Corporate Investment in Emerging Markets: The Role of Commodity Prices[1]

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Abstract

We examine how firm-level and country-specific macroeconomic variables determine corporate investment in emerging markets (EM). In particular, we investigate how investment decisions are affected by changes in country-specific commodity export prices, using firm-level data from 38 EMs for the period 1990—2013. We show that, in addition to the standard firm-level variables (e.g., expected future profitability, cash flows, leverage, and new debt flows) commodity export prices play a significant role in driving corporate investment. Moreover, we show that the sharp decline in commodity prices since 2011 has been a key factor explaining the sizable slowdown in private investment growth during this period, especially in regions with large net commodity exporters.

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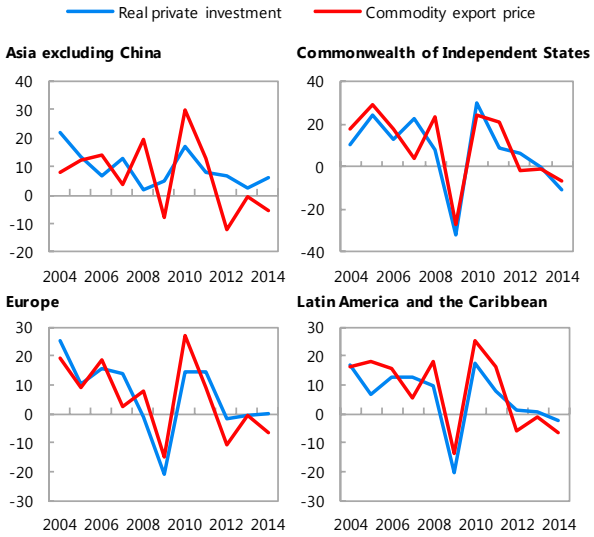
I. INTRODUCTION

Commodity prices have experienced sizable fluctuations over the past two decades. The macroeconomic impact of commodity price swings has been studied extensively in the literature, both empirically and theoretically. However, empirical studies on the link between commodity prices and corporate investment in emerging markets (EM) are relatively scant, particularly those based on firm-level data.

The main purpose of the paper is to investigate empirically the determinants of investment at the firm level in EMs, with a special focus on the role played by commodity export prices. After addressing this issue, as a by-product, the paper examines what factors explain the post-2011 weakening of private investment in EMs (in particular the role of commodity export prices) and the differences across EM regions.

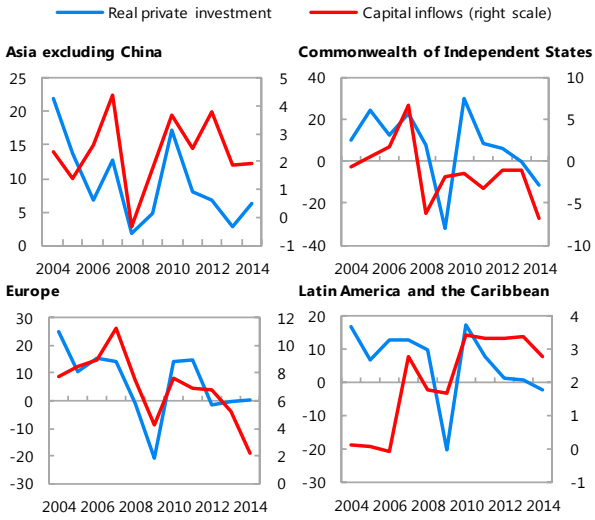
Private investment in EMs is highly correlated with (country-specific) commodity export prices (Figure 1). The co-movement of private investment and commodity export prices is especially high in the case of Latin America and the Caribbean (LAC) and the Commonwealth of Independent States (CIS), with correlation coefficients of 0.84, reflecting the fact that these regions include many of the largest commodity exporters. For emerging Europe, the correlation is also strong (0.82), while it is much lower for emerging Asia excluding China (0.36). Private investment in EMs has also been highly correlated with capital inflows (Figure 2).

Figure 1. Real Private Investment and Commodity Export Price Growth, 2004–14
(In percent)



Sources: IMF, World Economic Outlook database; Gruss (2014); and IMF staff calculations.

Figure 2. Real Private Investment Growth and Net Capital Inflows, 2004–14
(In percent, and percent of GDP)



Sources: IMF, World Economic Outlook database; and IMF staff calculations.
[1] PPP-weighted average. Capital inflows defined as the balance of the external financial account, in percent of GDP.

We study the determinants of investment in panel regressions that combine firm-level data for about 16,000 listed firms with country-specific macroeconomic variables—notably commodity export prices and capital inflows—for 38 EMs over the period 1990–2013. After identifying the key factors driving firms' investment decisions in EMs, we shed light on

which of these factors have been the main drivers of the sharp deceleration in corporate investment growth since 2011.

The main results are as follows:

- *The usual suspects:* In line with previous studies in the literature, we find that EM firms' capital expenditure is positively associated with expected profitability (proxied by Tobin's Q), cash flows (suggesting the existence of borrowing constraints), and debt flows. It is negatively associated with leverage.

- *Commodity prices matter:* Conditional on the usual suspects, our main contribution is to show that investment is positively associated with changes in (country-specific) commodity export prices, and the link is statistically and economically significant.

- *Foreign financing:* Investment by EM firms is also influenced by the availability of foreign (international) financing.

Based on the above results, we then put the magnifying glass into the most recent fall in commodity prices' event. Thus, as an extension to our main contribution we look into the following:

- *Who to blame for the post-2011 investment slowdown:* factors vary across EM region, with the sharp adjustment in commodity prices playing a substantial role in the case of commodity exporter regions (e.g., Latin America). Lower expected profitability of firms (which partly reflects the downward revisions to potential growth in many EMs) has also been an important factor behind the recent deceleration of investment. A moderation in

capital inflows to EMs and increased leverage (particularly in Asia) have also played a significant role.

Our paper is related to the extensive empirical literature on the determinants of corporate investment in EMs. It relates to a strand that studies financing constraints, typically relying on Tobin's Q investment models or Euler investment equations. Most of these studies have documented the importance of internal financing for firms' investment owing to capital markets imperfections. Based on this framework, for example, Fazzari and others 1988 examine the case of U.S. manufacturing firms, while Love and Zicchino 2006 study emerging market companies.[2] The sensitivity of investment to cash flows is particularly strong for smaller firms (Fazzari and others, 2000, and Carpenter and Guariglia, 2008) and for firms in less financially developed economies (Love, 2003). Criticism of using of cash flow as a measure of financial frictions (e.g., Kaplan and Zingales, 1997, Gomes, 2001, and Abel and Eberly, 2011) have been addressed by Gilchrist and Himmelberg (1995, 1999), who establish the existence of financial constraints by testing the significance of investment-cash flow sensitivities beyond the effect of the "Fundamental Q." The latter is essentially a VAR of forecasting equations out of which the expected value of marginal Q, conditional on observed fundamentals (including cash flow) is constructed. This implies that any additional effect picked up by cash slow should reflect financial constraints.

We follow this Q literature, aware of their possible shortcomings. We use the Q as one important explanatory variable of firm-level investment, but we also control for other

[2] Hubbard (1998) provides a thorough survey of this literature.

variables to mitigate, to the extent possible, other investment opportunities that could be misinterpreted as captured by the Q.

Harrison and others 2004, document that foreign direct investment (FDI) flows to EMs are associated with a reduction in firms' financing constraints. They examine whether—and to what extent—the availability of foreign capital helps relaxing financing constraints in EM firms by combining firm-level data on cash flows with country-specific capital flows. Forbes 2007 and Gelos and Werner 2002 also find that the latter relax when capital account restrictions are eased. These studies, us ours, focus on macroeconomic variables. But only on capital flows and focusing on their role played in the relaxation of financial constraints. Instead, we want to better understand another key driver of corporate investment in EMs, commodity export prices.

Fernandez, Gonzales, and Rodriguez (2014) is also related to our work, though from a macroeconomic perspective. They show that in EMs, business cycles are strongly influenced by country-specific commodity prices, which are procyclical. Finally, Fornero and other (2014) and Ross and Tashu (2015) also study the link between of terms of trade and investment.

We contribute to this literature in several ways. First, and in contrast with previous studies on investment in EMs using firm-level data—which mostly focused on one country or a small group of countries—we analyze the determinants of firms' investment decisions for a large sample of EMs covering a period of over two decades. This allows us not only to work with an extensive database, but also to explore (and exploit) the potential heterogeneity across EM regions. Second, in addition to firm level data we include some additional (country-specific)

macroeconomic variables into the analysis—notably commodity export prices. The latter is our main contribution. Finally, as a by-product, we examine the drivers of the post-2011 investment growth slowdown, and how the main factors varied across EM region.

The rest of the paper proceeds as follows. The next section presents a theoretical framework only to motivate the empirical exercise that follows. Section III describes the empirical approach, and section IV presents the results. Finally, Section V presents concluding remarks.

II. THEORETICAL FRAMEWORK

We present here an augmented Q-model of investment for a small open economy to use as a framework for the empirical analysis below. We develop a basic frictionless model to illustrate how commodity prices can impact on investment decisions. Adding frictions to this model is unlikely to affect firm-level decisions, which we anyhow test for in the empirical section below.

The problem of a firm *i* in period *t* over an infinite horizon is to maximize the present discounted value of the flow of dividends, D_t, given by

$$E_t \left\{ \sum_{i=1}^{\infty} \frac{D_{t+i}}{R^i} \right\} \qquad (1)$$

where *R* stands for the gross interest rate. In turn, the flow of dividends of the firm are given by

$$D_t = \pi(K_t, \theta_t) - p_t I_t - c(I_t, K_t) \qquad (2)$$

π is the firm's profit function, K_t the stock of capital, θ_t the level of technology, and p_t the price of capital in units of domestic goods. I_t denotes investment and $c(I_t, K_t)$ represents a function to capture the cost of adjustment of investment. The profit function is assumed to be increasing in capital and level of technology and concave. Adjustment costs of installing new capital is an increasing and convex function in the value of (I_t/K_t), defined below, and θ_t is a stationary first order Markov process. Given a constant rate of depreciation δ, the stock of capital equation changes over time as

$$K_{t+1} = I_t + (1-\delta)K_t \tag{3}$$

Assume that firms in this small open economy purchase its capital abroad.[3] Capital being imported, the domestic price of investment depends on the real exchange rate. In turn, the real exchange rate increases on the country's terms of trade, the relative price of exports to imports, i.e., p_X/p_M. We normalize the real exchange rate, *e*, to the unit circle, taking a value of zero when the terms-of-trade equal their long-run value. Thus, the domestic price of importing capital is given by

$$p_t = 1 - e_t = \begin{cases} \in (-1,0) & \text{if} \quad p_X/p_M < \overline{p_X/p_M} \\ 0 & \text{if} \quad p_X/p_M = \overline{p_X/p_M} \\ \in (0,1) & \text{if} \quad p_X/p_M > \overline{p_X/p_M} \end{cases} \tag{4}$$

If the terms of trade are at their long-run value (denoted by a bar), so is the real exchange rate (equaling zero). In this case we have the typical closed economy example, in which the domestic price of capital equals one. When the economy's terms of trade are above their

[3] Assuming that only a share of the capital stock is imported does not alter the results, this being only a simplifying assumption to ease the exposition.

long-run value, the economy is richer, so the real exchange appreciates (i.e., it increases), and the price of new capital in terms of domestic goods decreases. Likewise, for terms of trade lower than their long-term value the economy is poorer, the real exchange rate depreciates, and the price of investment is higher.

