Essays in International Finance and the Political Economy of Capital Flows

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Essays in International Finance and the Political Economy of Capital Flows

A dissertation presented

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Abstract

The integration of global financial markets is a double-edged sword, paving the way for increased growth and cooperation while also sowing the seeds for notoriously destabilizing sudden stops and currency crises. This dynamic has generated academic and practitioner interest in studying the causes of capital flow cycles and factors which may help insulate countries from exposure to negative financial shocks. In this dissertation I examine how countries respond to and manage sudden surges in capital and the channels which encourage greater international flows. I analyse these patterns with both macroeconomic and firm-level measures of engagement in global capital markets.

The first chapter examines how responsive global capital markets are to elections, partisanship and executive turnover. Using quarterly data for a panel of emerging market and advanced economies from 1987-2018, I find sudden stops in gross foreign capital flows are more likely in quarters preceding national elections. Consistent with hypotheses on capital flows responding to policy uncertainty, I find this positive relationship is strongest for elections that exhibited a partisan switch, with a predicted increase in stop onset from 12% to 20%. I then examine how adjustments in macroprudential regulation evolve around capital flow episodes and how this relationship is mediated by the relative independence of central banking authorities. After experiencing a capital surge, states with low levels of central bank independence are less likely to tighten macroprudential regulations, while states with higher levels of central bank independence exhibit a higher likelihood of tightening. These results contribute to our understanding of when governments may react to financial inflow bonanzas with regulations that serve to lean-against-the-wind and may prevent or cushion future hard

landings.

The second chapter studies another management tool in the form of international reserves. For many analysts, a large war chest of international reserves is seen as a prudent means of self-insurance, but holding reserves comes at the cost of limiting monetary expansion and can be politically costly during election periods. I argue the dynamics of this political business cycle of reserve accumulation fundamentally change depending on whether a country is experiencing large inflows of foreign capital. During foreign inflow surges, failure to accumulate adequate reserves can generate a real appreciation of the exchange rate, destabilizing the exchange rate and eroding the competitiveness of export sectors. I find prevailing foreign capital availability and election timing interact to modify previously documented political business cycle relationships between reserve growth and election timing. During capital inflow surges, the predicted change in country-level reserve growth rates in election windows is a 0.15 standard deviation increase, while no significant changes are observed around elections in the absence of large prevailing foreign inflows.

The final chapter is a joint work with Taehoon Kim. In this chapter we turn to a source of foreign capital flows from the corporate sector and examine theoretical motivations for firm-level decisions to invest and operate in foreign jurisdictions. Using survey data collected by the US Bureau of Economic Analysis on both the intensive and extensive margins of the activities of US multinational companies (MNCs) and their foreign affiliates, we estimate the impact of MNC operations on the persistent spread between the return on assets (ROA) and the interest rate payments of firms. Our evidence indicates MNCs enjoy a 0.9% larger spread between ROA and average interest rate compared to when these same firms did not have large ownership holdings in foreign affiliates. We then introduce a model of MNC activity which can disentangle potential mechanisms to explain this spread and estimate the implied 'FDI Restrictiveness' of different regions based on observed patterns of foreign investment. Our simulations suggest some of the variation in firm performance can be accounted for by the incomplete integration of global financial market. These results highlight the role of US multinationals as global arbitrageurs in addition to being global risk-takers.

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Chapter 1

Elections, Partisanship and Capital Episode Onset and Management

1.1 Introduction

Sharp changes in capital flows and their consequences have received renewed academic attention, with scholars continuing to advance new measures defining and predicting abnormal volatility and also examining the menu of tools policymakers have available to manage, or mismanage, these flows. Key questions remain about the global and domestic forces which can catalyze a market reaction and kick off a sudden surge, or reversal, of capital investment. How markets react to political competition and uncertainty remains an open question, as do the questions of optimal policy responses to inflow "bonanzas" (Reinhart and Reinhart (2008)) and the constraints imposed by global finance and political forces.

This paper studies these dynamics with a focus on two related questions. First, I examine how political economy variables are associated with the onset of various capital flow changes. Consistent with theories of the negative impact of uncertainty on lending, I find that capital flow reversals are more likely to occur during competitive election periods where the future executive is less certain. I further find that while executive turnover is associated with foreign outflows, additional information on the partisan direction of that turnover is not an important

predictor. I also find several types of extreme capital flow episodes are more likely to occur under left-leaning governments, but no evidence this relationship is significantly different during election periods. Next, I analyze data on changes in macroprudential regulations to test if (1) regulatory changes precede sharp changes in capital flows and (2) which types of governments are more likely to respond to capital flow volatility with regulatory change. I present evidence that prior regulatory tightening is associated with decreased onset of capital inflow surges, and that capital inflow surges are met with increased regulatory tightening only in countries with high-levels of central bank independence. These results point to an important potential role of political economy forces in shaping capital flow trends and management and highlight the need to be mindful of these variables when considering which economies are poised to effectively absorb foreign inflows.

1.2 Literature Review

Economists have long studied the relationship between uncertainty and international investment, and political uncertainty quickly drew the attention of scholars examining sluggish private investment flows after debt crises. Bernanke (1983) and Rodrik (1991) provide early contributions likening policy uncertainty to a tax on investment, which ultimately can discourage flows. A key component to these models, and subsequent work, has been the *irreversibility* of physical investment; if an investor in the future decides to relocate a capital investment, they cannot costlessly recover and redeploy their initial investment. Rodrik (1991) demonstrates how this irreversibility can cause the uncertainty over future government support or taxation policies to stymie investment, even if actors are risk-neutral. The focus on irreversibility has naturally lead papers to be particularly interested in the relationship between uncertainty and FDI. Alesina and Tabellini (1989) describe how uncertainty over future fiscal policies generate capital flight and reduced domestic investment, ultimately leading governments to accumulate higher burdens of external debt.

Electoral competition can be a source of changes in uncertainty. A variety of empirical papers examine the relationship between political uncertainty and measures of investment

flows. Block and Vaaler (2004) and Vaaler *et al.* (2005) find credit rating agencies downgrade country ratings, and bond spreads rise, in developing countries in the months before an election. Bernhard and Leblang (2002) and Leblang (2002) focus on financial market and currency responses, finding speculative attacks are more likely in the aftermath of elections and that risk premia are higher when there is greater political uncertainty. Further studies by Leblang and Mukherjee (2005) and Bernhard and Leblang (2006) examine changes in bond yields, exchange rates and equity volatility around elections. More recent work by Brooks *et al.* (2022) find sovereign risk volatility, as measured by bond indices and credit default swap pricing, is reactive to both election proximity and partisan turnover in emerging markets. The authors observe increased volatility in sovereign risk measures after elections of left-leaning governments, but this increase in volatility dissipates in the months following an election. They attribute this pattern to the impact of partisanship primarily operating through an increased uncertainty channel, as opposed to a more general market hostility to left governments.[1] For a regional focus, see Martinez and Santiso (2003) which reviews additional examples in Latin American.

Other recent empirical papers from Julio and Yook (2016) and Honig (2020) look at investment flows directly. Examining FDI flows from US companies to foreign affiliates, Julio and Yook (2016) find elections in destination countries are associated with lower investment, especially when elections are more competitive. They further find that this relationship is mediated by institutional quality, where countries with more veto players exhibit a weaker relationship between these foreign flows and elections. Honig (2020) examines FDI flows from all foreign sources, finding these flows fall before elections in emerging and developing countries, but they also find limited evidence this relationship exists amongst advanced economies. Finally, the relationship between elections and capital flows runs both ways; capital flows can shape the results of elections and the policies candidates pursue to attract voters in the run up to elections. Chang (2010) provides a model endogenizing this relationship.

