitude generated by the fluctuation of peculiar productivity panics leads to more volatile revenues from any given amount of labour, a higher likelihood of default, and a higher cost of financing. At steady-state, Hennessy et al. (2007) proposed that a rise in instability conduct companies to withdraw workers additionally employed.

The financial friction theories are applied explicitly to companies benefiting from external funding; however, they are often subject to borrowing restrictions and constraints. For example, Fernández-Villaverde (2010) found that adverse international financial shock generates a contagion impact that worsens financial friction; furthermore, it restricts companies' external financing ability, then inflicting a negative effect on productivity, consumption and capital expenditure.

Emerging market economies commonly employ various policies to control the contagion of outside incertitude panics on a macroeconomic level (Ostry et al., 2012). One of these policies is holding foreign assets, used as insurance and a shield to face global panics, and may help to stabilise the economic and financial spheres. By supporting this reasoning, it should combine the studies' results focusing on the stabilising role of foreign assets in emerging market economies with the theoretical studies demonstrating how worsening financial frictions reduce companies' capital expenditure. The studies focusing on the foreign assets' stabilising role often highlight the role of foreign assets in reducing the probability of reversal capital flows or lowering the insolvency risk, thereby reducing the costs of the credit and improving well-being. The

theoretical studies demonstrating how worsening financial frictions reduce companies' capital expenditure was addressed previously. Sula (2011), for instance, presented a welfare-maximisation model with foreign assets through which government is a lender of last resort in the event of external shocks. Likewise, Tertytchnaya and De Vries (2019) suggested a model including a self-insure government financial tool expressly contingent on an output rise. The authors prove considerable income gains caused by the financial mechanism, which provides self-insure against reversal flows and shifts in their likelihood.

As well as reversal flows, foreign assets also have a function to reduce the risk of sovereign default/rollover. The Bianchi et al. (2018) model suggested that a government in debt should accumulate foreign assets by incurring loans exposed to insolvency. In case of a negative shock, an expected result of this process is a rise in sovereign spreads, becoming expensive when the government decides to renew its credits. On the other hand, the accumulation of foreign assets with a significant adverse shock may mitigate the effect of the shock by lowering the cost of debt, thus attenuating the decline in expenditure.

Addressing FAM and IFS, Ravenna and Walsh (2011) performed a model founded on the welfare of free capital movements with banking friction. Banks can sell their assets at low prices and use the accumulated foreign assets to buy them at low prices. In this context, the assets' selling price is determined through FAM and the fire-sale likelihood. The authors propose that an emerging market economy can alleviate financial friction through effective FAM to benefit from social welfare.

The empirical papers examining the impact of foreign asset management on a country's economic stability or the determinants of a firm's capital expenditure decisions focusing on financial shocks are rare. For instance, Aizenman et al. (2021) have examined the effects of active international reserve management conducted by central banks of emerging market economies on firm investment in the presence of global financial shocks. Using firm level data from 46 emerging market economies from 2000 to 2018, they found that active international reserves management positively affects firm investment – the effect strengthens with the magnitude of adverse external financial shocks. Besides, their results suggest that the country credit spread is a plausible causal channel of the positive international reserves effect on firm investment. Further, the results indicate the international reserves effect on firm investment is both statistically and economically significant and is relevant to the aggregate economy. In a macro-level, Dominguez et al. (2012) examined whether pre-crisis international reserve accumulations, as well as exchange rate and reserve policy decisions made during the global financial crisis, can help to explain cross-country differences in post-crisis economic performance. The authors use novel data to gauge how reserve accumulation policies influenced the economic and financial performance of countries during and after the global crisis. Their findings support the view that higher reserve accumulations prior to the crisis are associated with higher post-crisis GDP growth. Jermann and Quadrini (2012) documented the cyclical properties of US firms' financial flows and developed a model with debt and equity financing to explore how the dynamics of real and financial variables are affected by "financial shocks." The authors found that financial shocks contributed significantly to the observed dynamics of real and financial

variables. Recent events in the financial sector show up as a tightening of firms' financing conditions which contributed to the 2008-2009 recession.

3. FAM and IFS Measurements

A FAM strategy that accumulates foreign assets in normal times and sells them in panics events is simple in describing, however hard to measure. Nevertheless, the evaluation of FAM strategies is complicated by several issues. First, policymakers do not disclose details like the timing and sums of the purchase and sale of foreign assets. Second, there is some inaccuracy when measuring FAM from official data disclosed by financial authorities. For example, variations in foreign assets are due to interest income on these assets and the estimation effect that may explain this inaccuracy (both are adverse elements of FAM policy). Third, policymakers generally neglect the income and estimation effect of foreign assets. Moreover, these passive management components of FAM are difficult to estimate, as policymakers typically do not disclose the trade portfolios and currency composition of foreign assets. Finally, countries with extensive foreign asset holdings may under-report reserves to avoid criticism of mercantilist motives and excessive reserves.

Against this background, we use two proxies for FAM – the net foreign assets and international reserves. These proxies are employed to capture distinct FAM features linked with estimation effects, combined impacts of the interest rate, and time-varying impacts. In addition, we use net foreign assets to perform the main regression analysis and international reserves for the robustness check.

To empirically investigate how IFS impacts capital expenditure in emerging market economies, we use an independent measurement of IFS from both company and economy-specific circumstances. Centre country, the United States, causes shocks that spill over the whole world, maybe exogenous to company and country conditions. Considered a proxy of IFS in emerging market economies, our study applied the percentage variations of the federal funds rate ('Shock'). The US monetary policy creates a substantial spillover effect on the international financial market (Georgiadis, 2016; Obstfeld, 2021). The contagion impact of United States monetary policy spreads via the international financial system (Bruno & Shin, 2015) and the international debt market (Chen et al., 2016). Our study predicts that the United States monetary policy creates a contagion impact on companies' capital expenditure in emerging market economies.