Therefore, the firm's problem is to maximize (1) subject to (2)—(4). The Bellman equation for the firm's problem is given by

$$V(K_t, \theta_t, e_t) = \max_{I_t, K_{t+1}} \Big\{ \pi(K_t, \theta_t) - [1 - e_t(\, p_X / p_M)] I_t - c(I_t, K_t) + \frac{1}{R} E_t [V(K_{t+1}, \theta_{t+1}, e_{t+1})] \Big\} \quad (5)$$

Equivalently,

$$V(K_t, \theta_t, e_t) = \max_{I_t} \Big\{ \pi(K_t, \theta_t) - [1 - e_t(\, p_X / p_M)] I_t - c(I_t, K_t) + \frac{1}{R} E_t [V(I_t + (1 - \delta) K_t, \theta_{t+1}, e_{t+1})] \Big\} \quad (6)$$

Optimizing over the control variable I_t, while K_t is the state variable, implies the following first order condition

$$[1 - e_t(\, p_X / p_M)] I_t + \, c_I(I_t, K_t) = \frac{1}{R} E_t [V(K_{t+1}, \theta_{t+1}, e_{t+1})] = \frac{1}{R} E_t q_{t+1} \quad (7)$$

In the right hand side of (7), as usual in the literature, we define Tobin's Q as the discounted shadow price of capital—marginal Q—which equals the replacement cost of capital plus the adjustment cost of installing new capital, i.e., the effective price of new capital. Assume that a constant returns to scale adjustment cost of capital is given by

$$c(I_t, K_t) = \frac{1}{2} b \left(\frac{I_t}{K_t} - \mu\right)^2 \quad (8)$$

in which μ denotes the investment-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 the steady state. Substituting (8) in (7) we get

$$[1 - e_t(\, p_X/p_M)]I_t + \; b\left(\frac{I_t}{K_t} - \mu\right) = \frac{1}{R} E_t[V(K_{t+1}, \theta_{t+1}, e_{t+1})] = \frac{1}{R} E_t q_{t+1} \quad (9)$$

Re-arranging (9) we obtain

$$\frac{I_t}{K_t} = \frac{1}{b}\left(\frac{1}{R} E_t q_{t+1} + e_t(p_X/p_M) - 1\right) + \mu \quad (10)$$

which shows the standard positive association between Tobin's Q and investment. As has been shown in the literature, an increase in marginal Q (a higher shadow price of capital, implying a larger present discounted value of the flow of dividends, as shown below), makes the firm to optimally increase investment. The latter can be shown by using the envelope condition out of (6),

$$q_t = \; [\pi_K(K_t, \theta_t) - c_K(I_t, K_t)] + \frac{1}{R}(1 - \delta) E_t[q_{t+1}] \quad (11)$$

Updating (11) one period, forwarding it, taking expectations as of period *t*, applying the law of iterated expectations and substituting back in (11), and finally iterating forward and using the transversality condition, we obtain:

$$V_K(K_t, \theta_t) = E_t\left\{\sum_{i=0}^{\infty}\left(\frac{1-\delta}{R}\right)^i [\pi_K(K_{t+i}, \theta_{t+i}) - c_K(I_{t+i}, K_{t+i})]\right\} \quad (12)$$

which shows that the marginal value of an additional unit of capital should equal the discounted flow of marginal profits, net of adjustment costs.

Crucially for our empirical analysis, (10) also shows that, all else equal, an improvement in the terms of trade (the relative price of exports to imports) results in real appreciation, which increases investment—consistent with the lower costs of importing capital—and vice versa. The appendix presents the phase diagram corresponding to the saddle-path equilibrium and the effects of (transitory and permanent) terms-of-trade shocks.

III. Econometric Approach

Motivated by the model presented in the previous section, we estimate a panel regression model of investment with time- and firm-fixed effects, combining firm-level data and country-specific macroeconomic variables to identify the main determinants of corporate investment in EMs. The analysis focuses on factors that, for theoretical reasons, are thought to affect firms' investment decisions. These factors include firm-specific variables such as expected future profitability, cash flows, cost of debt, leverage, and debt flows. We also include country-specific macroeconomic variables—notably commodity export prices, but also net capital inflows and uncertainty. We then look at the recent period, characterized by a sharp deceleration of private investment growth in EMs, to examine the key factors explaining the slowdown and the main differences across emerging market regions.

A. Empirical Model

Our empirical specification is a variation of the traditional Tobin's Q investment model, augmented to include other possible determinants identified in the literature of corporate

investment. In a neoclassical model, the marginal benefit from an extra unit of investment and the cost of capital should be sufficient statistics to explain investment behavior. The Q-theory of investment (Tobin, 1969; Hayashi, 1982) basically reformulates the neoclassical theory, such that firms' investment decisions are based on the ratio between the market value of the firm's capital stock and its replacement cost.[4] Much of the literature on corporate investment during the last decades, however, has highlighted the importance of financing constraints. In the presence of financial frictions, access to external financing for investment projects that would in principle be profitable may be limited. Therefore, firms' investment decisions would be determined not only by investment opportunities, but also by the availability of internal funds.

Evidence of financial constraints has been based on the sensitivity of investment to different measures of internal funds—typically cash flow or cash stock. A firm's higher dependence on internal funding has been interpreted as a sign of tighter financial constraints.[5] However, this interpretation of the correlation between cash flow and investment as evidence of financial constraints is far from uncontroversial. A strand of the literature has argued that rather than financing constraints, the relationship between cash flows and investment may reflect the correlation between cash flow and investment opportunities that are not well-captured by traditional measures of investment opportunities, in particular Tobin's Q. A number of studies (e.g., Gilchrist and Himmelberg, 1995 and 1999; and Carpenter and Guariglia, 2008), however, have addressed these criticisms, and most empirical studies have

[4] For instance, investment would increase whenever the value of Q is larger than one, as it would reflect that the present discounted value of the flow of expected dividends outweighs the replacement cost of capital.

[5] See, for example, Fazzari and others 1988, Blanchard and others 1994, and Fazzari and others 2000.

continued to use the investment-cash flow sensitivity as a measure of financial frictions. We also follow this approach, using both cash flow measures and Tobin's Q.

Critically, beyond corporate financial indicators, we also include key country-specific macroeconomic variables that may affect corporate investment. Specifically, we consider commodity export prices (which drive the terms of trade), capital inflows, and uncertainty. We estimate linear panel regressions allowing for both time- and firm-fixed effects.[6] Given that our specification contains both firm-level and country-level data, we use clustered (by country) robust standard errors to address the risk of standard-error bias. As is common in the literature, we use the lagged dependent variable as an additional explanatory variable. Thus, the baseline specification, consistent with (10) above, is as follows:

$$\frac{I_{ic,t}}{K_{ic,t-1}} = \alpha + \lambda \frac{I_{ic,t-1}}{K_{c,t-2}} + \beta_1 Q_{ic,t} + \beta_2 \frac{CF_{ic,t}}{K_{ic,t-1}} + \beta_3 Lev_{ic,t-1} + \beta_4 \frac{\Delta Debt_{ic,t}}{K_{ic,t-1}} + \beta_5 Int_{ic,t} + \beta_6 P^x_{c,t-1} + \beta_7 KI_{c,t} + \beta_8 Unc_{c,t} + d_i + d_t + \varepsilon_{ic,t} \quad (13)$$

where subscripts *(ic,t)* stand for firm *i* in country *c* during period *t*. *I* is fixed investment (excluding inventories) and *K* the stock of capital. *Q* represents the standard Tobin's Q, where average *Q*, measured as the price-to-book value of the firm, is used as a proxy for (unobservable) marginal *Q*.[7] *CF* denotes the firm's cash flow; *Lev* is leverage; $\Delta Debt$ stands for the change in total debt since the previous period; and *Int* is a measure of the firm's cost of capital, to account for the opportunity cost of funds. *KI* denotes (net) capital inflows; P^x denotes (the log difference of) the commodity export price index; and *Unc* stands for

[6] As discussed later, the results are robust to also allowing for country fixed effects.

[7] See Hayashi 1982 for a discussion of under what conditions both measures are equivalent.

aggregate uncertainty. d_i, d_t stand for firm- and trend- (or alternatively time-, see discussion below) fixed effects. Finally, ε represents the error term.

Intuitively, this specification is based on the idea that investment is determined by the flow of (discounted) future dividends. As shown in (10) above, we should expect a positive coefficient associated to Q, indicating that firms that expect to be more profitable should invest more, a common finding in the literature. As also discussed above, the cash flow coefficient should exhibit a positive sign if firms face financial constraints, as firms would need to rely on internal funds to finance investment projects. Debt stock and debt flows, in turn, are expected to have opposite effects on corporate investment. While higher leverage is expected to be negatively associated with investment, the flow of debt would be positively related to capital expenditure because financing investment is one of the main reasons to incur new debt. A higher cost of debt, in turn, is expected to be associated with lower investment. Regarding the country-level variables, commodity export prices are expected to be positively related to capital spending. Net capital inflows should also be positively related to corporate investment, including owing to the fact that they may play a role in relaxing firms' financing constraints in EMs (Love and other, 2004). Finally, economic theory predicts that higher uncertainty should be associated with lower investment as firms enter a "wait and see" mode, especially to the extent that investment decisions are irreversible.[8]

B. Data

[8] See, for instance, Bloom and others 2001, Magud 2008, Baum and others 2008, and Dixit and Pindyck 1995. More recently, Li, Magud, and Valencia (2015) document how firm heterogeneity matters in the response of investment to interest rates vs. uncertainty shocks, as the balance sheet dimension can identity if either a financial channel or a wait and see channel dominate the firm's investment reaction to the shock.