[1]They argue in developing countries left-leaning governments are associated with greater policy uncertainty and exhibit more diversity in fiscal policy outcomes.

A common theme of the models in both Rodrik (1991) and Chang (2010) is a mechanism where even comparatively small changes in uncertainty can produce magnified shocks in the response of capital flows.

A separate strand of work in the economics literature studies extreme changes in capital inflows and outflows.[2] Early studies focused on defining these events based on large deviations from historical trends or thresholds of capital flows (Reinhart and Reinhart (2009); Cardarelli *et al.* (2010)). After identifying these capital flow episodes, these studies proceed to examine the behaviour of a range of macroeconomic variables around these events, documenting the distinct 'V-shaped' pattern exhibited by many metrics that suffer a sharp dip when capital inflows stop. Sharp reductions in capital inflows have been associated with generally negative economic outcomes and financial crisis. Given this risk from capital reversals, other studies have considered if capital inflows can be managed to avoid or mitigate the negative effects of a reversal, finding an important role for fiscal discipline and mitigation of exchange rate appreciation (Cardarelli *et al.* (2010)) and for reserve holdings (Frankel and Saravelos (2012)). The destabilizing nature of these events has also spawned a literature focusing on early-warning systems to identify impending crises (see Frankel and Saravelos (2012) and Catão and Milesi-Ferretti (2014) for summaries).

Later papers by Forbes and Warnock (2012) and Ghosh *et al.* (2014) added to this literature by explicitly analysing theoretical and empirical predictors for the onset of capital inflows. These papers document the importance of global "push" and domestic "pull" factors in determining when countries may be subject to large changes in capital flows. Global push factors are thought of as being largely exogenous from the perspective of the recipient country and include risk appetite and volatility along with real returns on investment in the US and other advanced economies. These factors are expected to influence the rates of return available to investors and their willingness to send capital abroad, but in isolation these variables cannot fully explain *which* locations are the final recipients of these flows. Domestic pull factors may complete the picture. Conditional on global push factors encouraging general increases

[2]These extreme events are variously referred to as surges, bonanzas, sudden stops or reversals.

in external investment, country-level variables can determine if a specific location is chosen for investment. These domestic pull factors include capital account openness, real exchange rates, financial market depth, debt, growth levels and general measures of institutional quality which can all make a country a more attractive destination for foreign capital. Global and regional contagion can also play important roles, especially when investors use geography and levels of development as a heuristic (Brooks *et al.* (2015)).

While finding robust economic predictors for large capital flow events, this literature has given less attention to the political economy variables outlined above, especially the roles of electoral timing and the political business cycle. This paper contributes to the literature on identifying capital flow onsets by incorporating political economy measures into previous works. Using a series of binomial regressions, I find elections and partisanship are robust predictors of various capital episodes, but the exact relationship depends on the specific type of capital flow being considered. Capital flow episodes are more likely to occur in quarters close to elections and are more likely to occur when left-wing governments control the executive. I also explicitly analyze the relationship between these flows and different partisan switches in government that are brought about by elections.

I further contribute to this literature by examining the role of capital controls and other macroprudential policies on capital flows, and the interaction between these policies and institutional constraints. I also use a broader data set which covers inflows and outflows from both domestic and international sources across a wide range of investment types, including: FDI, debt, equity and bank flows. This decomposition reveals additional nuances to the relationship between political economy variables and capital flows with different degrees of commitment.

1.3 Theory

1.3.1 Role of Election Timing

The timing of elections could influence capital flows from a variety of direct and indirect sources. First, we can think about the reaction of market participants to government competition. Upcoming elections increase political uncertainty, and thereby generate economic uncertainty which can inhibit capital inflows. This uncertainty is expected to be greater when elections are more competitive, or an actual change in executive leadership is more likely to occur. Foreign and domestic capital holders are responsive to expected returns and risk perceptions. Elections may entail general risk about the direction of future policies, both in terms of economic growth, exchange rate levels, inflation and taxation. To the extent that elections increase this uncertainty, we would expect capital to flow out of a country and into substitute locations. Both domestic and foreign capital owners may thus withdraw money (making a surge less likely and a stop more likely; similarly on the domestic side of things this prediction would suggest elections make a capital flight more likely and a retrenchment less likely).

If uncertainty were the only driving force, we might therefore expect elections to be associated with capital outflows, both from domestic and foreign holders. However, elections themselves may bring about a change in expected investment returns, and possibly the ability to freely move capital across borders. Countries and politicians compete to attract scarce capital. The benefits of attracting capital to fund new business ventures, housing starts, or other activities may deliver short-run economic (and political) benefits that policymakers covet when political time horizons shorten.[3] For this reason, policymakers may alter *de jure* or *de facto* policies to attract new (and maintain existing) capital investments. These changes could come in the form of regulatory forbearance, regulatory loosening, restrictions on outflows (for domestic agents), interest rate changes, and reserve requirements, to name a few (Broz (2013)).

[3]See Kose *et al.* (2009) for a critical review of the benefits of capital account liberalization in developing countries where financial liberalization appears to be neither a sufficient nor a necessary condition for growth.

The relationship between election timing and capital flows may also differ for foreign and domestic agents. Foreign agents may have easier access to investments in multiple external locations (e.g. a US investor could move investments from Mexico to Brazil). This would be more true if there are fixed costs of entry associated with investing in any location abroad, but conditional on investing abroad, the marginal costs of moving capital to another country are low for foreign investors already investing globally. Domestic agents seeking to send money outside of their home country may have to bear these initial fixed costs in a way that foreign investors already have. Thus, we might expect foreign investors to be more responsive to changes around elections. In contrast there may need to be relatively larger changes to induce a behavioural change from domestic investors. These predictions would point to foreign capital being more nimble than domestic capital.

Information asymmetry may also further divide foreign and domestic agents. If domestic capitalists have an informational advantage (compared to international investors), they may gain more information during election windows. This information gain could lead to less uncertainty, but whether this would encourage or discourage domestic capital outflows depends on if the signal is positive. Domestic agents which more reliably receive signals of pessimistic news may still opt to send capital abroad.

1.3.2 Role of Partisanship

In the previous section, I argued that political uncertainty increases around elections – especially where partisan turnover is more likely – and that this political risk generates corresponding policy uncertainty which produces a market reaction. For this argument to hold, market actors must perceive both (1) partisan differences in policy preferences and (2) that these differences significantly alter attractiveness of investment in a country. This section considers when these requirements are met.

One area of international finance that has generated discussion on the role of partisanship is the literature on sovereign debt. This literature argues external investors have a general preference for countries that can signal macroeconomic restraint and a higher propensity to

repay. Partisan divisions factor into these preferences as they shape expectations about future repayment and thus the attractiveness of foreign investment. The probability of repayment can be eroded due to both a reduction in economic capacity to pay (*e.g.* through changes in tax rates or government expenditure that alter the fiscal position of a country) or through a reduction in the *willingness* of governments to repay. Even if the economic position of a country does not change, the cost of debt repayment does not fall evenly across societal groups and different partisans may prioritise different domestic interests (Frieden (1991a)). During crises, the burden of repayment has often fallen upon labor, public sector employees and groups relying heavily on government support (Vreeland (2002); Tomz (2004); Curtis *et al.* (2014)). This work often predicts negative market reactions to left governments that are viewed as less connected to internationally oriented actors and therefore less likely to prioritize external repayment if it comes at the cost of imposing domestic austerity.[4] If Left governments are expected to bow to this pressure, investors will update their risk assessments and reallocate capital accordingly.[5] Left governments may also recognize these perceptions and *overcompensate* to send a stronger signal to markets. When this is the case, left governments may actually show stronger commitments to repayment because they have less room-to-move than their right-wing counterparts given markets may be more fickle to policy movements from the Left.