We use four additional indexes for a robustness check. First, the VIX index is widely employed to assess risk aversion and international financial and economic uncertainty (noted VIX) (Bekaert et al., 2013). The VIX is an implicit instability index derived from the S&P 500 index, which originates in the United States, and generates international effects. Bonciani and Ricci (2020) found that a considerable percentage of assets price volatility is related to changes in the VIX index. The second index is the "Risk On/Off" (noted ROF) used by Chari et al. (2020). This index, proxy of IFS, captures the changes in risk-taking of multiple financial markets in the United States and Europe. The third and fourth indexes used in Baker et al. (2016) are the news-based US monetary policy uncertainty index and the US economic policy uncertainty index (MPU and EPU, respectively). Since big MPU and EPU show considerable incertitude distress caused by

the United States and spill over to emerging market economies, our study anticipates that both indexes generate a contagion impact on capital expenditure in emerging market economies.

4. Empirical Methodology

4.1 The Baseline Model for Companies' Capital Expenditure

Here we analyse the company-level evidence of FAM impacts on capital expenditure in emerging market economies with IFS. We outline an additive regression model using a canonical capital expenditure Q framework (Aizenman et al., 2021; Baumol & Braunstein, 1977; Claessens et al., 2010). The baseline model is defined as follows:

$$CE_{i,t} = \beta + \partial_j + £_t + \alpha_1 FAM_{c,t-1} + \alpha_2 Shock_t + \alpha_3 FAM_{c,t-1} * Shock_t + \boldsymbol{\gamma} X_{c,t} + \mu Z_{i,t} + \varepsilon_{i,t} \quad (1)$$

The dependent variable $CE_{i,t}$ is measured as $\frac{Capital\ expenditure_{i,t}}{Total\ assets_{i,t-1}}$, the ratio of the company's capital expenditure to total assets (Vogt, 1997), where subscripts *i*, *t*, and *c* denote company, year and country, respectively. ∂_j include fixed effects for the country, industry sector and company, while $£_t$ include the year effect.

$FAM_{c,t-1}$ represent the foreign assets management variable. In the beginning, we used net foreign assets as the FAM measurement for the regression analysis. We use FAM-1, a one-year-delayed variable, to control potential endogeneity. Besides, we generated a FAM variable that simultaneously eliminates common factors affecting FAM and capital expenditure. The variables relative GDP per capita, net capital inflows, and short-term external debts are included and define these common factors. These variables direct policymakers to cumulate foreign assets and companies to increase their capital expenditure. To purge the common factor effect, we run a regression of FAM on the ratio of national income per capita to the US national income per capita, the net international investment position, and the ratio of PPP convertor ratio to exchange rate (a measure of the relative price level), as well as the country and year effect. The residual of the regression is obtained as the FAM purged of common factors effect. The description of all variables used in this study and their summary statistics are reported in Table 2 and Table 3.

As previously discussed, '$Shock_t$' proxy the IFS. A positive variation of the federal funds rate indicates an adverse global financial shock; a higher value of 'Shock' variable, the worse the shock. An interaction term – $FAM_{c,t-1} \times Shock_t$ – is included to measure the overall impact of FAM on capital expenditure in the context of IFS, thus performing an additive regression of equation (1) (Baumol & Braunstein, 1977). The overall impact of FAM on capital expenditure valued through equation (1) is presented by $\partial_{CE}/\partial_{FAM} = \alpha_1 + \alpha_3 * Shock_t$, implying a dependence of the marginal impact of FAM to IFS – $Shock_t$. The corresponding standard errors are calculated by:

$$\hat{\sigma} = \sqrt{var(\hat{\alpha}_1) + Shock_t^2(\hat{\alpha}_3) + 2Shock_t\, cov(\hat{\alpha}_1, \hat{\alpha}_3)}$$

Similarly, the effect of $Shock_t$ is given by $\partial_{CE}/\partial_{Shockt} = \alpha_2 + \alpha_3 * FAM_{c,t-1}$, showing a dependence of the marginal impact of IFS on capital expenditure to FAM.