We use firm-level data from Worldscope. The frequency of the data is annual, for a sample of 16,000 publicly traded firms from 38 EMs covering the period 1990—2013. Table A.1 in the Appendix presents the list of countries in the sample and the number of firms per country.[9] The number of firms varies significantly across countries as well as across time, with a smaller number in most countries during the first half of the 1990s.[10]

Firm-level data. Investment (*I*) is measured as the purchase of fixed assets by the firm. The stock of capital (*K*) is measured as the total net value of property, plant, and equipment. Tobin's Q is given by average *Q*. Cash flow (*CF)* is computed as the firm's net profits from operating activities; leverage (Lev) is measured as the ratio of total debt obligations to total assets; new debt ($\Delta Debt$) is defined as the change in total debt obligations since the previous period; and the cost of funds (*Int)* is defined as the firm's effective interest rate paid on total debt obligations.

To avoid the presence of outliers and coding errors that would bias the estimation, observations with non-consistent data are dropped from the sample.[11] Then, the country-specific distribution for each of the variables is calculated and the bottom and top 5 percent of each variable's observations are excluded from the analysis. Table 1 reports the summary statistics for the firm-level data.[12]

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[9] We consider countries that were classified as emerging markets at the start of the sample.

[10] The share of total private investment accounted for by corporate investment ranges, for example, between 70 and 75 percent across countries in LAC (although disaggregated data for many countries is not available). Moreover, the recent downturn has been mainly driven by corporate investment (although residential investment has also been trending downwards in some countries). The firm-level data in the sample represents about 12 percent of (national accounts) aggregate private investment, with correlation coefficients varying by country but averaging over 30 percent.

[11] For example, negative book values for the capital stock, debt, or the price-to-book value of equity.

[12] Using listed firms only restricts the sample of firms, imposing some limitations to the data.

Table 1. Summary Statistics

Variable	Observations	Mean	Std. Dev.
Investment/capital stock(t-1)	389977	0.25	1.46
Q	435454	1.81	1.59
Cash flow/capital stock(t-1)	410693	0.06	4.67
Leverage	493919	0.68	1.05
Interest expense ratio	355256	0.08	0.08
Change in debt/capital stock(t-1)	357397	0.27	6.69
Commodity export price growth	367748	4.32	13.18
Capital inflows/GDP	497058	-0.49	5.39

Source: Authors' calculations.

Macro-level data. We use the (country-specific) gross commodity export price indices constructed by Gruss (2014). Capital inflows (measured using the financial account balance, in percent of GDP) and real GDP series come from the IMF's *International Financial Statistics* and the *World Economic Outlook*. Finally, we use data from Bloomberg to construct our measure of country-specific uncertainty based on the (average monthly) volatility of stock market returns, computed as the standard deviation of daily stock market returns over a month.

IV. RESULTS

A. Baseline Results

Table 2 reports the results of the baseline specification (Equation 13). Columns 1-3 show that all the coefficients for the firm-level variables have the expected sign and are statistically significant at the one percent level. Following the theoretical model above, the dependent variable is the investment-capital ratio (ICR), with the stock of capital lagged one period. Consistent with theory and findings in previous empirical studies, Tobin's Q is positively related to investment. Also in line with previous studies, we find robust evidence of financial constraints, reflected in a positive relationship between firm's cash flow and capital

spending. Moreover, more leveraged firms tend to exhibit lower investment in the following period, while an increase in debt is associated with higher capital expenditure. Finally, the coefficient on the cost of debt is negative, as expected.

Table 2. Baseline Results[1]

VARIABLES	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR
ICR (t-1)	0.0967***	0.0966***	0.107***	0.0949***	0.0929***	0.0905***
	(0.0126)	(0.0124)	(0.0154)	(0.0188)	(0.0187)	(0.0191)
Q	0.0207***	0.0200***	0.0190***	0.0182***	0.0178***	0.0176***
	(0.00451)	(0.00442)	(0.00454)	(0.00446)	(0.00425)	(0.00421)
Cash flow		0.00687***	0.0125***	0.0117***	0.0117***	0.0115***
		(0.00189)	(0.00232)	(0.00221)	(0.00220)	(0.00212)
Leverage (t-1)			-0.0337***	-0.0324***	-0.0318***	-0.0318***
			(0.00349)	(0.00287)	(0.00302)	(0.00309)
Interest expense ratio (t-1)			-0.0793***	-0.0712**	-0.0685**	-0.0663**
			(0.0273)	(0.0283)	(0.0292)	(0.0298)
Change in debt			0.00327***	0.00289***	0.00286***	0.00285***
			(0.000928)	(0.00103)	(0.00104)	(0.00104)
Commodity export price (t-1)				0.000421***	0.000448***	0.000449***
				(0.000109)	(0.000104)	(0.000106)
Net capital inflows					0.00231***	0.00237***
					(0.000659)	(0.000687)
Uncertainty						-1.39e-06
						(1.31e-06)
Constant	8.832***	8.872***	9.813***	9.358***	9.164***	8.785***
	(1.017)	(0.998)	(0.963)	(0.830)	(0.854)	(0.989)
Observations	94,183	94,157	83,327	63,799	63,799	62,632
R^2	0.030	0.036	0.059	0.051	0.053	0.052
Number of firms	16,512	16,511	15,102	12,262	12,262	12,190
Number of countries	38	38	38	36	36	36

Source: authors' calculations.

Note: robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

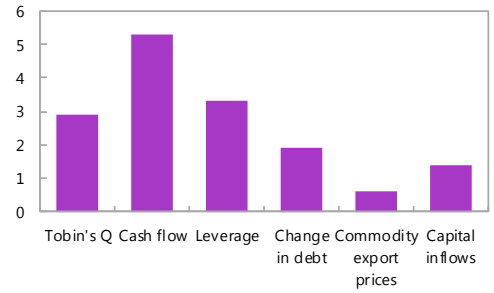
[1]Robust standard errors (clustered by country), controlling for time and firm-level effects.

We then introduce the country-specific macro variables (Table 2, columns 4–6). The magnitude and significance of the coefficients of Tobin's Q, cash flow, leverage, cost of debt, and change in debt do not change. We find robust evidence that an increase in a country's commodity export prices is associated with higher investment in firms in that country. This result is consistent with previous studies that have documented the positive impact of improving terms of trade on investment even beyond firms in the export sector (e.g., Fornero and others, 2014, for Chile and Ross and Tashu, 2015, for Peru). It also

consistent with Fernandez and others (2014), who document that, on average, EMs are commodity exporters and that country-specific commodity prices are pro-cyclical. The impact of commodity export prices could be transmitted through direct channels affecting commodity sectors (and other sectors, such as manufacturing and services, related to commodities), or indirectly through income effects affecting aggregate demand and activity in other sectors as well.[13]

Investment in EM firms is also influenced by the availability of foreign (cross-border) financing. The larger the net capital flows an EM economy receives, the larger its firms' capital expenditure. Both coefficients (on commodity export prices and capital inflows) are positive and strongly statistically significant. Interestingly, we do not find market uncertainty to be a significant determinant of capital expenditure at the firm level. This result is consistent with previous studies (e.g., Leahy and Whited, 1996) showing that although uncertainty has a negative effect on investment, the effect generally disappears when Tobin's Q is introduced.

Figure 3. Investment-Capital Ratio Response to 1 Standard Deviation Shock to RHS Variables
(Percentage points)



Source: IMF staff calculations.

[13] See Druck and others (2015).

The estimated coefficients are not only statistically but also economically significant in most cases. A one-standard-deviation change in each of the main independent variables would be associated with a change in the investment-to-capital ratio by the following amounts (in percentage points, Figure 3): Tobin's Q: 2.9, cash flow: 5.3, leverage: 3.3, change in debt: 1.9, commodity export growth: 0.63, and capital inflows: 1.4. As indicated in Table 1, the investment-to-capital ratio has a mean of 0.25, and a standard deviation of 1.46.

Table 3. Regional Decomposition[1]

	Full sample	LAC	Asia	Europe	Other
	(1)	(2)	(3)	(4)	(5)
VARIABLES	ICR	ICR	ICR	ICR	ICR
ICR (t-1)	0.0905***	0.190***	0.0787***	0.0776**	0.152***
	(0.0191)	(0.0353)	(0.0221)	(0.0310)	(0.0357)
Q	0.0176***	0.0129***	0.0162**	0.0230***	0.0268***
	(0.00421)	(0.00299)	(0.00507)	(0.00585)	(0.00202)
Cash flow	0.0115***	0.0136**	0.0191***	0.00137	0.00839***
	(0.00212)	(0.00513)	(0.00387)	(0.00119)	(0.00105)
Leverage (t-1)	-0.0318***	-0.0450***	-0.0329***	-0.0133	-0.0291*
	(0.00309)	(0.00890)	(0.00347)	(0.00885)	(0.0119)
Interest expense ratio (t-1)	-0.0663**	-0.0114	-0.0803*	0.00256	-0.133*
	(0.0298)	(0.0214)	(0.0402)	(0.0768)	(0.0604)
Change in debt	0.00285***	0.00259*	0.00267*	0.000799	0.00751**
	(0.00104)	(0.00127)	(0.00136)	(0.00161)	(0.00214)
Commodity export price (t-1)	0.000449***	0.000579**	0.000467***	0.000393***	-5.00e-05
	(0.000106)	(0.000167)	(0.000139)	(6.81e-05)	(0.000420)
Net capital inflows	0.00237***	0.00188	0.00239**	0.00403***	0.00120
	(0.000687)	(0.00104)	(0.000855)	(0.00120)	(0.00116)
Uncertainty	-1.39e-06	-9.01e-07**	-4.66e-06**	-2.90e-06	7.98e-06
	(1.31e-06)	(3.39e-07)	(1.61e-06)	(2.29e-06)	(5.47e-06)
Constant	8.785***	1.844	9.360***	9.094*	14.04***
	(0.989)	(1.349)	(1.119)	(5.046)	(2.912)
Observations	62,632	4,622	47,506	6,404	4,100
R^2	0.052	0.085	0.049	0.044	0.142
Number of firms	12,190	775	8,894	1,615	906
Number of countries	36	7	10	13	6

Source: authors' calculations.

Note: robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

[1]Robust standard errors (clustered by country), controlling for time and firm-level effects.

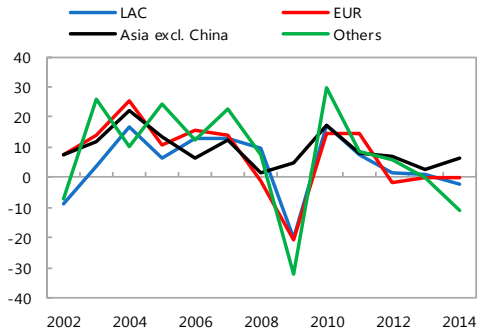
When then explore whether the overall results are mostly explained by one EM region or if they hold across regions. Table 3 reports the results of splitting the sample by regions. The

results on most of the main explanatory variables hold for most regions.[14] In particular, the coefficient on commodity export prices is positive and statistically significant for all regions.