While the above arguments are framed around sovereign debt, the story is more complicated when looking at private credit flows. Ahlquist (2006) examines how capital inflows to developing countries respond to policy changes and finds that portfolio investors are more responsive to fiscal policy while direct investors are more sensitive to changes in political institutions than macroeconomic policies. Pinto and Pinto (2008) argues the response of FDI to partisanship will depend upon the alignment of government and sectoral ties. In their argument, the

[4]The stark choice policymakers face when committing to external repayments was on display in Argentina in December 2021 where a rallying cry of protests against IMF repayment was "la deuda es con el pueblo no con el FMI" - the debt is with the people, not the IMF.

[5]Domestic debtors were in fact prioritized in the Argentine case in 2000-2001 when domestic residents' debt was rolled over to new instruments that received favorable treatment compared to foreign bond holders (Tomz and Wright (2013))

political risk of FDI decreases when a foreign firm's production activities complement the factor endowments tied with the current partisan government. This model predicts the composition, rather than the magnitude, of FDI flows will have a larger response to partisan changes.[6] Pinto (2013) further argues that the alignment of pro-labor and foreign capital interests can result in foreign direct investors preferring left governments as a form of 'exchanging hostages.' In their model, both right and left governments have incentives to ex-post overtax FDI for classical obsolescence bargaining reasons, but labor constituencies which have shared interests with foreign capital investors act as a greater restraint on pro-labor left governments. Beyond these discussions on FDI, Broz (2013) argues that right-wing parties deregulate and encourage financial booms which can fund credit expansion and fill fiscal deficits created by tax cuts. This builds on the "twin deficit" relationship between fiscal deficits and current account deficits. Chinn and Frieden (2011) note how these policies can fuel federal deficits, consumer debt and housing price booms. At the same time, a prominent concern for international investors is price stability, in terms of both exchange rates and inflation, and some argue left-wing governments are more likely to defend exchange rate regimes (Walter (2009)). Further, for external investors making long term commitments tied to the local economy, as in the case of FDI, it is not obvious if this group would prefer to invest in a location which prioritizes international stability at the expense of mobilizing monetary policy as a form of counter-cyclical demand management.

Finally, changes in partisanship may be irrelevant when actors cannot reliably implement their preferred policies. Differences in partisan preferences must be able to manifest for there to be a market reaction. On this point, Sattler (2013) provides evidence that stock market reactions to partisan switches are muted in countries with high constraints that mitigate the ability of new governments to change policy. Beyond the number of veto players, other forms of constraint include delegation of monetary authority to independent central banks (Bodea and Hicks (2015)) adoption of fixed exchange rates (Broz (2002a)) and – in the case of sovereign debt repayments – general democratic advantage (Jensen (2003); Schultz and

[6]See Pandya (2016) for a broader review of recent findings related to the political economy of FDI.

Weingast (2003); Archer *et al.* (2007); Ballard-Rosa *et al.* (2021)).

The balance of these forces makes ex-ante predictions about the relationship between partisanship and broad changes in capital flows ambiguous, but given my focus on the onset of extreme deviations in capital flows, I expect the uncertainty channel to be a more important driver of large changes than general alignment of interests between partisans and external investors (e.g. the Left and labor-complementing FDI), where the latter channel may produce a more gradual market response which is less likely to constitute an extreme sudden change. This suggests capital outflow episodes would occur around the installment of left governments with weaker ties to domestic interests aligned with international creditors.

1.3.3 Interaction of Partisanship and Election Timings

There may also be an important interactive effect between electoral timing and partisan ideologies as different parties may use different tools to encourage investment around elections or be associated with different types of uncertainty. Brooks *et al.* (2022) examine changes in government bond market values around elections and find that abnormal returns are not associated with most elections, but abnormal returns are more likely when elections generate a change in government. They argue that the market reaction to left-wing governments is primarily an increase in volatility, rather than a consistent partisan-based reward or punishment. Volatility emerges due to policy uncertainty, but this uncertainty is unwound in the months after a new government comes to power and its policy positions are revealed.

Further, capital flows are responsive to fiscal and monetary policies, and these policies themselves are a function of partisan policy-making and institutional quality (Céspedes and Velasco (2012)). This opens a separate channel for political uncertainty to encourage capital flight and other market responses (Alesina (1988); Alesina and Tabellini (1989); Rodrik (1991)). Different partisans may prioritize fiscal transfers to different domestic groups, and in doing so alter the expected return on investment in a location. In addition to direct transfers, Alesina and Tabellini (1989) demonstrate how this uncertainty, through its effect on external debt, indirectly encourages capital flight. Under political uncertainty, current governments

are at risk of being replaced after the next election. As a result, these governments do not fully internalize the costs of servicing debt in the future; the opposition party may have come to power when the debt comes due and it will fall to them to bear the cost of debt service. This failure to fully internalize the cost of debt makes debt more attractive and can lead policymakers to overborrow. This overaccumulation however can make a location less attractive for investment, as governments may decide to reduce excessive debt through repudiation or revaluation. In this way, political uncertainty influences both the response of actors but also policy makers *ex-ante* decisions.

In the next section I introduce the data and strategy used to empirically examine the associations between these political economy forces and sharp changes in capital flows.

1.4 Data Description

1.4.1 Defining Capital Flow Episodes Data Description

In this context, a capital flow episode refers to a large change in the inflows (outflows) of capital a country receives (sends).[7] Capital flows themselves have been measured in a variety of ways: Reinhart and Reinhart (2009) used large current account deficits as a proxy for inflows, Cardarelli *et al.* (2010) and Ghosh *et al.* (2014) examined net capital flows while Forbes and Warnock (2012) and Forbes and Warnock (2021) examined gross capital inflows and outflows. In the analysis that follows, we use gross capital flows as a measurement for two primary reasons. First, by examining gross flows, capital flow episodes can be delineated between those arising from changes in behaviour of domestic agents and those stemming from changes in the behaviour of international investors. Differentiating between domestic and foreign capital may be particularly important when examining capital flow shocks around elections as domestic agents may have an informational advantage during these times. Second, studies focusing on net capital flows have primarily been applied to emerging market economies (EMEs) and

[7]In this paper I follow the convention from Forbes and Warnock (2012) and will use *Surges* and *Stops* to refer to extreme capital flow events for foreign capital. *Flights* and *Retrenchments* refer to similarly large changes in capital flows from domestic agents.

used threshold analyses based on the ratio of net flows to GDP to identify extreme surges relative to both a country's own flows and flows in the entire sample. This technique would fail to consistently identify capital flow episodes in advanced economies with lower net capital to GDP ratios across the entire sample, even though those countries might be experiencing large flows relative to their own history. The construction using gross capital flows developed in Forbes and Warnock (2021) allows us to measure what is happening in both sides of the account. This approach also allow for better identifying events for advanced economies, which are more prone to large swings in gross inflows and outflows that may cancel each other out and show little movement in net flows.

1.4.2 Types of Capital Flow Episodes

Forbes and Warnock (2021) extend definitions of capital flow episodes to cover four broad categories, depending on the flow type (inflow or outflow) and the direction of the change. The events are defined as:

- *Surge*: a sharp increase in gross inflows
- *Stop*: a sharp decrease in gross inflows
- *Flight*: a sharp increase in gross outflows
- *Retrenchment*: a sharp decrease in gross outflows

Surge and *Stop* capture flows coming from external sources, while *Flight* and *Retrenchment* measure the activities of domestic agents. As an example, if foreign investors begin sending more funds to a country, that would be classified as a Surge. If domestic agents bring back money they had previously held abroad, that would be classified as a Retrenchment. Stops and Flights are defined analogously for capital leaving the country. Following the criteria from Forbes and Warnock (2012), an individual country is coded as experiencing one of the above episodes across a period of multiple quarters if:

1. The year-over-year change in gross flows is one standard deviation above (below) the historical average (5-year rolling)

2. For at least one quarterly observation in the period, the year-over-year change in gross flows is two standard deviations above (below) the historical average (5-year rolling)

3. The length of the episode is at least two quarters

Using the above coding, I analyse data at the country-quarter level to estimate the relationship between when the various capital flow episodes occur and a variety of economic and political economy control variables which are introduced in the next sections.