Table 1. Sampled countries

Country	No. of companies	Exchange rate arrangements	Financial development
Argentina	72	Floating	Low (0.314)
Bangladesh	15	Floating	Low (0.256)
Brazil	45	Floating	High (0.652)
Bulgaria	38	Currency board	Low (0.380)
Chile	41	Free floating	High (0.655)
China	515	Managed floating	High (0.572)
Colombia	28	Floating	Low (0.449)
Croatia	42	Stabilised arrangement	High (0.684)
Czech Republic	38	Floating	Low (0.360)
Egypt	29	Floating	Low (0.280)
Hong Kong	421	Floating	Low (0.827)
Hungary	61	Floating	Low (0.464)
India	124	Floating	Low (0.392)
Indonesia	92	Free floating	Low (0.322)
Jordan	31	Conventional peg	Low (0.414)
Kazakhstan	18	Floating	Low (0.311)
Kenya	12	Stabilised arrangement	Low (0.187)
Korea	81	Floating	High (0.854)
Kuwait	52	Conventional peg	Low (0.313)
Latvia	31	Free floating	Low (0.298)
Lithuania	29	Free floating	Low (0.273)
Malaysia	71	Free floating	High (0.685)
Mexico	32	Free floating	Low (0.396)
Morocco	36	Conventional peg	Low (0.471)
Nigeria	29	Stabilised arrangement	Low (0.138)
Oman	27	Conventional peg	Low (0.131)
Pakistan	12	Stabilised arrangement	Low (0.197)
Peru	24	Floating	Low (0.410)
Philippines	61	Floating	Low (0.365)
Poland	42	Free floating	Low (0.476)
Qatar	78	Conventional peg	Low (0.452)
Russia	125	Free floating	High (0.592)
Saudi Arabia	91	Conventional peg	High (0.530)
Singapore	102	Stabilised arrangement	High (0.731)
Slovakia	31	Free floating	Low (0.314)
Slovenia	28	Free floating	Low (0.464)
South Africa	43	Floating	High (0.618)
Sri Lanka	27	Crawl-like arrangement	Low (0.270)
Thailand	45	Floating	High (0.645)
Tunisia	15	Floating	Low (0.239)
Turkey	51	Floating	High (0.537)
Ukraine	32	Floating	Low (0.257)
United Arab Emirates	48	Conventional peg	High (0.624)
Venezuela	37	Other managed arrangement	Low (0.255)
Vietnam	29	Stabilised arrangement	Low (0.236)

Notes: The exchange rate arrangements for each country are obtained from the *IMF Annual Report of Exchange Arrangement and Exchange Restrictions* (updated in 2018). We classify free floating, floating and other managed arrangement as flexible exchange rate regime; otherwise, regimes are fixed. The sample contains 30 countries with flexible exchange rates and 15 countries with fixed exchange rates. For the column on financial development, we report the Svirydzenka (2016) financial development index values in parentheses. A country is classified as high-financially developed if the index exceeds 0.5. Therefore, the sample is composed of 13 high-financially developed countries and 32 low-financially developed.

Table 2. Variables description

Variable	Description
	Company features (Thomson Reuters Worldscope database)
Capital expenditure	The ratio of capital expenditure to total assets.
Q ratio	Measures the market value of a company divided by its assets' replacement cost
CF	Cash flow from operation measures, the cash flows generated and reflects the marginal product of capital.
TAS	Company total assets, a measure of the company size.
Sales	Sales expansion measures business growth.
For_Fun	A dummy variable, For_Fun = 1 if a company's ratio (Capital expenditure – Cash flows)/Capital expenditure) is less than the country-industry sector average ratio level to indicate a company is financially constrained and 0 indicates that the company is financially unconstrained.
TA	A dummy variable, TA = 1 if the ratio of tangible assets to long-term liabilities is less than the country-industry sector average ratio. Otherwise, TA = 0 indicates financially unconstrained companies.
CF_AS	A dummy variable, CF_AS = 1, if the cash flow ratio to total assets is less than the country-industry sector average level. Otherwise, CF_AS = 0 indicates financially unconstrained companies.
SAL	A dummy variable, SAL = 1 if a company is financially constrained, i.e., if its sales grow less than the country-industry sector average level. Otherwise, SAL = 0 indicates financially unconstrained companies.
	Macroeconomic context
Shock	The changes in the Fed's effective funds rate, source data from FRED, Federal Reserve Bank of St. Louis.
FAM	Net foreign assets, The World Bank WDI.
RES	Reserves and related items, The IFS, IMF.
RES_IMP	Reserves (% imports), The IFS, IMF.
RES_DEBT	Ratio of reserves to short-term external debt, The World Bank WDI.
RES_M2	Ratio of reserves to M2, The World Bank WDI.
GDP	The real GDP growth rate, The World Bank WDI.
CAB	The current account balance, The IFS, IMF.
CC	A dummy variable for capital controls; CC = 1 to indicate a country manages capital controls, if the country has Fernández et al. (2016) index value of <0.065; otherwise, CC = 0.
MP	A dummy variable for macroprudential policy, MP is measured based on the coarse classification index in Alam et al. (2019). We set MP = 1 to indicate countries that adopt macroprudential policy; MP = 0 to mark countries that don't apply a macroprudential policy.
	Alternatives proxies for International Financial Shocks
VIX	Index for the implied volatility of the S&P 500 stock option, FRED, Federal Reserve Bank of St. Louis.
ROF	The Chari et al. (2020) index "risk-on/risk off".
MPU	The news-based US monetary policy uncertainty index of Baker et al. (2016).
EPU	The news-based US economic policy uncertainty index of Baker et al. (2016).

Table 3. Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Capital expenditure	39821	0.0724	0.1180	0.0000	1.0681
Q ratio	39821	0.2151	0.2548	1.00E-06	2.4250
CF	30541	0.0704	0.2711	-37.6254	69.4896
TAS	31459	22.0740	2.9833	5.3927	33.4614
Sales	34827	0.0962	0.6330	-84.9367	111.9956
For_Fun	30905	-0.0001	0.1653	-38.3180	54.0414
TA	32854	0.0102	0.3364	-120.2350	28.7530
CF_AS	31985	5.0135	10.3768	-12.1350	51.1152
Shock	39821	1.1863	1.5226	0.0700	5.2400
FAM	39821	0.0012	0.0758	-0.6233	0.4254
RES	31520	1.3587	2.3870	0.1247	25.3279
RES_IMP	30982	0.4128	1.2579	0.0457	1.3429
RES_DEBT	29567	0.2376	2.9824	0.0845	5.6821
RES_M2	32640	0.4157	1.8546	0.0015	0.4571
GDP	39821	0.0529	0.0312	-0.1481	0.2617
CAB	39821	-1.6214	4.5076	-12.3875	16.3784
VIX	39821	15.3533	7.1617	6.2618	37.0060
ROF	39821	0.1638	1.3097	-3.6986	1.9119
MPU	39821	128.2747	28.1732	70.0833	176.4167
EPU	39821	96.5119	28.1954	56.0621	134.2509

Source: Author's calculations.