B. Extension: The post-2011 Private Investment Weakening

Private investment exhibited strong growth in EMs in the period 2003–11, except in 2009, when the global financial crisis hit. After peaking in 2011, however, investment growth has gradually slowed (Figure 4). Most EM regions have shared a similar pattern of investment dynamics, with strong growth in the pre-crisis period, a sharp contraction in 2009 followed by a rapid and strong recovery, and a sustained deceleration since 2011. The latter was particularly pronounced in emerging Europe, where growth has stalled, and "Other" economies, where it actually turned negative in 2014.

Figure 4. Real Private Investment Growth, 2001–14
(In percent)



Sources: IMF, World Economic Outlook database; and IMF staff calculations.
Note: LAC=Latin America and the Caribbean; EUR=Europe; CIS=Commonwealth of Independent States.

But, which of the factors identified above have played the biggest role in explaining the recent investment deceleration? And have the key factors varied across EM region? To focus

[14] An exception is emerging Europe, where a few regressors (i.e., cash flow, leverage, and cost of debt) show the correct sign but are not statistically significant.

on the most recent (post-2011) period with the aim of answering these questions, we add to the equation a dummy variable (*RECENT*) that takes the value of one for all observations during this period. Here, we control for time effects through a time trend rather than year dummies (to mitigate multicolinearity problems).[15] We also add interaction terms, interacting the *RECENT* dummy with the main factors determining investment, in order to assess whether the marginal effect of any of the latter changed in the most recent period—in the full sample and for each region. Specifically, we estimate the following specification:

$$\frac{I_{ic,t}}{K_{ic,t-1}} = \alpha + \beta_1 Q_{ic,t} + \beta_2 \frac{CF_{ic,t}}{K_{ic,t-1}} + \beta_3 Lev_{ic,t-1} + \beta_4 \frac{\Delta Debt_{ic,t}}{K_{ic,t-1}} + \beta_5 Int_{ic,t-1} + \beta_6 P^x_{c,t-1} + \beta_7 KI_{c,t} + \delta RECENT + \eta_h RECENT * X^h_t + d_i + d_t + \varepsilon_{ic,t} \quad (14)$$

For $X^h_t = \left\{ \frac{CF_{ic,t}}{K_{ic,t-1}}, Lev_{ic,t-1}, \frac{\Delta Debt_{ic,t}}{K_{ic,t-1}}, P^x_{c,t-1}, KI_{c,t} \right\}$, respectively.

Table 4 presents the results for the full sample. The *RECENT* dummy coefficient is negative and statistically significant, pointing to weaker corporate investment during this period (column 1), while all the regressors (both firm-level and country-specific macro variables) retain their sign and statistical significance. Regarding the interaction terms, we observe that in the recent slowdown financial constraints relaxed (column 3), while the negative relationship between leverage and firm-level investment became stronger (column 4). At the same time, firms' investment sensitivity to changes in capital inflows and debt flows weakened in the post-2011 period (columns 5-6).

[15] Analysis of time effects through year dummies point to a clear downward trend, which supports the substitution for a time trend in the regression.

Table 4. The Role of the Main Factors in the Post-2011 Slowdown[1]

VARIABLES	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR	(7) ICR
ICR (t-1)	0.0907***	0.0905***	0.0911***	0.0906***	0.0904***	0.0909***	0.0906***
	(0.0191)	(0.0191)	(0.0191)	(0.0191)	(0.0191)	(0.0189)	(0.0191)
Q	0.0175***	0.0170***	0.0174***	0.0174***	0.0174***	0.0174***	0.0175***
	(0.00428)	(0.00445)	(0.00426)	(0.00429)	(0.00425)	(0.00429)	(0.00428)
Cash flow	0.0114***	0.0114***	0.0130***	0.0115***	0.0114***	0.0116***	0.0114***
	(0.00211)	(0.00211)	(0.00212)	(0.00212)	(0.00211)	(0.00210)	(0.00211)
Leverage (t-1)	-0.0316***	-0.0317***	-0.0315***	-0.0313***	-0.0315***	-0.0312***	-0.0316***
	(0.00310)	(0.00310)	(0.00312)	(0.00311)	(0.00306)	(0.00320)	(0.00308)
Interest expense ratio (t-1)	-0.0638**	-0.0644**	-0.0639**	-0.0638**	-0.0641**	-0.0638**	-0.0637**
	(0.0293)	(0.0299)	(0.0294)	(0.0292)	(0.0294)	(0.0293)	(0.0291)
Change in debt	0.00285***	0.00285***	0.00291***	0.00285***	0.00285***	0.00327***	0.00285***
	(0.00103)	(0.00103)	(0.00101)	(0.00103)	(0.00103)	(0.000855)	(0.00104)
Commodity export price (t-1)	0.000399***	0.000401***	0.000399***	0.000379***	0.000408***	0.000399***	0.000372***
	(9.46e-05)	(9.39e-05)	(9.42e-05)	(9.94e-05)	(9.40e-05)	(9.41e-05)	(9.65e-05)
Net capital inflows	0.00248***	0.00245***	0.00250***	0.00248***	0.00259***	0.00249***	0.00246***
	(0.000705)	(0.000687)	(0.000711)	(0.000704)	(0.000714)	(0.000710)	(0.000707)
Uncertainty	-2.11e-06	-2.02e-06	-2.13e-06	-2.24e-06	-2.09e-06	-2.09e-06	-2.29e-06
	(1.39e-06)	(1.34e-06)	(1.37e-06)	(1.46e-06)	(1.36e-06)	(1.39e-06)	(1.63e-06)
Recent	-0.00837*	-0.0136*	-0.00652	-0.00719	-0.00967**	-0.00761*	-0.00692
	(0.00417)	(0.00686)	(0.00400)	(0.00437)	(0.00389)	(0.00421)	(0.00458)
Recent * Q		0.00377					
		(0.00263)					
Recent * cash flow			-0.00749**				
			(0.00363)				
Recent * leverage (t-1)				-0.00453*			
				(0.00245)			
Recent * capital inflows					-0.00132***		
					(0.000383)		
Recent * change in debt						-0.00227*	
						(0.00115)	
Recent * commodity export prices							0.000356
							(0.000458)
Constant	7.809***	7.868***	7.799***	7.710***	7.862***	7.809***	7.691***
	(0.960)	(0.966)	(0.959)	(0.941)	(0.978)	(0.968)	(0.936)
Observations	62,632	62,632	62,632	62,632	62,632	62,632	62,632
R^2	0.052	0.052	0.053	0.052	0.052	0.052	0.052
Number of firms	12,190	12,190	12,190	12,190	12,190	12,190	12,190
Number of countries	36	36	36	36	36	36	36

Source: authors' calculations.

Note: robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

[1]Robust standard errors (clustered by country), controlling for time and firm-level effects.

To focus on the contribution of each factor in each emerging market region during the recent slowdown we run specification (14) for each region's firms separately. The results are shown in the Appendix (Tables A.2—A.4). Notably, corporate investment has become more sensitive to commodity export prices in Latin America and less so in emerging Asia (columns 5–6 in Table A.2), while leverage's role in explaining investment increased in emerging Asia and dropped in Latin America (columns 1–2 in Table A.3). Finally, the sensitivity to Q increased in emerging Europe (column 7 in Table A.3) while in Asia the

relationship between capital inflows and firm-level investment weakened (column 6 in Table A.4).

The contribution of each of the determinants to the post-2011 investment-to capital ratio slowdown in the average firm is computed by multiplying this period's change in each factor by its corresponding estimated marginal effect. Based on these regional regressions, the marginal effect of each variable in the recent (post-2011) period is computed as the sum of the coefficient associated with that variable and the coefficient on the interaction term (of that variable with the *RECENT* dummy), if the latter is statistically significant. Then, this marginal effect is multiplied by the change in the explanatory variable since 2011 to compute the overall contribution of the latter to the recent slowdown.

Formally, the contribution of each factor X in region j (conditional on being statistically significant) is given by

$$\left(\beta_j^h + \eta_j^h\right)\Delta X_j\Big|_{2011\text{–}13} \quad \text{for } X_j = \left\{\frac{CF_{j,t}}{K_{j,t-1}}, Lev_{j,t-1}, \frac{\Delta Debt_{j,t}}{K_{j,t-1}}, P^x_{j,t-1}, KI_{j,t}\right\}, \quad j = \text{LAC, ASIA, EUR, Other}$$

The recent weakening in business investment in the average firm can be, to a large extent, explained by the evolution of its main explanatory factors (Figure 5).[16] However, our results suggest that the relative contribution of each of the determinants has been different across regions. Lower commodity export prices emerge as the largest contributor to the slowdown, particularly for LAC economies. The substantial contributions of weaker commodity prices

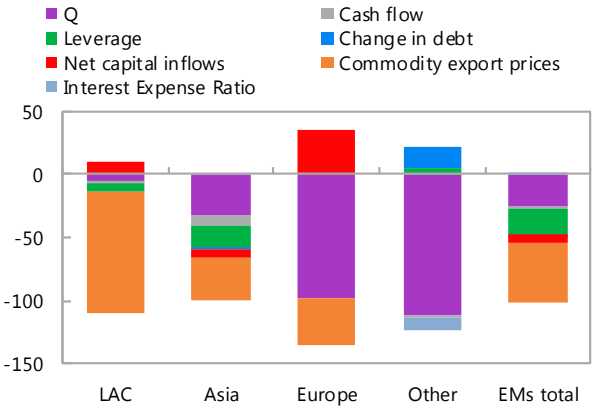
[16] The sum of the contributions of each variable adds to the fitted value presented in the figure. Thus, the illustrated fitted value does not include the impact of fixed effects.

to the decline in private investment growth observed since 2011 is not surprising given the large share of commodity sectors in private investment in this region.

Lower expectations of firms' future profitability (as measured by Tobin's Q) have also been an important factor behind the weakening of investment in EMs. This is likely to reflect, at least partly, the downward revisions to potential growth observed in many EMs during this period, as well as a general sense of leaner times associated with weaker external demand and tighter global financial conditions.[17]

Figure 5. Contributions to the Post-2011 Slowdown[1]

(In percent)



Source: authors' calculations.

[1]Relative contribution of each factor to the 2011–2013 investment slowdown.