1.4.3 Political Economy Controls

This paper focuses on executive party affiliation and election proximity as its key political economy variables. I explicitly incorporate variables of election timing and government partisanship into previous models estimating predictors of large changes in capital flows. The National Elections Across Democracy and Autocracy (NELDA V6) records elections dates which I use to create an indicator variable for if country is experiencing an election in a given quarter.[8] I also include separate lagged and forward versions of this measure to examine relationships in a window around elections. The "Election Window" variable presented below is a binary indicator of whether an election occurred within +1 quarter.

For party ideology, I use the 'execrlc' variable from the World Bank's Database of Political Institutions (DPI).[9] This measure categorizes the party affiliation of a country's executive in a given year into three categories (Right, Left, Center).[10]

[8]Coppedge *et al.* (2022)

[9]Scartascini *et al.* (2021)

[10]Following the approach of Brooks *et al.* (2022), I create a binary indicator from this measure denoting if the executive is coded as Left, and pool Right and Center observations into a single 'non-left' category.

1.4.4 Global / Regional Controls

Capital flow episodes exhibit global cycles, with many countries experiencing large deviations from historical flows at the same time (Reinhart and Reinhart (2008)). There have been general inflow waves in the 1980s, late 1990s prior to the Asian Financial Crisis (AFC) and another wave of global inflows at the end of the dataset coverage prior to the Global Financial Crisis (GFC).

The literature on push factors highlights the importance of global factors in accounting for this tendency for many countries to all experience inflow surges simultaneously. Key theoretical drivers of this include global risk aversion, low rates of returns in advanced economies and the search for yield. International investment entails additional risks beyond domestic investment, including currency risk, appropriation risk, legal frictions and restrictions on capital flows that could make it harder to reinvest money quickly. Investing abroad may therefore become more attractive when risk perceptions are lower and/or risk tolerance is higher. The literature has used the Volatility Index (VIX) from the CBOE to control for these risk perceptions, or the VXO which is a similar series which pre-dates the development of the VIX. I include the quarterly trailing average of the VXO at close as proxy for market perceptions of risk. Higher measures of this variable denote higher volatility and risk, and are expected to be associated with lower capital flows into emerging markets.

I also include several additional control variables from the dataset and analysis in Forbes and Warnock (2021). Given the theoretical importance of a search for yield in driving large capital flows, the analysis includes a measure of the change in interest rates in a subset of developed countries (US, Japan, UK and the EU area) as a proxy for safe returns in advanced economies.[11] When returns in advanced economies are larger, capital is expected to flow into these economies instead of other markets. Other key global control variables include global growth rates (quarterly growth in real economic activity) and global money supply growth

[11]The measure of interest rate used is the change in the average shadow short rate for the US, Japan, Euro area and UK (relative to 4 quarters earlier), as constructed in Clark *et al.* (2020) and Forbes and Warnock (2021). The shadow rate measure is designed to reflect the impact of asset purchases and other policies that may emerge when actual rates approach the zero bound.

rates.[12] A final control is the change in global oil prices, which has been identified as taking on increased importance in the post-GFC environment (Forbes and Warnock (2021)).

Capital flow episodes also historically tend to concentrate in geographic regions, and investors may use heuristics to evaluate the creditworthiness of a country based on perceptions of peers (Brooks *et al.* (2015)). To account for the probability of regional contagion, I include an indicator variable to control for whether any other countries in a region are also experiencing the same type of event (surge, stop, flight, retrenchment). Countries are divided into seven regions.[13] Regional flows are also an important potential control for general capital availability and corresponding investor risk-tolerance towards political risk (Ballard-Rosa *et al.* (2021)).

1.4.5 Domestic Economy Controls

Global push forces may be important in determining when capital flow waves occur, but domestic level pull factors have also been identified as important determinants of whether a specific country is the recipient of inflows (or subject to outflows). Papaioannou (2009) examines the impact of institutional quality on international bank lending, finding that political liberalizations and privatizations (along with other general structural changes) make an economy a more attractive destination for foreign bank capital. Other important domestic determinants of capital flows are general development levels, inflation and exchange rate stability, and capital controls. We incorporate several additional variables to control for these relationships. To measure capital controls, we use the Chinn-Ito 'kaopen' variable.[14] Also included as controls are country level measures of real GDP and GDP growth rates.[15] Summary statistics of the key variables are reported in Table A.1 in the appendix, and

[12]The global money supply is calculated as the sum of M2 in the United States, Euro-zone and Japan and M4 in the UK.

[13]Following definitions from Forbes and Warnock (2021), the regions are: North America, Western Europe, Asia, Eastern Europe, Latin America and Other.

[14]Chinn and Ito (2008)

[15]Real GDP growth rate is winsorized (at 1 percent). Later regression analysis includes this variable after standardization.

geographic coverage is reported in Table A.2. The final data set covers an unbalanced panel of 19 emerging market and 23 advanced economies from 1987-2018.

1.5 Regression Analysis of Capital Flow Episodes

To formally analyse the relationship between political economy variables and capital flow episode onset, I run a series of binomial regressions relating the variables outlined above and the onset of various capital flow episodes.[16] The key results are presented in Table 1.1, which includes both year and time fixed effects across all types of capital flow episodes.[17] The preferred model includes country and year fixed effects as there is a well documented tendency for large capital flow episodes to pool across several countries and regions simultaneously. While the baseline model includes some controls for these global trends, the addition of year-fixed effects helps to better control for these global trends when examining the desired relationship identified with the political economy variables. By the same token, certain countries have more volatile capital flows and are coded as having more episodes in the data sample. Country fixed effects help to control for unidentified time-invariant country-level factors that may make certain countries more attractive destinations for capital, or generate more variable flows.

Examining the results presented in Table 1.1 reveals evidence for the relationship between political economy variables, but this relationship is conditional on the type of flow being considered. The reported coefficients are non-transformed, and the relevant comparison point for individual coefficients is zero. First, election proximity appears to only be an important predictor of the onset of Capital Flow Stops (a large reduction in foreign capital inflows), where the coefficient on the Election Window variable is positive and statistically significant.

[16] Following the approach in Forbes and Warnock (2012), I use a complementary log-log link given capital flow episodes are by construction defined as uncommon deviations from historical trends and therefore a minority of the country-quarter observations are coded as having an event in any given time. Results are robust to using a logistic link.

[17] Tables A.3 and A.4 in the appendix present these results with no fixed effects and country fixed effects respectively. The key findings are not materially changed by altering these fixed effects.