We control a couple of factors impacting capital expenditure in $X_{c,t}$ (Boateng et al., 2014; Muda & Naibaho, 2018) – the real GDP growth rate (GDP), which captures domestic capital expenditure opportunity (De Gregorio, 2005), and the current account balance (CAB), the main determinant of NFA (Lane & Milesi-Ferretti, 2001).

Following Aizenman et al. (2021), we include four common company-specific factors that determine capital expenditure behaviours in $Z_{i,t}$: 1) the Q ratio which measures the market value of a company divided by its market value assets (Q ratio), 2) cash flow from operation which measures the cash flows generated and reflects the marginal product of capital (CF), 3) company total assets which measures the company size (TAS), and 4) sales expansion measuring business growth (Sales). The existing literature has found that companies have higher capital expenditure when the Q ratio is higher, the company size is more prominent, and the business has higher cash flows and sales growth (Kadapakkam et al., 1998; Shin & Kim, 2002).

4.2 Data Sample

We use a pooled ordinary least square regression on cross-company annual data to estimate equation (1), and we control for effects of year, company, industry sector and country. At a company level, we calculated the cluster-robust standard errors. Company-

level statistics were collected from 3,120 publicly listed companies in 45 emerging market economies from 2005 to 2020 in the Thomson Reuters Worldscope database. Table 1 reports the sampled countries. We register the number of companies, the exchange rate regime and the financial development level for each country.

5. Results and Discussion

5.1 The Base Model for Company Capital Expenditure

Table 4 reports the results for the regression of equation (1). Without explicitly accounting for the possibility that the effect of FAM is conditional on IFS, Column (1) shows that FAM is positively correlated with capital expenditure while IFS ($Shock_t$) is negatively correlated with companies' capital expenditure. These findings align with previous studies presented in the literature review section (Fernández-Villaverde, 2010; Hwang, 2012). Besides, we found that higher current account surplus and real GDP growth promote capital expenditure in emerging market economies. The regression explains 12.1% of the capital expenditure variation (R^2 = 0.121).

Table 4. The impact of FAM on capital expenditure (with IFS)

	(1)	(2)	(3)
FAM	0.031***	0.028***	0.039***
	(0.005)	(0.004)	(0.006)
Shock	-0.091***	-0.093***	-0.096***
	(0.004)	(0.005)	(0.008)
FAM × Shock		0.075***	0.075***
		(0.011)	(0.021)
GDP	0.081***	0.069***	0.083***
	(0.011)	(0.014)	(0.019)
CAB	0.025***	0.014***	0.001
	(0.005)	(0.002)	(0.003)
Q ratio	0.029***	0.029***	0.029***
	(0.003)	(0.003)	(0.003)
CF	0.018**	0.019**	0.019**
	(0.008)	(0.008)	(0.009)
TAS	0.006***	0.006***	0.007***
	(0.001)	(0.001)	(0.001)
Sales	0.023***	0.021***	0.024***
	(0.004)	(0.007)	(0.008)
#Obs	39821	39821	39821
R^2	0.121	0.121	0.125

Notes: The table displays estimates for equation (1). FAM is measured by the net foreign assets/GDP ratio and one-year lag. We use, in column 3, FAM that removes the foreign assets collected via the increase in GDP per capita, surge of capital flows and short-term external debts. Standard errors are reported in parentheses. All panels include economy, industry sector, company and time effects. ***, **, * correspond to 1%, 5% and 10% significance.

The FAM effects conditional on IFS are reported in Column (2). The coefficients of α_1 and α_3 are positive and significant. The FAM marginal impact, consequently, is valued by '$0.03+0.041*Shock_t$', showing a positive association between FAM and capital expenditure. Besides, the overall impact is conditional on IFS – for a one standard deviation harmful IFS ($Shock_t$ = 0.093). A 1% increase in FAM is associated with a higher company capital expenditure ratio of about 2.8% (coefficient of FAM in column (2) in Table 4). This result is consistent with our expectation since an accumulation of foreign assets might enable emerging market economies to raise their capital expenditure. To better assess the economic significance of the impacts of FAM, we used the median company size in the gross domestic product average of each economy to evaluate the aggregated effects of FAM on companies' capital expenditure in that country. We found that the accumulation of 1 billion US dollars of foreign assets is associated with a capital expenditure of about 0.93 million more in the presence of one standard deviation of $Shock_t$ (1 – 0.93/0.93 = 0.075 is the coefficient of FAM × Shock in Column (2) in Table 4).

Column (3) presents the results using the FAM measurement purged of impacts from GDP per capita, net capital inflows and short-term external debts. Again, equivalent results are found unless the variables associated with FAM have more significant impacts. Our findings are more meaningful after considering the potential endogeneity problem arising from specific drivers affecting FAM and capital expenditure concurrently. Indeed, the estimated effect of FAM is even more prominent after controlling for the impact of the common factors.

5.2 Company Heterogeneity: Financially Constrained/Unconstrained

To finance their capital expenditure, companies often borrow externally, especially those in the corporate sector in emerging economies, and this trend has increased substantially at the beginning of the 2000s (Coppola et al., 2021). Nevertheless, crises and financial shocks that disrupt total loan availability and the resulting sudden stops of capital flows hinder companies' access to the international capital market. Moreover, companies with different financial constraints show different expenditure patterns when faced with uncertainty shocks.