Corporate investment has also been influenced by the declining availability of international financing in recent years, particularly in emerging Asia. A number of economies have seen a moderation in capital inflows since 2012,[18] and our firm-level regressions suggest that this explains a non-negligible share of the investment slowdown. Higher corporate leverage

[17] Potential GDP growth has slowed considerably in EMs as a whole, by about 1.2 percentage points since 2011. See Chapter 3 of the April 2015 *World Economic Outlook*.

[18] See Chapter 4 of the October 2013 IMF *World Economic Outlook* and the IMF 2014 *Spillover Report*.

(continued…)

(presumably increasing the external finance premium), and lower internal cash flow have also played a role, especially in Asian EMs.[19]

C. Robustness

We check the robustness of our results in several ways. First, we estimate the model using the difference-in-difference Arellano-Bond approach. The results for the baseline specification remain broadly unchanged (Table 5).

Table 5. Robustness: Arellano-Bond Specifcation[1]

VARIABLES	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR	(7) ICR	(8) ICR
ICR (t-1)	-0.233***	-0.231***	-0.233***	-0.228***	-0.228***	-0.261***	-0.262***	-0.262***
	(0.00750)	(0.00753)	(0.00753)	(0.00798)	(0.00797)	(0.00944)	(0.00943)	(0.00949)
Q	0.0155***	0.0151***	0.0151***	0.0139***	0.0137***	0.0132***	0.0132***	0.0126***
	(0.00132)	(0.00132)	(0.00132)	(0.00137)	(0.00136)	(0.00155)	(0.00155)	(0.00156)
Cash flow		0.00649***	0.00653***	0.0140***	0.0140***	0.0132***	0.0131***	0.0127***
		(0.00150)	(0.00151)	(0.00260)	(0.00253)	(0.00303)	(0.00302)	(0.00299)
Leverage (t-1)			-0.0801***	-0.0800***	-0.0737***	-0.0714***	-0.0704***	-0.0701***
			(0.00584)	(0.00622)	(0.00623)	(0.00736)	(0.00729)	(0.00732)
Interest expense ratio (t-1)				-0.0245	-0.0233	-0.0274	-0.0240	-0.0289
				(0.0254)	(0.0255)	(0.0280)	(0.0280)	(0.0285)
Change in debt					0.00256***	0.00211***	0.00210***	0.00208***
					(0.000764)	(0.000794)	(0.000791)	(0.000793)
Commodity export price (t-1)						0.000463***	0.000476***	0.000444***
						(5.09e-05)	(5.08e-05)	(5.10e-05)
Net capital inflows							0.00234***	0.00246***
							(0.000281)	(0.000280)
Uncertainty								7.57e-06***
								(1.74e-06)
Constant	23.23***	23.17***	23.67***	22.49***	22.34***	17.40***	17.39***	17.13***
	(1.079)	(1.071)	(1.086)	(1.100)	(1.096)	(1.271)	(1.271)	(1.282)
Observations	72,049	72,016	72,001	63,098	63,090	48,459	48,459	47,742

Robust standard errors in parenth
*** p<0.01, ** p<0.05, * p<0.1

Second, we use cash stock rather than cash flow to measure availability of internal funds. Some previous studies (e.g., Harrison and others, 2004) have used the cash stock because it is assumed to be less likely to be associated with the future growth opportunities than the cash

[19] The result for leverage is in line with Chapter 2 of the April 2014 IMF *Regional Economic Outlook: Asia and Pacific*.

flow measure (see Love, 2003 for further discussion). The results are reported in Table 6. Using cash stock rather than cash flow does not alter the results. Specifically, Tobin's Q, lagged leverage, the change in debt, commodity export prices, as well as the availability of foreign financing all have similar coefficients as before, both in terms of magnitude and statistical significance. Cash stock is also a significant explanatory variable of firms' capital spending, with its coefficient being positive and statistically significant.

Table 6. Cash Stock[1]

VARIABLES	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR
ICR (t-1)	0.0967***	0.0934***	0.106***	0.0933***	0.0916***	0.0889***
	(0.0126)	(0.0134)	(0.0164)	(0.0198)	(0.0198)	(0.0201)
Q	0.0207***	0.0201***	0.0196***	0.0186***	0.0183***	0.0181***
	(0.00451)	(0.00461)	(0.00478)	(0.00466)	(0.00446)	(0.00441)
Cash stock		0.000646***	0.00274**	0.00235**	0.00235**	0.00231**
		(0.000225)	(0.00102)	(0.00100)	(0.00100)	(0.000984)
Leverage (t-1)			-0.0390***	-0.0374***	-0.0368***	-0.0369***
			(0.00351)	(0.00302)	(0.00317)	(0.00329)
Interest expense ratio (t-1)			-0.0662**	-0.0585*	-0.0568*	-0.0541*
			(0.0282)	(0.0289)	(0.0300)	(0.0304)
Change in debt			0.00359***	0.00333***	0.00331***	0.00329***
			(0.00103)	(0.00116)	(0.00116)	(0.00116)
Commodity export price (t-1)				0.000448***	0.000472***	0.000473***
				(0.000114)	(0.000110)	(0.000111)
Net capital inflows					0.00214***	0.00219***
					(0.000660)	(0.000692)
Uncertainty						-1.71e-06
						(1.52e-06)
Constant	8.832***	8.780***	9.700***	9.086***	8.947***	8.501***
	(1.017)	(1.070)	(1.089)	(0.967)	(0.973)	(1.111)
Observations	94,183	88,273	79,319	60,541	60,541	59,398
R^2	0.030	0.032	0.056	0.048	0.050	0.048
Number of firms	16,512	15,281	14,126	11,414	11,414	11,344
Number of countries	38	36	36	34	34	34

Source: authors' calculations.
Note: robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
[1]Robust standard errors (clustered by country), controlling for time and firm-level effects.

To further test the robustness of our results, we include additional controls (Table 7). In particular, real GDP growth is added as a proxy for aggregate economic activity—with the previous results also holding. Commodity import prices are included as additional regressors, as they may affect the firms' cost of inputs, particularly in commodity-importer economies.

However, this variable appears to be not statistically significant—with all the other coefficients unchanged. We also lagged capital inflows and the change in debt to mitigate potential endogeneity problems, and results remain unaltered. In particular, in all these alternative specifications, the positive relationship between commodity export prices and firms' investment remains statistically and economically significant.

Table 7. Other Robustness Checks[1]

VARIABLES	(1) ICR	(2) ICR	(3) ICR	(4) ICR
ICR (t-1)	0.0904***	0.0912***	0.0913***	0.00254***
	(0.0191)	(0.0192)	(0.0190)	(0.000383)
Q	0.0177***	0.0168***	0.0180***	0.0277***
	(0.00426)	(0.00425)	(0.00430)	(0.000409)
Cash flow	0.0115***	0.0114***	0.0115***	0.00377***
	(0.00212)	(0.00212)	(0.00213)	(0.000194)
Leverage (t-1)	-0.0318***	-0.0315***	-0.0324***	-0.0294***
	(0.00310)	(0.00314)	(0.00292)	(0.000724)
Interest expense ratio (t-1)	-0.0661**	-0.0622**	-0.0691**	0.0849***
	(0.0298)	(0.0288)	(0.0291)	(0.00728)
Change in debt	0.00285***	0.00284***	0.00287***	
	(0.00104)	(0.00104)	(0.00103)	
Commodity export price (t-1)	0.000326**	0.000453***	0.000435***	0.000417***
	(0.000133)	(9.87e-05)	(0.000116)	(2.96e-05)
Net capital inflows	0.00236***	0.00230***		0.00197***
	(0.000703)	(0.000641)		(0.000127)
Uncertainty	-1.11e-06	-9.56e-07	-9.69e-07	-5.09e-06***
	(1.44e-06)	(1.21e-06)	(1.22e-06)	(7.43e-07)
Commodity import price (t-1)	0.000156			
	(0.000258)			
Real GDP growth (t-1)		0.00139*		
		(0.000736)		
Net capital inflows (t-1)			0.00104*	
			(0.000552)	
Change in debt (t-1)				0.000661***
				(9.60e-05)
Constant	8.831***	8.480***	8.787***	5.343***
	(1.021)	(0.970)	(1.006)	(0.184)
Observations	62,632	62,632	62,632	209,726
R^2	0.052	0.052	0.050	
Number of firms	12,190	12,190	12,190	35,047
Number of countries	36	36	36	36

Source: authors' calculations.

Note: robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

[1]Robust standard errors (clustered by country), controlling for time and firm-level effects.

Furthermore, we estimate the model without a few countries with the largest number of firms, such as China, Korea, and Taiwan, to rule out the possibility that these countries are driving the results (Table 8). However, the results hold when we exclude these countries from the sample. Although not shown here, results also hold if we add firm-specific sales as a control.

Table 8. Excluding Countries with the Most Firms[1]

VARIABLES	(1) ICR	(2) ICR	(3) ICR	(4) ICR	(5) ICR	(6) ICR
ICR (t-1)	0.0850***	0.0849***	0.0964***	0.0919***	0.0898***	0.0859***
	(0.0150)	(0.0148)	(0.0197)	(0.0232)	(0.0230)	(0.0232)
Q	0.0250***	0.0243***	0.0231***	0.0238***	0.0231***	0.0230***
	(0.00198)	(0.00190)	(0.00201)	(0.00194)	(0.00211)	(0.00208)
Cash flow		0.00581***	0.0115***	0.0110***	0.0110***	0.0107***
		(0.00174)	(0.00240)	(0.00212)	(0.00212)	(0.00202)
Leverage (t-1)			-0.0301***	-0.0319***	-0.0312***	-0.0313***
			(0.00337)	(0.00368)	(0.00387)	(0.00397)
Interest expense ratio (t-1)			-0.0458*	-0.0486	-0.0438	-0.0396
			(0.0242)	(0.0289)	(0.0280)	(0.0279)
Change in debt			0.00326***	0.00289**	0.00286**	0.00285**
			(0.00108)	(0.00118)	(0.00118)	(0.00118)
Commodity export price (t-1)				0.000442***	0.000475***	0.000479***
				(0.000158)	(0.000138)	(0.000142)
Net capital inflows					0.00199***	0.00206***
					(0.000675)	(0.000713)
Uncertainty						-3.59e-08
						(1.15e-06)
Constant	7.156***	7.207***	8.237***	8.502***	8.274***	7.833***
	(0.894)	(0.876)	(0.981)	(0.930)	(0.967)	(1.185)
Observations	57,851	57,837	50,580	44,416	44,416	43,249
R^2	0.029	0.035	0.061	0.059	0.061	0.059
Number of firms	10,372	10,372	9,392	8,558	8,558	8,486
Number of countries	35	35	35	34	34	34

Source: authors' calculations.
Note: robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
[1]Robust standard errors (clustered by country), controlling for time and firm-level effects.