Table 1.1: *Predictors of Capital Flow Episodes - Election Window*

	Surge	Stop	Flight	Retrench
Election Window	0.05	0.32***	0.14	0.10
	(0.15)	(0.10)	(0.12)	(0.14)
Left Gov.	0.37**	0.20	0.33**	0.38**
	(0.18)	(0.17)	(0.15)	(0.16)
VXO	0.00	−0.00	0.01	−0.01**
	(0.02)	(0.01)	(0.01)	(0.01)
Global Growth	0.14	0.28***	0.12	0.15*
	(0.11)	(0.08)	(0.10)	(0.08)
Global Money Growth	−0.00	0.02	−0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Interest Rates	0.20**	−0.08	−0.01	−0.24**
	(0.09)	(0.11)	(0.12)	(0.10)
Real GDP Growth (YoY)	0.09	−0.20**	0.00	−0.17*
	(0.10)	(0.08)	(0.08)	(0.10)
Oil Prices	0.00**	−0.01***	−0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	2.24**	1.38	1.75*	3.36***
	(1.01)	(1.04)	(0.95)	(0.86)
Capital Openness	0.32	0.37	−0.51	0.14
	(0.38)	(0.27)	(0.33)	(0.26)
Regional Contagion	−0.22	−0.05	−0.07	−0.05
	(0.16)	(0.16)	(0.19)	(0.14)
Fixed Effects	Country, Year	Country, Year	Country, Year	Country, Year
Num. obs.	3674	3814	3819	3814
Num. groups: country	42	42	42	42
Num. groups: year	31	32	32	32

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Transforming this coefficient to a risk ratio yields an estimate of 1.38 (95-percent confidence interval of 1.13 - 1.68). This indicates that, controlling for other variables, *Stop* episodes are 38 percent more likely to occur when a country is in an election window compared to when that country is not experiencing an upcoming election. This result is consistent with foreign capital perceiving more volatility around elections, which could push risk-averse investors to reallocate their capital. Election timing is not found to be a significant predictor of any other type of capital flow episode. Of note, the previous significance pattern is not found for *Flights*, which would correspond to domestic agents sending capital abroad. This could be due to foreign capital investments being more sensitive to potential uncertainty or foreign investors perceiving more uncertainty around elections. This result would also emerge if domestic agents face greater barriers to moving capital out of a country and are therefore less able to adjust in response to elections.

The regressions also reveal significant variation by partisan affiliation. *Surge*, *Flight* and *Retrench* episodes are more likely to begin when a Left government is in power, while a marginally positive (but non-significant) relationship also exists between Left governments and *Stops*. The predicted risk ratios for Left governments are 1.45 $(1.03 - 2.05)$ for *Surges*, 1.40 $(1.05 - 1.86)$ for *Flights* and 1.46 $(1.05 - 2.01)$ for *Retrenches*. While the confidence intervals are wide, all estimates are positive and the point estimates are of a meaningful magnitude. In general, this is consistent with capital flows exhibiting larger reactions under Left governments, but there is no strong evidence from these models for a systemically negative market reaction to left governments. The positive association between left governments and Surge onset is more consistent with markets favoring the left.

Turning to the global economic controls, most of the patterns are consistent with the findings in Forbes and Warnock (2012) and Forbes and Warnock (2021), while some variables are no longer significant after incorporating fixed effects and political economy controls. I do not find a significant relationship between the VXO and onset of surges or stops, which is not surprising given the inclusion of time fixed effects. Of note, VXO was found to no longer be significant for these flows only after incorporating year fixed effects. Table A.4

in the appendix presents the results from models with only country fixed effects. In these specifications, the coefficient on VXO is negative and significant for *Surges* and *Flights*, and positive and significant for *Stops*. These relationships are consistent with existing findings that when global volatility is higher, capital inflows tend to be smaller, and both domestic and foreign investors appear to keep more capital at home during these high-volatility times.

The coefficient on global growth is positive and highly significant in the cases of *Stops*, while positive but only marginally significant for the onset of *Retrenches*. When global growth rates are higher, the predicted probability of a *Stop* is higher. This is consistent with global growth acting in the opposite direction as the traditional "push" effects that can drive capital flows; when global growth is higher, the search-for-yield pressure is lower and capital may retreat. A final result that merits discussion is the coefficient on interest rates. This measure is negatively associated with the onset of *Retrench* episodes. This is consistent with domestic agents keeping funds abroad, rather than repatriating, when foreign rates are high. The positive coefficient in the case of *Surges* is more puzzling. The search-for-yield story predicts that when interest rates in advanced economies are higher, there is less of a need to invest in other countries, and the expected onset of capital surges is smaller. I find the opposite relationship.[18]

For domestic economic controls, capital openness is not a significant predictor in the models with fixed effects. This is not surprising as there is limited variability in capital openness at the country-level over the period. Higher domestic GDP growth exhibits a negative relationship with both *Stop* and *Retrench* episodes.

1.5.1 Elections and Full Executive Turnover

The above results suggest a relationship between election proximity and the onset of capital stop episodes. The theoretical mechanism outlined above relating to political business cycle forces and political risk suggest this relationship should be strongest around competitive

[18]The sign of these coefficient estimates for Surges matches the earlier findings from Forbes and Warnock (2012) and Forbes and Warnock (2021) in the full period (1986-2020) and post-crisis period (2010-2020), although the estimates are more precise in the regressions reported here.

elections. When elections are more competitive, there is greater market uncertainty about future policies. To test this, I re-run the previous analysis but I replace the Election Window variable with a binary indicator denoting if a country experienced a turnover in the executive in a given quarter. An executive turnover is defined as a partisan switch in the executive. I include this variable and its lagged measure to account for capital market reactions in the run-up to and immediate aftermath of changes in government. Table 1.2 presents the results of this analysis, which mirror earlier findings; *Stops* are significantly more likely to occur in quarters when a country is experiencing political turnover. When a leadership change occurs, it is reasonable to expect policy changes, and during these times, gross capital outflows increase. Further, the magnitude of the estimated relationship increased when examining executive turnover when compared to elections in isolation. Transforming to risk-ratios, Executive Turnover is associated with a 71 percent increase in the onset of capital stop episodes. While suggestive, this analysis cannot rule out other channels besides policy uncertainty. It could be the case that executive turnover is associated with more competitive elections, and these competitive elections could induce policy changes that capital markets are responding to.

1.5.2 Elections and Partial Turnover

Partisan switch may not appropriately capture uncertainty around elections if new leaders from the same party behave differently than their predecessors. To examine this, I re-run the turnover analysis for *Stop* episodes, but instead of examining a full turnover in the executive (a switch to a new party), I consider partial-turnovers, which indicate a new executive is coming into power but this new executive is of the same party as the previous executive. Table 1.3 reports the results. Partial executive turnover is not a significant predictor of capital stop episodes, suggesting the market response to elections is not merely a function of a new individual coming to power; a change in party orientation is crucial for these predictions.

For ease of comparison, Figure 1.1 presents the predicted probabilities for the onset of stop episodes for both full and partial executive turnover. While full turnover is associated with an increase of nearly 8 percentage points in the predicted probability of a Stop episode,

Table 1.2: *Predictors of Capital Flow Episodes - Executive Turnover*

	Surge	Stop	Flight	Retrench
Left Gov.	0.38**	0.22	0.34**	0.38**
	(0.18)	(0.18)	(0.15)	(0.16)
Executive Turnover	0.10	0.64***	0.12	0.14
	(0.21)	(0.18)	(0.22)	(0.24)
Executive Turnover Lag	0.30	0.58***	0.05	0.18
	(0.19)	(0.19)	(0.23)	(0.25)
VXO	0.00	−0.00	0.01	−0.01***
	(0.02)	(0.01)	(0.01)	(0.01)
Global Growth	0.15	0.27***	0.12	0.15*
	(0.11)	(0.08)	(0.10)	(0.08)
Global Money Growth	−0.00	0.02	−0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Interest Rates	0.20**	−0.08	−0.00	−0.24**
	(0.09)	(0.11)	(0.12)	(0.10)
Real GDP Growth (YoY)	0.09	−0.19**	0.00	−0.17*
	(0.10)	(0.08)	(0.08)	(0.10)
Oil Prices	0.00**	−0.01***	−0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	2.26**	1.54	1.74*	3.39***
	(1.01)	(1.05)	(0.96)	(0.87)
Capital Openness	0.33	0.37	−0.50	0.14
	(0.38)	(0.27)	(0.33)	(0.26)
Regional Contagion	−0.22	−0.04	−0.08	−0.05
	(0.15)	(0.16)	(0.19)	(0.14)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Num. obs.	3674	3814	3819	3814
Num. groups: country	42	42	42	42
Num. groups: year	31	32	32	32

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Table 1.3: *Capital Stop Onset and Partial Government Turnover*

	Stop
Left Gov.	0.20
	(0.18)
Executive Partial Turnover	−0.13
	(0.42)
Executive Partial Turnover Lag	0.01
	(0.47)
VXO	−0.00
	(0.01)
Global Growth	0.27***
	(0.08)
Global Money Growth	0.02
	(0.02)
Interest Rates	−0.08
	(0.11)
Real GDP Growth (YoY)	−0.20**
	(0.08)
Oil Prices	−0.01***
	(0.00)
Log(Real GDP)	1.43
	(1.04)
Capital Openness	0.37
	(0.27)
Regional Contagion	−0.04
	(0.16)
Country FE	Y
Year FE	Y
Num. obs.	3814
Num. groups: country	42
Num. groups: year	32

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

there is no significant change for elections that resulted in partial executive turnover. Given the incidence of Stops in the entire sample is 15%, the estimated magnitude is of practical significance.