This part examines how companies' capital expenditure responds differently to FAM in the presence of IFS and considers the financial restrictions applied to these companies. Accordingly, we expand our baseline model through a financial restriction proxy – $RESTRICT_{i,t}$ – and its interaction term with $FAM_{c,t-1}$, $Shock_t$, and $FAM_{c,t-1}*Shock_t$, as follows:

$$CE_{i,t} = \beta + \partial_j + £_t + \alpha_1 FAM_{c,t-1} + \alpha_2 Shock_t + \alpha_3 FAM_{c,t-1}*Shock_t + \varphi_1 RESTRICT_{i,t} + \varphi_2 RESTRICT_{i,t}*FAM_{c,t-1} + \varphi_3 RESTRICT_{i,t}*FAM_{c,t-1}*Shockt + \boldsymbol{\gamma} X_{c,t} + \mu Z_{i,t} + \varepsilon_{i,t} \quad (2)$$

We use the heterogeneity-based difference-in-difference approach (Liu et al., 2021; Ravallion & Chen, 2005) to generate dichotomous dummy variables that categorise a company as financially constrained or unconstrained. We define three firm-level financial constraint measurements included in $RESTRICT_{i,t}$ in equation (2). Our first financial restraint measure is the company's ability to access foreign funding, calculated

through the ratio (capital expenditure – cash flows)/capital expenditure (Rajan & Zingales, 1998). We argue that higher ratio measurement in emerging markets may indicate firms' superior borrowing capability, reflecting firms' better access to external finance sources (possibly superior management, better reputation, etc.). Due to periods of adverse global financial shocks, high borrowing capacity firms access more external fund sources than lower capacity firms. We generate – For_Fun = 1 – to denote a company as constrained when the percentage is lower than the economy average and 0 for an unconstrained company. Tangible assets to long-term liabilities is our second ratio. Since tangible assets are employed to lower default on long-term credit, a smaller insolvency risk is associated with a higher ratio of tangible assets to long-term debt. A dummy variable 'TA' is generated. TA = 1, when the ratio is lesser than the country-industry sector average level, and 0 for unconstrained companies.

Cash flow to total assets (CF_AS) is our third ratio. If the ratio value is lower than the economy average, the company is constrained. Otherwise, it is financially unconstrained. The fourth variable is sales growth (SAL). Again, a company is financially constrained if its sales growth is lower than the country-industry sector average level.

The results of the second equation are reported in Table 5. Column (1) reveals that constrained companies (assessed by For_Fun) have a different expenditure behaviour than financially unconstrained companies when responding to FAM policy within IFS. Despite that most companies respond to FAM positively, the capital expenditure of financially constrained companies is less sensitive to FAM than the expenditure of unconstrained companies. Based on our results, the overall impact of FAM on unconstrained companies is 0.041 + 0.069∗Shock, while it is 0.009 + 0.013∗Shock for financially constrained companies. This result shows the different impacts of FAM on the two types of companies. Financially unconstrained firms are more responsive to FAM irrespective of the magnitude of external shock. On average, financially unconstrained firms are more responsive than financially constrained firms. In addition, the responses of unconstrained firms' capital expenditure to FAM intensify sharply as the magnitude of adverse shocks increases. By contrast, the effect of FAM on capital expenditure in financially constrained firms appears to be relatively small and it becomes insignificant when there is large external shock, favourable or adverse. These results are consistent with Gomez-Gonzalez et al. (2020), who found that companies with smaller insolvency respond better to shocks to monetary policy. Columns (2) and (3) report similar results, using TA and CF_AS to define financially constrained companies. In addition, despite that For_Fun and TA proxied constraints from various forms, they may both reflect a global feature of companies' restrictions.

In sum, FAM positively affects companies' capital expenditure in emerging market economies; the size of this effect varies throughout companies. Financially unconstrained companies respond more to a favourable effect of FAM compared to constrained companies. These results highlight the relevance of considering the heterogeneity of companies when studying the effect of global policies like FAM policy on economic and financial aggregates. These global policies seem to be ineffective in constrained companies. For more policy efficiency, policymakers in emerging market economies should apply the appropriate policy according to the category of company, financially constrained or not.

Table 5. The impact of FAM and IFS on capital expenditure in financially constrained and unconstrained companies

	(1)	(2)	(3)	(4)
FAM	0.041***	0.040***	0.037***	0.027***
	(0.008)	(0.009)	(0.008)	(0.005)
Shock	-0.087***	-0.085***	-0.086***	-0.093***
	(0.007)	(0.006)	(0.004)	(0.006)
FAM × Shock	0.069***	0.119***	0.071***	0.043***
	(0.018)	(0.013)	(0.022)	(0.011)
For_Fun	-0.008***			
	(0.002)			
For_Fun × FAM	-0.031***			
	(0.009)			
For_Fun × Shock	-0.006**			
	(0.003)			
TA		-0.014***		
		(0.002)		
TA × FAM		-0.025***		
		(0.008)		
TA × Shock		-0.009***		
		(0.001)		
TA × FAM × Shock		-0.121***		
		(0.022)		
CF_AS			-0.021***	
			(0.001)	
CF_AS × FAM			-0.019***	
			(0.006)	
CF_AS × Shock			-0.011***	
			(0.003)	
SAL				-0.011***
				(0.002)
SAL × FAM				-0.018***
				(0.003)
SAL × Shock				-0.007***
				(0.002)
#Obs	31627	33694	29397	30648
R^2	0.120	0.121	0.119	0.120