As an additional robustness check, we excluded firms in the lower decile of capital stock levels, to ensure the results are not biased by them, and the results remained robust. We also run quantile regression, results also holding. Another extension to check the performance of

the model was to control for the size and for the degree of internationalization of the firm. Once again, our main results did not change.[20] [21]

As mentioned before, we also consider a specification including country fixed effects and the results remain unaltered. To control for time effects we use year dummies, and find evidence of a negative trend in investment-to-capital ratios. Thus, we then use a trend variable rather than year dummies and the baseline results do not change.[22] Finally, we also estimate the model including country-time dummies instead of the country-specific macroeconomic variables. The coefficients on the firm-level variables do not change substantially (both in terms of statistical and economic significance).[23]

To sum up, we find that beyond the standard firm-level variables used to explain investment, country-specific macroeconomic variables—notably commodity export prices –are important determinants of firms' investment decisions, and this result appears to be quite robust.

[20] Interestingly, we found that larger firms and firms highly integrated with international financial markets, all else equal, tend to invest more.

[21] To economize on space these results are not here, but they are available from the authors upon request.

[22] In the extension incorporating the "*RECENT*" dummy, as mentioned earlier, the trend variable is used to capture time effects, since having both year dummies and the *RECENT* dummy one would entail identification/interpretation issues.

[23] These country-time dummies capture time-varying idiosyncratic domestic factors, which are positively correlated with our country-specific macro variables—particularly commodity export prices. Our baseline specification given by equation (13) does not necessarily capture all possible domestic factors that may influence firms' investment. But this does not affect the interpretation of our results on commodity export prices, since these are mostly exogenous to the country and most likely are not affected by any other domestic variable not included in the model. That is, there may be other relevant domestic factors, for example a political cycle, but this should not be correlated with commodity export prices and therefore it should not be biasing the estimated coefficient of the latter.

V. Concluding Remarks

We find that commodity export prices are key to explain firm-level investment decisions, an aspect that appears to have been overlooked in the past. As commodity export prices increase, private sector firms increase their investment ratios. We show this by analyzing business investment using standard panel regression models drawing on a combination of firm-level data for about 16,000 firms for 38 EMs over the period 1990–2013. We also include a simple investment model consistent with this finding.

We also find that other country-specific macroeconomic variables such as profitability, debt stocks and flows, availability of external financing, and financial constraints also affect private-sector investment decisions, in line with the exiting literature. We also document which of all these factors (especially commodity export prices) and to what extent, have each of them driven the recent investment weakness, and how the contribution of each factor varied across regions.

APPENDIX

Table A.1. Firm-Level Panel Regressions: List of Countries

Country	Number of firms	Country	Number of firms
ARGENTINA	1,073	MOROCCO	538
BRAZIL	3,100	PAKISTAN	2,342
BULGARIA	1,164	PERU	1,436
CHILE	3,103	PHILIPPINES	2,708
CHINA	22,799	POLAND	3,602
COLOMBIA	753	ROMANIA	770
CROATIA	545	RUSSIAN FEDERATION	4,998
CZECH REPUBLIC	511	SERBIA	534
EGYPT	1,227	SINGAPORE	7,982
HUNGARY	563	SLOVAKIA	237
INDIA	17,480	SLOVENIA	361
INDONESIA	4,355	SOUTH AFRICA	5,381
ISRAEL	3,618	SRI LANKA	1,551
JORDAN	1,538	TAIWAN	17,997
KAZAKHSTAN	223	THAILAND	7,065
KOREA (SOUTH)	17,245	TURKEY	2,453
LITHUANIA	225	UKRAINE	375
MALAYSIA	12,814	VENEZUELA	378
MEXICO	2,096	VIETNAM	3,515

Table A.2. Regional Decomposition[1]

	LAC	Asia	Europe	Other	LAC	Aisa	Europe	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	ICR	ICR	ICR	ICR	ICR	ICR	ICR	ICR
ICR (t-1)	0.190***	0.0790***	0.0773**	0.150***	0.192***	0.0784***	0.0777**	0.150***
	(0.0362)	(0.0221)	(0.0320)	(0.0362)	(0.0351)	(0.0219)	(0.0314)	(0.0361)
Q	0.0131***	0.0160**	0.0224***	0.0272***	0.0131***	0.0160**	0.0229***	0.0264***
	(0.00297)	(0.00512)	(0.00571)	(0.00203)	(0.00295)	(0.00513)	(0.00583)	(0.00206)
Cash flow	0.0133**	0.0200***	0.00654	0.00868***	0.0136**	0.0190***	0.00137	0.00840***
	(0.00485)	(0.00463)	(0.00373)	(0.00123)	(0.00506)	(0.00382)	(0.00119)	(0.00100)
Leverage (t-1)	-0.0444***	-0.0327***	-0.0130	-0.0285*	-0.0444***	-0.0326***	-0.0132	-0.0283*
	(0.00886)	(0.00346)	(0.00835)	(0.0118)	(0.00892)	(0.00336)	(0.00876)	(0.0119)
Interest expense ratio (t-1)	-0.00960	-0.0782*	0.00788	-0.134*	-0.0113	-0.0747*	0.00356	-0.130*
	(0.0224)	(0.0391)	(0.0789)	(0.0572)	(0.0214)	(0.0376)	(0.0772)	(0.0581)
Change in debt	0.00256*	0.00267*	0.00135	0.00745**	0.00258*	0.00267*	0.000794	0.00757**
	(0.00126)	(0.00135)	(0.00116)	(0.00215)	(0.00127)	(0.00137)	(0.00159)	(0.00214)
Commodity export price (t-1)	0.000545**	0.000431***	0.000377***	-0.000161	0.000561**	0.000330**	0.000398***	-0.000172
	(0.000161)	(0.000123)	(0.000101)	(0.000359)	(0.000171)	(0.000128)	(0.000116)	(0.000356)
Net capital inflows	0.00296**	0.00247**	0.00404***	0.00190	0.00287**	0.00248**	0.00400***	0.00183
	(0.000875)	(0.000884)	(0.00123)	(0.00120)	(0.000868)	(0.000871)	(0.00121)	(0.00125)
Uncertainty	-1.91e-06**	-5.26e-06***	-3.15e-06	2.04e-06	-1.67e-06**	-7.28e-06***	-3.03e-06	2.59e-06
	(6.34e-07)	(1.49e-06)	(3.11e-06)	(4.75e-06)	(6.33e-07)	(1.44e-06)	(3.18e-06)	(5.24e-06)
Recent	-0.0228	-0.00460	-0.000560	-0.0272***	-0.00954	-0.0158**	0.000349	-0.0328***
	(0.0121)	(0.00490)	(0.0118)	(0.00415)	(0.0133)	(0.00584)	(0.0128)	(0.00595)
Recent * cash flow	0.00923	-0.00342	-0.00862	-0.00906**				
	(0.00607)	(0.00568)	(0.00507)	(0.00263)				
Recent * commodity export prices					0.00210***	-0.00122***	0.000389	-0.000298
					(0.000510)	(0.000301)	(0.000307)	(0.000788)
Constant	-0.0877	8.724***	8.706	10.36***	0.168	8.209***	8.840	10.42**
	(1.961)	(0.979)	(6.060)	(2.548)	(1.885)	(0.983)	(6.112)	(2.587)
Observations	4,622	47,506	6,404	4,100	4,622	47,506	6,404	4,100
R^2	0.087	0.049	0.047	0.145	0.087	0.050	0.044	0.144
Number of firms	775	8,894	1,615	906	775	8,894	1,615	906
Number of countries	7	10	13	6	7	10	13	6

Source: authors' calculations.

Note: robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

[1]Robust standard errors (clustered by country), controlling for time and firm-level effects.

Table A.3. Regional Decomposition[1]

	LAC	Asia	Europe	Other	LAC	Aisa	Europe	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	ICR	ICR	ICR	ICR	ICR	ICR	ICR	ICR
ICR (t-1)	0.192***	0.0788***	0.0774**	0.150***	0.192***	0.0787***	0.0771**	0.150***
	(0.0350)	(0.0221)	(0.0311)	(0.0361)	(0.0346)	(0.0220)	(0.0313)	(0.0360)
Q	0.0131***	0.0160**	0.0230***	0.0264***	0.0139***	0.0155**	0.0213***	0.0266***
	(0.00296)	(0.00515)	(0.00589)	(0.00219)	(0.00318)	(0.00530)	(0.00575)	(0.00174)
Cash flow	0.0135**	0.0191***	0.00138	0.00840***	0.0136**	0.0190***	0.00136	0.00840***
	(0.00504)	(0.00386)	(0.00120)	(0.00100)	(0.00508)	(0.00383)	(0.00119)	(0.00102)
Leverage (t-1)	-0.0454***	-0.0322***	-0.0132	-0.0282*	-0.0443***	-0.0328***	-0.0138	-0.0282*
	(0.00889)	(0.00347)	(0.00869)	(0.0117)	(0.00879)	(0.00347)	(0.00873)	(0.0118)
Interest expense ratio (t-1)	-0.0100	-0.0778*	0.00282	-0.130*	-0.00996	-0.0790*	0.00298	-0.130*
	(0.0221)	(0.0391)	(0.0773)	(0.0584)	(0.0216)	(0.0405)	(0.0775)	(0.0583)
Change in debt	0.00259*	0.00268*	0.000787	0.00757**	0.00259*	0.00267*	0.000754	0.00757**
	(0.00127)	(0.00136)	(0.00162)	(0.00214)	(0.00127)	(0.00137)	(0.00160)	(0.00215)
Commodity export price (t-1)	0.000566**	0.000399**	0.000350**	-0.000171	0.000540**	0.000434***	0.000394***	-0.000167
	(0.000168)	(0.000131)	(0.000120)	(0.000368)	(0.000164)	(0.000122)	(0.000109)	(0.000352)
Net capital inflows	0.00287**	0.00246**	0.00404***	0.00190	0.00299**	0.00244**	0.00396***	0.00191
	(0.000858)	(0.000880)	(0.00121)	(0.00126)	(0.000883)	(0.000856)	(0.00120)	(0.00117)
Uncertainty	-1.78e-06**	-5.73e-06***	-3.31e-06	2.39e-06	-1.96e-06**	-5.11e-06***	-2.86e-06	2.31e-06
	(6.49e-07)	(1.56e-06)	(3.27e-06)	(5.18e-06)	(5.82e-07)	(1.53e-06)	(3.20e-06)	(4.84e-06)
Recent	-0.0234*	-0.00382	-0.000558	-0.0306***	-0.0126	-0.0116	-0.0144	-0.0285
	(0.0111)	(0.00531)	(0.0106)	(0.00268)	(0.0149)	(0.00824)	(0.00936)	(0.0170)
Recent * leverage (t-1)	0.0102*	-0.00653*	-0.00757	-0.00235				
	(0.00496)	(0.00336)	(0.00614)	(0.00977)				
Recent * Q					-0.00468	0.00436	0.0105***	-0.00195
					(0.00569)	(0.00278)	(0.00285)	(0.00940)
Constant	0.0863	8.568***	8.428	10.39***	-0.0949	8.782***	9.041	10.36**
	(1.942)	(0.963)	(6.042)	(2.506)	(1.939)	(0.991)	(6.176)	(2.738)
Observations	4,622	47,506	6,404	4,100	4,622	47,506	6,404	4,100
R^2	0.087	0.049	0.045	0.144	0.087	0.049	0.045	0.144
Number of firms	775	8,894	1,615	906	775	8,894	1,615	906
Number of countries	7	10	13	6	7	10	13	6

Source: authors' calculations. Source: aut

Note: robust standard errors in parentheses. *** p Note: robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

[1]Robust standard errors (clustered by country), co [1]Robust standard errors (clustered by country), controlling for time and firm-level effects.