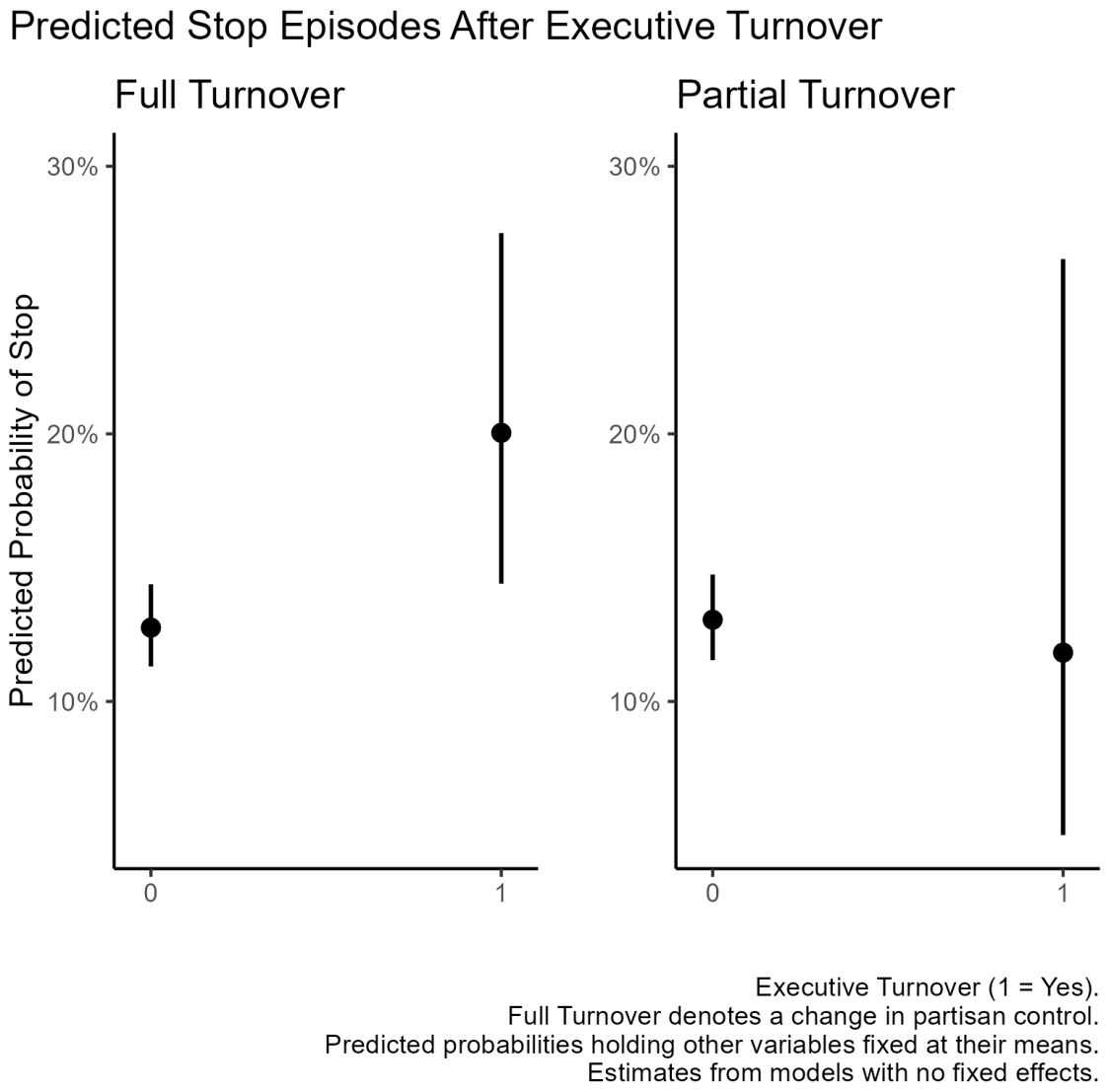


Figure 1.1: *Executive Turnover and Stop Episodes*

1.5.3 Partisanship of Turnover

Next we consider if capital flow episodes are more responsive to executive turnovers of a particular partisan direction. Does it matter if a turnover involves the replacement of a left-

wing government by a right-wing government? Vaaler *et al.* (2005) present evidence supporting this idea in the context of bond spreads. They find that when right-wing incumbents appear likely to be replaced by left-wing challengers, credit spreads on sovereign bonds are higher. The findings of Brooks *et al.* (2022) are more skeptical about the impact on spreads but do identify increased volatility after partisan switches. To test for this relationship in the context of capital flows themselves, I replicate the earlier analysis after incorporating an interaction between the government type and measures of executive turnover. The results of these estimates across all types of capital flow episodes are presented in Table 1.4. Focusing on stop episodes (which already exhibited the strongest relationship with executive turnover), the coefficient on the interaction between party and turnover is negligible and non-significant. This suggests a significant market response when there is executive turnover, but the partisan direction of that turnover does not materially change this prediction in the election quarter. The coefficient on the interaction between left governments and the lag of executive turnover is positive but non-significant.

1.5.4 Types of Capital Flows

The above analysis examined capital flow episodes based on the total of gross capital flows. However, previous literature (see Bernanke (1983) Rodrik (1991), Ahlquist (2006), Julio and Yook (2016), Honig (2020)) has emphasized FDI as being particularly responsive to uncertainty. I now examine this possibility by focusing on *Stop* episodes for various sub-types of capital flows.[19] I focus on *Stops* given the previous results only identify a consistent relationship between elections and these types of episodes. The results by capital sub-type are presented in Table 1.5. Columns 1-4 of the table report estimates from the previous model separately for four different types of foreign capital. For comparison, column 5 replicates the earlier result on total flows. I do not find evidence that a *Stop* in FDI flows is more likely around elections, instead, I find a weak and negative relationship. A similar weak negative relationship is

[19]These episodes are defined analogously to the earlier definitions used to identify episodes in total flows based on large deviations from recent historical trends.