Notes: The table displays estimates controlling for company diversity in financial restraints. Column (1) represents the company's access to foreign funding to finance capital expenditure (*For_Fun*). The estimates using the company's long-term liabilities to its physical assets (tangible assets) as a proxy for the company's financial restraints (*TA*), are reported in Column (2). The ratio of cash flow to total assets (*CF_AS*), to measure company's financial constraints are reported in Column (3); the sales growth (SAL) in Column (4). For_Fun, TA, CF_AS and SAL are used as dummy variables. For 'For_Fun' and 'TA', 1 is assigned when a company-year value exceeds the mean value in the branch of industry; and 0 otherwise. The third and fourth measurements, CF_AS and SAL, are the cash flow ratio to total assets and the sales growth, respectively. A company is financially constrained if each ratio from CF_AS and SAL is less than the mean value of the branch of industry; otherwise, the company is financially unconstrained. The results of *GDP*, *CAB*, *Q ratio*, *CF*, *TAS* and *Sales* are not reported to lighten content. Standard errors are reported in parentheses. All panels include economy, industry sector, company and time effects. ***, **, * correspond to 1%, 5% and 10% significance.

5.3 Capital Controls and Macroprudential Policy Coordination

The Mundell-Fleming theory proposes that an economy can be protected against IFS and ensure the independence of its monetary policy by using a floating exchange rate regime or by applying restrictions on capital flow movements. Therefore, there is a need to coordinate different macroeconomic policies to ensure macroeconomic stability (Zehri, 2020). Traditionally, emerging economies have used restrictive policies such as capital controls and macroprudential policy to protect themselves from IFS.

There is evidence that capital controls can insulate the economy against IFS. Pastor and Wise (2015) found that countries applying restrictions on capital flows recovered well from the global recession of 2008. Capital controls are re-employed in many emerging market economies after the 2008 financial crisis (Gallagher, 2011). The International Monetary Fund considers capital controls an effective instrument to stabilise financial markets. Furthermore, emerging markets' vulnerability to IFS calls for policymakers to employ additional policy tools. There is growing awareness that macroprudential policies can also play an important role in stabilising emerging markets. Therefore, it is interesting to examine how FAM may have different effects on countries that use capital controls and apply macroprudential policy compared to countries that do not have capital controls or a macroprudential policy. Besides, the macroprudential policy and capital controls complement net foreign assets in insulating emerging market economies against IFS (Eichengreen, 2010).

To compare between economies with capital controls and macroprudential policy and those without,[1] we expand the baseline model with capital controls and macroprudential policy as follows:

$$CE_{i,t} = \beta + \partial_j + £_t + \alpha_1 FAM_{c,t-1} + \alpha_2 Shock_t + \alpha_3 FAM_{c,t-1}*Shock_t + \varphi_1 CONTROL_{i,t} + \varphi_2 CONTROL_{i,t}*FAM_{c,t-1} + \boldsymbol{\gamma} X_{c,t} + \mu Z_{i,t} + \varepsilon_{i,t} \quad (3)$$

where $CONTROL_{i,t}$ includes proxies showing if an economy applies capital controls or implements macroprudential policy. We keep the same explicative variables as in the first equation. In addition, dummy variables categorising economies based on capital controls and a macroprudential policy are used to interpret the findings of the interaction terms.

For economies with capital controls (CC), we create a dummy variable that relied on the Fernández et al. (2016) index. When the economy has a Fernández et al. (2016) index value lower than 0.041,[2] we set CC = 1 to denote that this economy applies capital controls. Otherwise, we assigned CC = 0 for countries without restrictions on capital movements. Likewise, we generated – MP – a second dummy variable that indicates whether countries adopt a macroprudential policy or not. The data for MP are obtained from the study of Alam et al. (2019). Again, we set MP = 1 to indicate countries that adopt a macroprudential policy, and MP = 0, otherwise.

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[1] The integrated Macroprudential Policy Database (iMaPP) database of Alam et al. (2019) provides: (1) dummy-type indices of tightening and loosening actions for 17 macroprudential policy instruments and their subcategories, (2) detailed description of each policy action, and (3) country-level averages of the regulatory limits on loan-to-value (LTV) ratios at a monthly frequency.

[2] The average of the Fernández et al. (2016) index across our country sample.

Table 6 reports the results of this exercise. The estimates for capital controls and macroprudential policy are displayed in Columns (1) and (2). The findings for economies applying macroprudential policy and capital controls are reported in Column (3). FAM impact is evaluated as 0.004 + 0.025∗Shock in Column (1); however, this effect is insignificant, indicating that capital expenditure in emerging market economies with a liberalised capital account is unresponsive to FAM. Nevertheless, we did not find a substantial effect of FAM, and FAM seems to reduce the adverse effect of IFS (negative coefficient of 'Shock'). However, economies with capital controls display higher capital expenditure, and the effect of FAM is significantly stronger than in countries without capital controls. The marginal impact of FAM in countries with capital controls is 0.053 + 0.062∗Shock; at the average level of Shock, a 1% increase in FAM is associated with