Table A.4. Regional Decomposition[1]

	LAC	Asia	Europe	Other	LAC	Aisa	Europe	Other
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	ICR	ICR	ICR	ICR	ICR	ICR	ICR	ICR
ICR (t-1)	0.193***	0.0790***	0.0767**	0.151***	0.192***	0.0786***	0.0777**	0.150***
	(0.0348)	(0.0220)	(0.0320)	(0.0358)	(0.0348)	(0.0221)	(0.0311)	(0.0362)
Q	0.0131***	0.0160**	0.0228***	0.0263***	0.0131***	0.0160**	0.0230***	0.0261***
	(0.00290)	(0.00515)	(0.00571)	(0.00206)	(0.00295)	(0.00510)	(0.00590)	(0.00234)
Cash flow	0.0139**	0.0191***	0.00228	0.00836***	0.0136**	0.0191***	0.00137	0.00841***
	(0.00531)	(0.00384)	(0.00160)	(0.00107)	(0.00508)	(0.00385)	(0.00120)	(0.00100)
Leverage (t-1)	-0.0444***	-0.0326***	-0.0104	-0.0283*	-0.0443***	-0.0327***	-0.0134	-0.0282*
	(0.00890)	(0.00356)	(0.00691)	(0.0120)	(0.00894)	(0.00340)	(0.00869)	(0.0117)
Interest expense ratio (t-1)	-0.0107	-0.0780*	0.00146	-0.130*	-0.0101	-0.0772*	0.00282	-0.130*
	(0.0218)	(0.0394)	(0.0772)	(0.0578)	(0.0222)	(0.0394)	(0.0777)	(0.0590)
Change in debt	0.00271	0.00295**	0.00238	0.00766**	0.00259*	0.00267*	0.000788	0.00758**
	(0.00146)	(0.00114)	(0.00150)	(0.00232)	(0.00127)	(0.00136)	(0.00159)	(0.00213)
Commodity export price (t-1)	0.000541**	0.000431***	0.000379***	-0.000166	0.000543**	0.000440***	0.000387***	-0.000164
	(0.000165)	(0.000123)	(0.000108)	(0.000355)	(0.000170)	(0.000124)	(0.000113)	(0.000364)
Net capital inflows	0.00293**	0.00247**	0.00402***	0.00192	0.00293**	0.00258**	0.00401***	0.00219
	(0.000888)	(0.000887)	(0.00121)	(0.00121)	(0.000870)	(0.000888)	(0.00119)	(0.00190)
Uncertainty	-1.90e-06**	-5.26e-06***	-3.13e-06	2.28e-06	-1.89e-06**	-5.11e-06***	-3.15e-06	2.02e-06
	(6.37e-07)	(1.49e-06)	(3.13e-06)	(4.88e-06)	(7.10e-07)	(1.49e-06)	(3.15e-06)	(5.04e-06)
Recent	-0.0197	-0.00481	-0.00232	-0.0311***	-0.0222	-0.00823	-0.00333	-0.0276*
	(0.0129)	(0.00510)	(0.0115)	(0.00382)	(0.0246)	(0.00511)	(0.00887)	(0.0126)
Recent * change in debt	-0.00319	-0.00148	-0.00357	-0.00223				
	(0.00668)	(0.000900)	(0.00271)	(0.00398)				
Recent * capital inflows					0.000603	-0.00138**	0.00126	-0.000779
					(0.00726)	(0.000465)	(0.00249)	(0.00200)
Constant	-0.0678	8.729***	8.817	10.38***	-0.0612	8.779***	8.659	10.51***
	(1.976)	(0.987)	(6.170)	(2.545)	(2.063)	(1.008)	(6.132)	(2.365)
Observations	4,622	47,506	6,404	4,100	4,622	47,506	6,404	4,100
R^2	0.087	0.050	0.047	0.144	0.087	0.050	0.044	0.144
Number of firms	775	8,894	1,615	906	775	8,894	1,615	906
Number of countries	7	10	13	6	7	10	13	6

Source: authors' calculations. Source: aut

Note: robust standard errors in parentheses. *** p Note: robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

[1]Robust standard errors (clustered by country), co [1]Robust standard errors (clustered by country), controlling for time and firm-level effects.

Effects of terms-of-trade shocks

Replicating (11)

$$q_t = [\pi_K(K_t, \theta_t) - c_K(I_t, K_t)] + \frac{1}{R}(1-\delta)E_t[q_{t+1}] \qquad \text{(A.1)}$$

Subtracting q_{t+1} from both sides and re-arranging (where $\Delta E_t q_{t+1} = q_{t+1} - q_t$),

$$E_t \Delta q_{t+1} = \pi_K(K_t, \theta_t) - c_K(I_t, K_t) + \frac{1}{R}\left(\frac{1-\delta+R}{R}\right)E_t[q_{t+1}]$$

In steady state, $\Delta E_t q_{t+1} = 0$ holds for $E_t[q_{t+1}] = \frac{R}{1-\delta+R}[c_K(I_t, K_t) - \pi_K(K_t, \theta_t)]$. Thus, the slope of the $E_t \Delta q_{t+1} = 0$ line is given by

$\frac{\partial E_t q_{t+1}}{\partial K_t} = \frac{R}{1-\delta+R}[c_{KK}(I_t, K_t) - \pi_{KK}(K_t, \theta_t)] > 0$, given that $c_{KK}(I_t, K_t) > 0$ and $\pi_{KK}(K_t, \theta_t) < 0$.

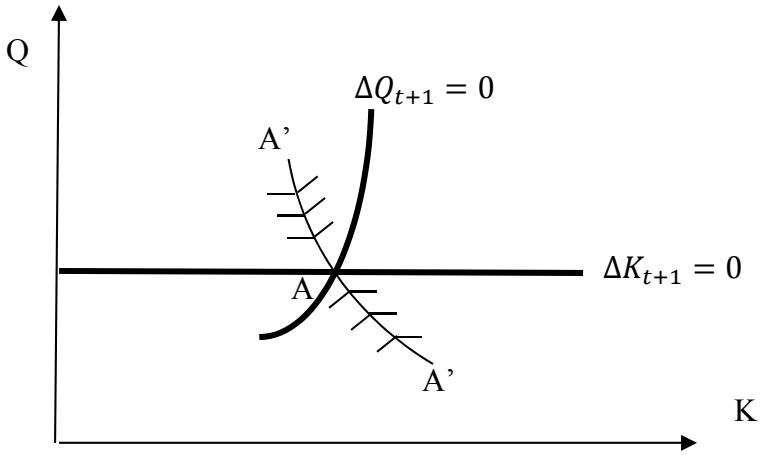
From (10) and (3),

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

Thus, $\Delta K_{t+1} = 0 <=> \mu - \delta = \frac{1}{b}\left(\frac{E_t[q_{t+1}]}{R} + e_t - 1\right)$, implying a zero slope.

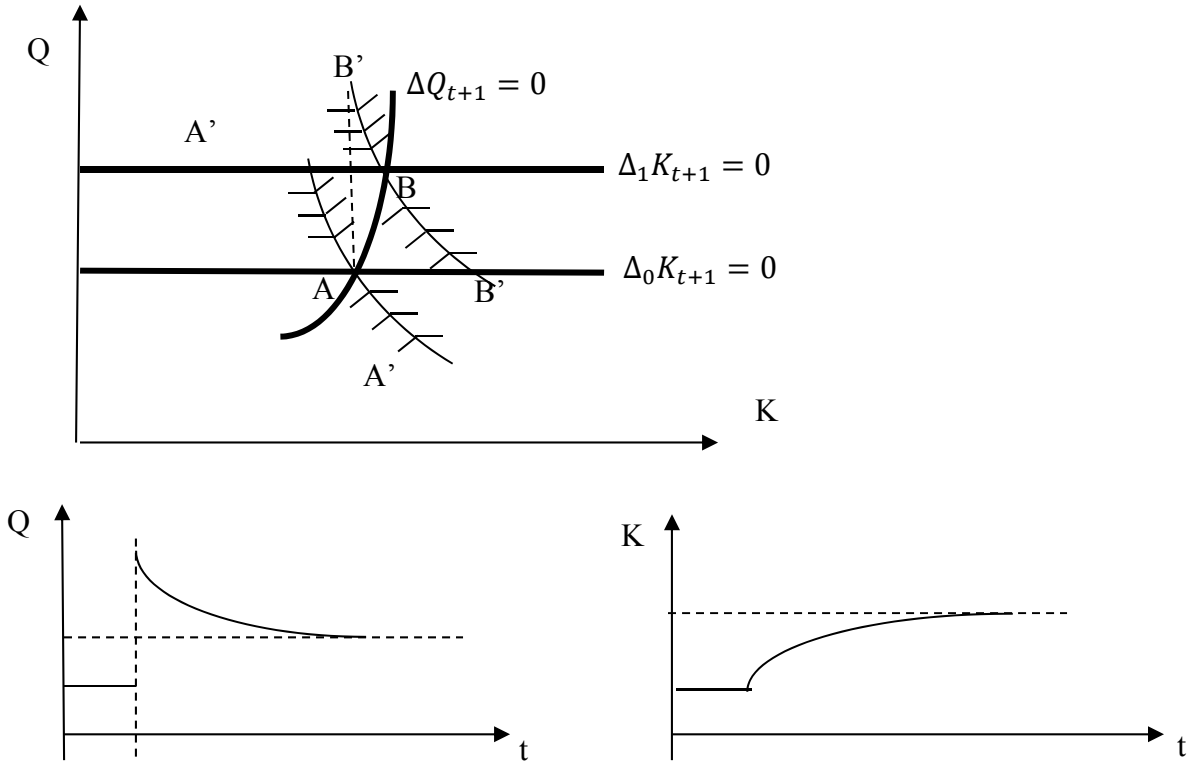
Figure A.1 shows the phase diagram, which uses the fact that $\frac{\partial E_t \Delta q_{t+1}}{\partial K_t}\Big|_{\Delta E_t q_{t+1}=0} = \pi_{KK}(K_t, \theta_t) - c_{KK}(I_t, K_t) < 0$ and $\frac{\partial \Delta K_{t+1}}{\partial E_t q_{t+1}} = \frac{1}{bR} > 0$.