Table 1.4: *Capital Stop Onset and Partisan Turnover*

	Surge	Stop	Flight	Retrench
Left Gov.	0.36**	0.19	0.29*	0.37**
	(0.18)	(0.19)	(0.15)	(0.17)
Executive Turnover	−0.10	0.63***	−0.13	0.17
	(0.28)	(0.24)	(0.34)	(0.28)
Executive Turnover Lag	0.41*	0.37	−0.37	0.06
	(0.22)	(0.23)	(0.37)	(0.27)
VXO	0.01	−0.00	0.01	−0.01**
	(0.02)	(0.01)	(0.01)	(0.01)
Global Growth	0.14	0.28***	0.13	0.15**
	(0.11)	(0.08)	(0.09)	(0.08)
Global Money Growth	−0.00	0.02	−0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Interest Rates	0.20**	−0.09	−0.00	−0.24**
	(0.09)	(0.11)	(0.11)	(0.10)
Real GDP Growth (YoY)	0.08	−0.19**	0.00	−0.17*
	(0.10)	(0.08)	(0.08)	(0.10)
Oil Prices	0.01**	−0.01***	−0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	2.18**	1.58	1.77*	3.42***
	(1.01)	(1.06)	(0.95)	(0.86)
Capital Openness	0.29	0.37	−0.50	0.14
	(0.38)	(0.27)	(0.33)	(0.27)
Left:Turnover	0.38	−0.02	0.44	−0.07
	(0.41)	(0.33)	(0.39)	(0.49)
Left:Turnover Lag	−0.24	0.60	0.76	0.34
	(0.50)	(0.38)	(0.57)	(0.40)
Country FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Num. obs.	3674	3814	3819	3814
Num. groups: country	42	42	42	42
Num. groups: year	31	32	32	32

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

found for Equity flows, while Bank and Debt flows exhibit insignificant positive relationships. Overall, elections are not a significant predictor for an onset of a *Stop* in any of the individual capital components, although elections are significant when looking at the aggregate (Column 5).

Table 1.6 replaces the election window variable with the previously used measure of government turnover. The general findings from the above analysis persist, but some relationships are significant when focusing on this more narrow definition of executive turnover and looking across multiple quarters around elections. In contrast to other findings, executive turnover is associated with a significantly decreased onset of sudden stops in FDI flows in the quarter of an election and the immediately following quarter when there was turnover in the executive. I find no evidence that FDI flows are likely to suddenly stop in the quarter before elections that ultimately feature executive turnover. This result is contrary to predictions that FDI may drop before elections and subsequently increase after political uncertainty is resolved.

The relationship between turnover and equity flow stops remains negative but non-significant. In contrast, there is a significant positive relationship between a stop in bank flows and executive turnover, which is strongest in the quarter of the election. When looking at the quarter before elections that feature turnover, stops in bank flows are weakly *less* likely to occur. Debt flows are also more likely to stop around elections featuring turnovers.

1.5.5 Advanced Economies and Emerging Market Economies

We might be concerned that capital flow trends differ based on levels of development. Much of the literature on sudden stop episodes and political uncertainty has focused on emerging markets, and prior to the onset of the Global Financial Crisis in 2007 many analysts viewed advanced economies as being insulated from these episodes. Further, uncertainties and political instability may be particularly relevant for emerging markets with less financial stability and weaker institutions (Martinez and Santiso (2003), Aghion *et al.* (2004)). To examine these potential differences, I next replicate the previous analysis examining executive turnover and *Stop* episodes for subsets of the data by development level.

Table 1.5: *Capital Stop Episodes - Capital Flow Subtypes*

	FDI	Bank	Equity	Debt	Total
Election Window	−0.17	0.17	−0.25*	0.11	0.32***
	(0.12)	(0.12)	(0.14)	(0.13)	(0.10)
Left Gov.	−0.16	0.09	−0.06	−0.23	0.20
	(0.21)	(0.16)	(0.18)	(0.15)	(0.17)
VXO	0.01	0.01	−0.02	−0.03**	−0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Global Growth	−0.07	0.03	0.24**	0.22**	0.28***
	(0.08)	(0.11)	(0.12)	(0.11)	(0.08)
Global Money Growth	0.01	−0.03*	0.02	0.04**	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Interest Rates	−0.22*	−0.09	0.09	−0.03	−0.08
	(0.13)	(0.09)	(0.12)	(0.10)	(0.11)
Real GDP Growth (YoY)	−0.08	−0.13	−0.02	−0.16*	−0.20**
	(0.09)	(0.09)	(0.09)	(0.09)	(0.08)
Oil Prices	−0.00	−0.01***	−0.00	−0.00	−0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	1.98*	−1.01	0.70	1.22	1.38
	(1.18)	(1.09)	(0.72)	(0.83)	(1.04)
Capital Openness	−0.51**	0.65**	0.05	0.20	0.37
	(0.25)	(0.30)	(0.30)	(0.24)	(0.27)
Regional Contagion	−0.20	−0.40**	−0.30*	0.11	−0.05
	(0.17)	(0.16)	(0.17)	(0.15)	(0.16)
Fixed Effects	Country, Year	Country, Year	Country, Year	Country, Year	Country, Year
Num. obs.	3779	3773	3550	3509	3814
Num. groups: country	42	41	40	44	42
Num. groups: year	31	32	32	30	32

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Standard errors clustered by country.

Table 1.6: *Capital Stop Episodes After Turnover - Capital Flow Subtypes*

	FDI	Bank	Equity	Debt	Total
Left Gov.	−0.17	0.10	−0.06	−0.23	0.22
	(0.21)	(0.16)	(0.18)	(0.15)	(0.18)
Executive Turnover	−0.68**	0.44**	−0.37	0.18	0.64***
	(0.32)	(0.22)	(0.32)	(0.21)	(0.18)
Executive Turnover Lag	−0.62**	0.32	−0.22	0.36**	0.58***
	(0.27)	(0.26)	(0.26)	(0.18)	(0.19)
Executive Turnover Forward	0.05	−0.49*	−0.13	0.09	0.01
	(0.16)	(0.27)	(0.23)	(0.26)	(0.22)
VXO	0.01	0.01	−0.02	−0.03**	−0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Global Growth	−0.07	0.03	0.24**	0.21**	0.27***
	(0.08)	(0.11)	(0.12)	(0.11)	(0.08)
Global Money Growth	0.01	−0.03*	0.02	0.04**	0.02
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Interest Rates	−0.22*	−0.09	0.08	−0.03	−0.08
	(0.13)	(0.09)	(0.12)	(0.10)	(0.11)
Real GDP Growth (YoY)	−0.09	−0.12	−0.02	−0.16*	−0.19**
	(0.09)	(0.09)	(0.09)	(0.09)	(0.08)
Oil Prices	−0.00	−0.01***	−0.00	−0.00	−0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	1.90	−0.91	0.65	1.26	1.54
	(1.17)	(1.11)	(0.73)	(0.84)	(1.06)
Capital Openness	−0.50**	0.64**	0.04	0.20	0.37
	(0.25)	(0.29)	(0.31)	(0.25)	(0.27)
Regional Contagion	−0.20	−0.40**	−0.31*	0.11	−0.04
	(0.17)	(0.16)	(0.17)	(0.15)	(0.16)
Fixed Effects	Country, Year	Country, Year	Country, Year	Country, Year	Country, Year
Num. obs.	3779	3773	3550	3509	3814
Num. groups: country	42	41	40	44	42
Num. groups: year	31	32	32	30	32

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Standard errors clustered by country.

Table 1.7 reports the results for advanced economies. In the full sample, executive turnover was found to be a significant predictor for stop episodes for FDI, Bank and Debt flows. In advanced economies, only the relationship for Bank and Debt flows remains significant, while FDI stop episodes no longer exhibit a significant relationship. Executive turnover is associated with an increased probability of a *Stop* in Bank flows in the period of turnover, and an increased probability of a *Stop* in Debt flows in the quarter following electoral turnover. This finding reflects the relative liquidity of Bank and Debt flows. However, contrary to predictions that FDI flows may exhibit a "wait and see" trend until political uncertainty is resolved, I find no significant association between turnover and the onset of stops in FDI flows for advanced economies.