Table 6. The impact of FAM, capital controls, and macroprudential policy on capital expenditure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FAM	0.004	0.020***	0.018***	0.007	0.021***	0.020***	0.006
	(0.005)	(0.005)	(0.003)	(0.012)	(0.004)	(0.003)	(0.018)
Shock	-0.089***	-0.152***	-0.089***	-0.081***	-0.159***	-0.087***	-0.069***
	(0.005)	(0.020)	(0.004)	(0.004)	(0.022)	(0.006)	(0.007)
FAM × Shock	0.019*	0.029**	0.031***	0.030**	0.034**	0.039***	0.032**
	(0.009)	(0.012)	(0.010)	(0.013)	(0.011)	(0.012)	(0.014)
CC	0.005***						
	(0.001)						
CC × FAM	0.051***						
	(0.010)						
CC × Shock	0.009***						
	(0.003)						
MP		0.020***					
		(0.006)					
MP × FAM		0.072					
		(0.143)					
MP × Shock		0.034***					
		(0.011)					
#Obs	21854	23864	30427	25138	11357	11237	26381
R^2	0.121	0.109	0.113	0.112	0.107	0.121	0.125

Notes: The table displays estimates using capital controls and macroprudential policy variables. 'CC' denotes a capital control dummy variable [*CC* = 1 when Fernández et al. (2016) index exceeds 0.057 (the mean of Fernández et al. (2016) index in our sample); = 0, otherwise]; *MP*, a dummy variable, shows the application or not of a macroprudential policy. [*MP* = 1 if a macroprudential policy is applied; 0, otherwise); CC&MP measures countries with both capital controls and macroprudential policy. Columns (4) – (5) use both CC and MP for countries with flexible (30 countries) and fixed exchange rates (15 countries), respectively. Columns (6) – (7) use both CC and MP for high- (13 countries) and low- (32 countries) financially developed countries, respectively. Results of GDP, CAB, Q ratio, CF, TAS and Sales are not reported. Standard errors are reported in parentheses. All panels include economy, industry sector, company and time effects. ***, **, * correspond to 1%, 5% and 10% significance.

capital expenditure that is about 5% higher. These results support the complementary role of capital controls and foreign assets found in the previous studies. The harmful impact of IFS on capital expenditure is smaller in economies applying capital flows restrictions than others, verifying capital controls' function in insulating against shocks. However, we found no statistical evidence that FAM plays a different role in reducing the adverse impact of IFS in economies regarding their use or not of capital controls. We found evidence that adopting a macroprudential policy mitigates the adverse effect of IFS on capital expenditure, as MP×Shock is estimated to be positive and significant. Besides, Column (2) shows a favourable impact of FAM on capital expenditure in economies without a macroprudential policy (the coefficients of FAM and FAM×Shock are both positive and significant). Countries that adopt a macroprudential policy have higher capital expenditure. However, we found no evidence that capital expenditure responds differently to FAM in countries that adopt a macroprudential policy than others (MP×FAM is not significant).

Column (3) shows that FAM has a more substantial positive effect on capital expenditure in economies combining capital controls and macroprudential policy than in others. Based on these findings, a well-coordinated restrictive policy (capital controls or macroprudential policy) may effectively protect against harmful IFS. Moreover, these findings call for harmonising policies to face adverse international shocks (Zehri, 2022).

For further development, we examine the role of exchange regime management and financial development in dampening the effects of IFS and supporting companies' capital expenditure. First, the literature suggests that emerging economies are sensitive to shocks from the world's biggest economies through the exchange rate regime (Yeyati & Williams, 2012). The literature suggests that the floating exchange rate may dampen shocks (Broda, 2006). Besides, a flexible exchange rate regime in emerging market economies attenuates financial instability and mitigates the effects of IFS (Blanchard et al., 2010). We control the exchange rate regime management and examine if our findings are changed. We divided our sample into flexible and fixed exchange rate regimes; the results are displayed in columns (4) and (5), respectively. In line with the literature, our results suggest that a floating exchange rate mitigates the harmful impact of IFS on companies' capital expenditure. This effect is stronger in countries with a fixed exchange rate.

Second, companies in a more developed financial system are likely to have more alternative funding sources and respond better to IFS. In this case, the international transmission of financial shocks should be reduced (Ongena et al., 2015). To investigate whether the results in columns 1–3 vary based on the country's level of financial development, we divided our sample into financially developed and financially repressed economies. The financial development data are obtained from Svirydzenka (2016), who established a classification of 180 economies according to their level of financial development. The results for financially developed and financially repressed countries are reported in columns (6) and (7). The last Column in Table 1 displays the classification of our country sample according to the financial development level. The findings support stronger mitigation of the adverse impact of IFS on company capital expenditure in more financially developed systems. Furthermore, when capital controls and macroprudential policies are introduced concurrently, a higher level of financial

development facilitates their effectiveness in dampening the adverse effects of IFS and supports companies' capital expenditure. This effect is stronger than in economies with a less developed financial system, where the coefficient is only 0.012.

6. Robustness Checks

In this part, we check the robustness of our findings by testing the changes occurring following the use of different proxies of FAM and IFS.

First, we explore the sensitivity of our estimates to alternative measures of FAM by applying four measures alternative to FAM-1 (Sula & Oguzoglu, 2021). Column (1) in Table 7 reports the estimates using the balance of payments IMF data on reserves and related items (RES). The literature shows that policymakers pursue a set of variables matching reserves accumulation with measures of instability or exposure. Consequently, we used three variables to assess reserve adequacy's preventive motivations in the next three columns. First, we scaled reserves with imports (RES_IMP) which measures the imports coverage. Second, we use the country's ability to cover its external liabilities through foreign reserves – the ratio of reserves to short-term external debt (RES_DEBT). Third, we include the potential need for foreign reserves from the local market – the ratio of reserves to broad money (RES_M2).