Figure A.1

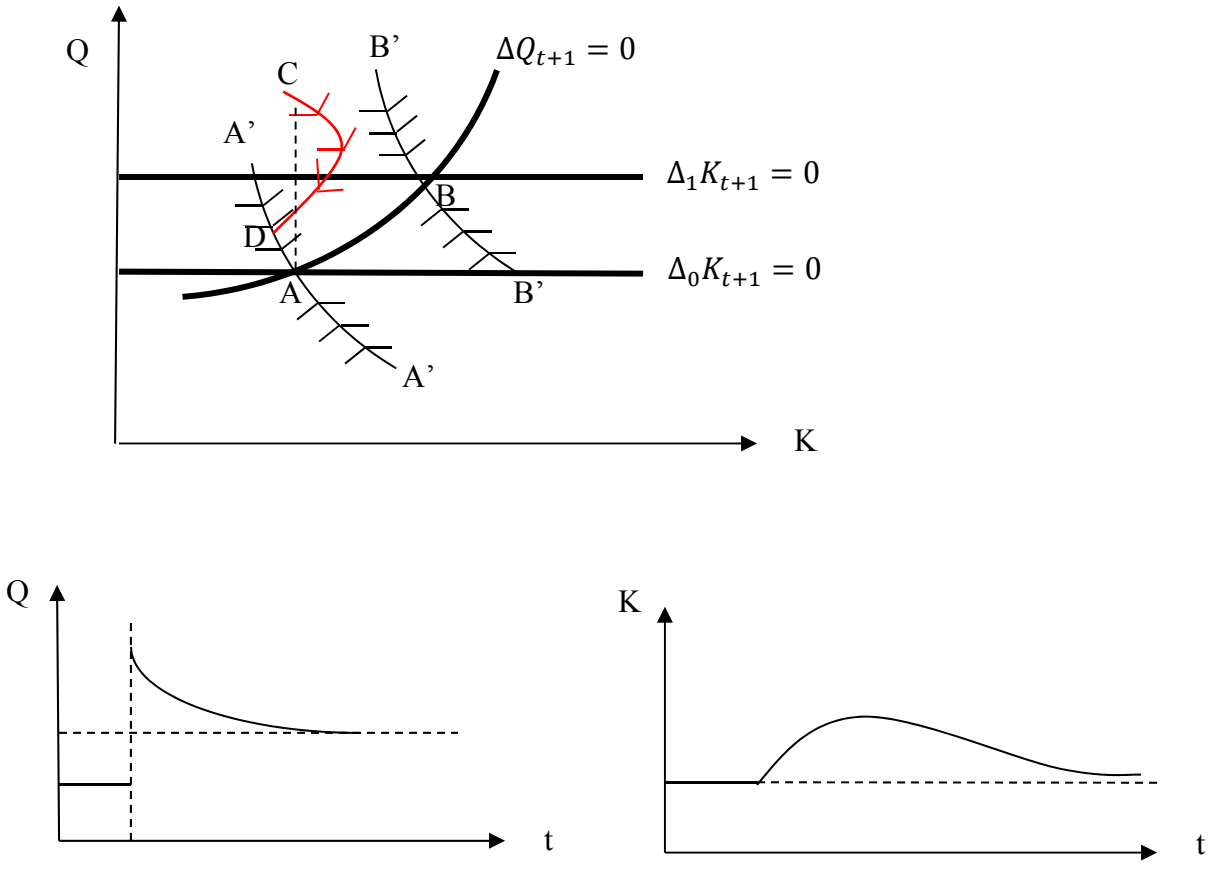


Notice that a real appreciation, an increase in e_t, shifts the $E_t \Delta q_{t+1} = 0$ schedule upwards, while $\Delta K_{t+1} = 0$ remains unaltered. Figure A.2 present the movements in the phase diagram, while Figure A.3 shows the dynamics over time of investment and Q in response to permanent and transitory shocks.

Figure A.2
Permanent increase in the terms-of-trade



Transitory increase in the terms-of-trade



REFERENCES

Abel, A. and J. Eberly (2011), "How Q and Cash Flow Affect Investment Without Frictions: An Analytical Explanation," *Review of Economic Studies* 78, pp. 1179-1200.

Baum, C., M. Caglayan, and O. Talavera (2008), "Uncertainty Determinants of Firm Investment," *Economic Letters* 98, pp. 282-287.

Blanchard, O., C. Rhee, and L. Summers (1993), "The Stock Market, Profit and Investment," *Quarterly Journal of Economics*, 108(1), 115-136.

Bloom, N., S. Bond, and J. Van Reenen (2001), "The Dynamics of Investment Under Uncertainty," Working Papers WP01/5. Institute for Fiscal Studies.

Brauman, R. and R. Kopcke (2001), "The Performance of Traditional Macroeconomic Models of Businesses' Investment Spending," *New England Economic Review*, November (2), pp. 3-39.

Brown, J. and B. Petersen (2009), "Why has the Investment-Cash Flow Sensitivity Declined so Sharply? Rising R&D and Equity Market Developments," *Journal of Banking and Finance*, 33, pp. 971-984.

Carpenter, R. and A. Guariglia (2008), "Cash Flow, Investment, and Investment Opportunities: New Tests using UK Panel Data," *Journal of Banking and Finance*, 32, pp.1894-1906.

Dixit, A. and R. Pindyck (1994), "Investment under Uncertainty," Princeton University Press (Princeton, New Jersey: Princeton University Press).

Druck, P., N. Magud, and R. Mariscal (2015), "Collateral Damage: Dollar Strength and Emerging Markets' Growth," IMF Working Paper 15/179 (Washington: International Monetary Fund)

Fazzari, S., G. Hubbard, and B. Petersen (1998), "Financing Constraints and Corporate Investment," *Brooking Papers on Economic Activity*, 1:1998, pp. 141–195.

Fazzari, S., G. Hubbard, and B. Petersen (2000), "Investment-Cash Flow Sensitivities are Useful: A Comment on Kaplan and Zingales," *The Quarterly Journal of Economics*, 115(2), 695–05.

Fernandez, A., A. Gonzales, and D. Rodriguez (2014), "Riding the Commodity Roller Coaster Together: Common Factors in Business Cycles of Emerging Economies," mimeo.

Forbes. K. (2007), "The Microeconomic Evidence on Capital Controls: No Free Lunch," in *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices, and Consequences*, Sebastian Edwards (editor), University of Chicago: University of Chicago Press for the National Bureau of Economic Research pp. 171–199.

Fornero, J., M. Kirchner, and A. Yany (2014), "Terms of Trade Shocks and Investment in Commodity-Exporting Economies," Central Bank of Chile Working Paper, mimeo (Santiago: Central Bank of Chile).

Gelos, G. and A. Werner (2002), "Financial Liberalization, Credit Constraints, and Collateral: Investment in the Mexican Manufacturing Sector," *Journal of Development Economics* Vol. 67, pp. 1-62.

Gilchrist, S. and C. Himmelberg (1995), "Evidence on the Role of Cash Flow for Investment," *Journal of Monetary Economics*, 36, pp. 541-572.

Gomes, J. (2001), "Financing Investment," *American Economic Review*, 1263–1285.

Gruss, B. (2014), "After the Boom–Commodity Prices and Economic Growth in Latin America and the Caribbean," IMF Working Paper 14/154 (Washington: International Monetary Fund).

Harrison, A., I. Love, and M. McMillan (2004), "Global Capital Flows and Financing Constraints," *Journal of Development Economics* 75, pp. 269–301.

Hayashi, F. (1982), "Tobin's Marginal Q and Average Q: A Neoclassical Interpretation," *Econometrica*, 50 (1), 213–224.

Ilzetzki, I., C. Reinhart, and K. Rogoff (2012) "Exchange Rate Arrangements into the 21st Century: Will the Anchor Currency Hold?" mimeo.

Kalemli-Ozcan. S., L.Laeven, and D. Moreno (2015), "Debt Overhang in Europe: Evidence from Firm-Bank-Sovereign Linkages," mimeo, forthcoming.

Kalemli-Ozcan. S., B. Sorensen, and S. Yesiltas (2013), "Leverage across Firms, Banks, and Countries," *Journal of International Economics*, Vol. 88, No. 2, March, pp. 495–510.

Kaplan, S.N., and L. Zingales (1997), "Do Investment-Cash Flow Sensitivities Provide Useful Measures of Financing Constraints?" *Quarterly Journal of Economics* 112, (1, February), pp.169-216.

Laeven L. (2003), "Does Financial Liberalization Reduce Financing Constraints?" *Financial Managemen*t, Vol. 32, No. 1, Spring.

Leahy, J. and T. Whited (1996), "The Effects of Uncertainty on Investment: Some Stylized Facts," *Journal of Money, Credit, and Banking*, Vol. 28, Issue 1, pp.64–83.

Li. D., N. Magud, and F. Valencia (2015), "Corporate Investment in Emerging Markets: Financing vs. Real Options Channel," IMF Working Paper 15/285 (Washington: International Monetary Fund).

Magud, N. (2008), "On Asymmetric Business Cycles and the Effectiveness of Counter-Cyclical Fiscal Policies," *Journal of Macroeconomics*, 30, 885–905.

Medina, J.P. and R. Valdés (1998), "Flujo de Caja y Decisiones de Inversión en Chile: Evidencia de Sociedades Anónimas Abiertas," *Cuadernos de Economía*, 36, diciembre, pp. 301–323.

Ross, K. and M. Tashu (2015), "Investment Dynamics in Peru," in *Peru: The Challenge of Managing Success*, by Alejandro Santos (editor), forthcoming (Washington: International Monetary Fund).

Tobin, J. (1969), "A General Equilibrium Approach To Monetary Theory," *Journal of Money, Credit, and Banking*, Vol. 1, (1), February, pp. 15–29.

Tornell, A. and F. Westermann (2005), "Boom-Bust Cycles and Financial Liberalization," The MIT Press, (Massachusetts: The MIT Press).