Globally, the results are similar to those in Column (2) of Table 4, with slight discrepancies. We note a marginal change in the estimates' values and a decrease in the significance level for the interaction terms. The considerable difference is observed in Column (4), $Shock_t$ is estimated to be non-significant, yet still negative. In general, the new findings are fundamentally stable, showing the robustness of our findings through the use of alternative proxies of FAM.

Second, we used four alternative measurements of shocks in IFS other than the Fed's funds rate (Shock). The VIX index (noted VIX) is our first proxy IFS. 'VIX' assesses

Table 7. Alternative FAM variables, the impact of FAM on capital expenditure

	(1)	(2)	(3)	(4)
FAM	0.018***	0.021***	0.031***	0.043***
	(0.003)	(0.005)	(0.008)	(0.008)
Shock	-0.139***	-0.095***	-0.152***	-0.031
	(0.005)	(0.004)	(0.010)	(0.042)
FAM × Shock	0.021**	0.021**	0.067**	0.061**
	(0.011)	(0.009)	(0.029)	(0.027)
#Obs	24831	28076	21583	26374
R^2	0.121	0.120	0.122	0.118

Notes: The table displays equation (1) estimates using alternative lagged FAM variables. Column (1) employs reserves and related items 'RES'; Column (2) uses scaled reserves with imports 'RES_IMP'; Column (3) uses the ratio of reserves to short-term external debt 'RES_DEBT' and (4) uses the ratio of reserves to broad money 'RES_M2'. Results of GDP, CAB, Q ratio, CF, TAS and Sales are not reported. Standard errors are reported in parentheses. All panels include economy, industry sector, company and time effects. ***, **, * correspond to 1%, 5% and 10% significance.

Table 8. Alternative IFS variables, the impact of FAM on capital expenditure

	VIX	ROF	MPU	EPU
FAM	0.021***	0.019***	-0.074***	-0.041***
	(0.005)	(0.005)	(0.017)	(0.012)
Alter-shock	-0.062***	-0.048***	-0.002***	-0.004***
	(0.005)	(0.005)	(0.000)	(0.001)
FAM × Alter-shock	0.015**	0.008	0.002***	0.002***
	(0.007)	(0.022)	(0.000)	(0.000)
#Obs	39821	39821	39821	39821
R^2	0.121	0.105	0.120	0.119

Notes: The table displays equation (1) estimates using alternative IFS variables. Column "VIX" uses data of S&P 500 volatility index; column "ROF" displays estimates using 'risk on/off' index of Chari et al. (2020); columns "MPU" and "EPU", illustrate, respectively, the US monetary policy uncertainty and the US economic policy uncertainty indexes of Baker et al. (2016). Estimates of GDP, CAB, Q ratio, CF, TAS and Sales are not reported. Standard errors are reported in parentheses. All panels include economy, industry sector, company and time effects. ***, **, * correspond to 1%, 5% and 10% significance.

the implicit instability of the S&P 500 stock option, which originates in the United States, and its impact emerges across the world. To broaden the global aspect of our results, we used the Chari et al. (2020) index "Risk On/Off" (ROF), which describes the correlation between global risk-taking and surges of capital flows.

Finally, we use the Baker et al. (2016) index, which mirrors the news uncertainty of the United States monetary and economic policies (noted MPU and EPU, respectively). These indexes proxy the transmission of shocks from the United States to the international financial system.

The robustness checks findings using different proxies of IFS (noted Alter-shock) are reported in Table 8. We observe similar estimates to those in columns (2) and (3) of Table 4; nevertheless, the estimated coefficients of Alter-shock and FAM×Alter-shock are smaller than those of Shock and FAM×Shock. These smaller coefficients are particularly perceived with MPU and EPU indexes to proxy IFS. As a result, FAM×Alter-shock become non-significant in the ROF index regression.

7. Conclusion

A typical macro policy tool used by emerging market economies to manage their economic system is the accumulation of foreign assets in prosperous times to safeguard the economy against adverse IFS. The present study expands the debate on FAM's role in supporting capital expenditure at the company level. Therefore, it provides a glance at the micro-level characteristics whereby FAM attenuates the adverse effect of IFS.

The empirical approach applies a canonical capital expenditure Q model. We determine the extent to which FAM and IFS impact companies' capital expenditure in emerging market economies. We find that FAM impact differs throughout companies; the positive effect of FAM on capital expenditure is weaker in financially constrained

companies than in non-constrained ones. This company-level impact mirrors the FAM impact highlighted in the literature on the macro-level.

Concerning stabilising companies' capital expenditure in the presence of IFS, we find that FAM is correlated to capital controls and a macroprudential policy. All three policies have comparable roles in mitigating the negative impact of IFS on companies' capital expenditure in emerging market economies. These results point to the benefits of combining these tools to insulate companies' capital expenditure against IFS.

A flexible exchange rate regime reduces the negative effect of adverse external shocks. Therefore, it helps FAM policy to attenuate the adverse effect of IFS. Furthermore, highly developed financial systems support FAM and mitigate the adverse impact of IFS on companies' capital expenditure.

While this study has determined the FAM impact at a company level, FAM can exhibit additional impacts further than those found in this study. For example, the FAM policy and its role in buffering shocks may limit the likelihood of speculative bubbles. An additional concern, the FAM may have an asymmetric impact; the stock of foreign assets is greater in crisis than in stable periods. The low foreign assets in normal periods can mitigate the effectiveness of FAM policy in a crisis period. However, this mechanism can raise moral hazard problems and increase opportunity costs due to low returns on the accumulated foreign assets.

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