Table 1.8 reports the results of the analysis for the subset of emerging market economies. While there is some loss in power when moving to this smaller sample, the broad patterns remain consistent. Of note, executive turnover (lagged) is found to be a significant and negative predictor for onset of Stop episodes for FDI flows, but not for any other capital flows. In contrast to the earlier theoretical predictions, FDI flows are less likely to stop suddenly in the quarters following an election that exhibited a turnover in the executive.

Table 1.7: *Capital Stop Episodes - Advanced Economies*

	FDI	Bank	Equity	Debt	Total
Left Gov.	−0.17	0.04	−0.00	−0.11	0.30
	(0.29)	(0.19)	(0.23)	(0.17)	(0.21)
Executive Turnover	−0.50	0.60**	−0.37	0.20	0.81***
	(0.42)	(0.29)	(0.43)	(0.26)	(0.23)
Executive Turnover Lag	−0.15	0.37	−0.32	0.41*	0.66**
	(0.31)	(0.33)	(0.39)	(0.22)	(0.26)
Executive Turnover Forward	−0.07	−0.85**	0.18	−0.03	−0.02
	(0.28)	(0.39)	(0.26)	(0.32)	(0.30)
VXO	0.02**	0.01	−0.02	−0.03**	−0.01
	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)
Global Growth	−0.08	0.11	0.14	0.16	0.41***
	(0.11)	(0.16)	(0.14)	(0.14)	(0.10)
Global Money Growth	0.01	−0.01	0.00	0.04*	0.03
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
Interest Rates	−0.31*	−0.26***	0.15	−0.04	−0.40***
	(0.18)	(0.09)	(0.16)	(0.16)	(0.12)
Real GDP Growth (YoY)	−0.15	−0.36**	0.03	−0.25	−0.45***
	(0.17)	(0.14)	(0.20)	(0.16)	(0.12)
Oil Prices	−0.00	−0.01**	−0.00	−0.00	−0.01**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	2.71	3.04	−0.85	2.78	6.02***
	(1.65)	(2.16)	(1.57)	(2.66)	(1.55)
Capital Openness	−0.32	1.61***	−0.26	−0.38	0.33
	(0.29)	(0.51)	(0.41)	(0.45)	(0.51)
Regional Contagion	−0.45**	−0.42*	−0.19	−0.02	−0.21
	(0.19)	(0.24)	(0.16)	(0.20)	(0.20)
Fixed Effects	Country, Year	Country, Year	Country, Year	Country, Year	Country, Year
Num. obs.	2220	2108	1909	2116	2336
Num. groups: country	24	24	23	24	24
Num. groups: year	30	29	28	30	32

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Table 1.8: *Capital Stop Episodes - Emerging Market Economies*

	FDI	Bank	Equity	Debt	Total
Left Gov.	−0.32	−0.04	−0.19	−0.66	−0.15
	(0.40)	(0.21)	(0.48)	(0.41)	(0.32)
Executive Turnover	−0.87	0.39	−0.45	0.13	0.41
	(0.54)	(0.35)	(0.49)	(0.33)	(0.31)
Executive Turnover Lag	−1.46**	0.27	−0.13	0.30	0.48
	(0.64)	(0.42)	(0.33)	(0.29)	(0.31)
Executive Turnover Forward	0.14	−0.13	−0.83*	0.07	0.04
	(0.25)	(0.34)	(0.45)	(0.44)	(0.37)
VXO	−0.01	0.02	−0.02	−0.02	0.01
	(0.01)	(0.02)	(0.03)	(0.03)	(0.01)
Global Growth	−0.02	−0.07	0.46**	0.43**	0.21
	(0.13)	(0.18)	(0.22)	(0.18)	(0.15)
Global Money Growth	0.01	−0.07*	0.04	0.04	−0.00
	(0.03)	(0.04)	(0.03)	(0.03)	(0.04)
Interest Rates	−0.08	0.12	−0.01	−0.01	0.30**
	(0.16)	(0.20)	(0.23)	(0.12)	(0.15)
Real GDP Growth (YoY)	0.00	0.07	−0.05	−0.03	0.01
	(0.09)	(0.11)	(0.16)	(0.13)	(0.07)
Oil Prices	0.00	−0.01**	−0.00	−0.00	−0.02***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Log(Real GDP)	0.86	−6.24***	4.07***	0.14	−2.51*
	(1.61)	(1.92)	(1.21)	(1.20)	(1.29)
Capital Openness	−0.49	0.32	0.08	0.18	0.37
	(0.42)	(0.42)	(0.43)	(0.32)	(0.29)
Regional Contagion	0.23	−0.35	−0.21	0.55**	0.20
	(0.37)	(0.32)	(0.36)	(0.28)	(0.34)
Fixed Effects	Country, Year	Country, Year	Country, Year	Country, Year	Country, Year
Num. obs.	1310	1324	1221	1172	1410
Num. groups: country	18	17	17	20	18
Num. groups: year	27	27	28	21	28

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

1.6 Regulatory Changes

In this section I explore the relationship between macroprudential regulatory policy and capital flow episodes. I examine these trends on both an *ex-ante* and *ex-post* basis. First, I describe the measure of regulatory changes that I employ. I then examine if a relaxation or loosening of capital controls is a predictor of subsequent capital flow episodes. Next, I examine if regulatory changes occur in the periods after a large change in capital flows. Prudential regulations are often seen as a potential way to effectively manage capital inflows and risk, although the empirical evidence is mixed. Mitchener (2005) exploits cross-state variation in

supervision and regulation during the US banking crisis from 1929-1933 and finds tighter capital requirements were negatively related to bank failures, while higher reserve requirements were positively associated with failures.[20] Other contributions evaluate when regulations are likely to be amended (see Kroszner (1998); Kroszner and Strahan (1999); Pagano and Volpin (2001)). This early work highlighted the "crisis theory" of regulatory change, where economic, legal and technological shocks are needed to change the relative power of different interest groups, ultimately leading to a new political equilibrium and corresponding regulatory change. Also of note is the interest group theory developed in Rajan and Zingales (2003), which argues incumbent politicians generally oppose financial development due to the fear that this development will increase competition. However, the costs of not encouraging development are higher when cross-border trade and capital flows are easier, and this reduced cost will lessen incumbent opposition. Instances of capital inflow surges may thus exhibit weaker incumbent resistance to financial development, which could promote regulatory change.[21].

As a potential solution to regulatory capture and to insulate monetary decision-making, many nations have delegated regulatory authority to independent agencies, including central banks. Regarding central bank independence (CBI), two general strands of political economy literature have emerged. A first treats levels of central bank independence as an outcome variable to be explained and seeks to understand when and why governments delegate monetary policy to independent institutions (see Bernhard *et al.* (2002a) for a summary of early contributions). Delegation is seen as a way of avoiding a time-inconsistency problem and delivering lower inflation. A second strand treats central bank independence as an explanatory variable in other outcomes. Given the mandates of central banks, papers have used differences in central bank independence to model inflation levels and financial regulation (Broz (2002a); Copelovitch and Singer (2008); Aklin and Kern (2021)). Other lines of work argue the relationship between CBI and financial regulation is conditional on the extent regulatory

[20]Although higher reserves could act as a buffer stock, holding more reserves also reduces bank profitability and may encourage banks to make riskier investments as compensation.

[21]However, this is an extension beyond the argument in Rajan and Zingales (2003) which focuses on reforms in security markets rather than banking capital requirement regulations

power is shared across different government agencies. Aklin and Kern (2021) argues for a substitution effect where an increase in CBI makes governments unable to manipulate the economy through monetary policy, leading governments to instead opt for deregulation. They find increases in CBI are followed by several types of financial deregulation, including bank privatization and increased ease of entry for foreign banks.[22] Relevant for surges brought on by commodity price booms, Gelos and Ustyugova (2017) find more independent central banks better contain the inflationary impacts of these inflows.

1.6.1 Data Description

Regulatory changes are coded from the IMF's integrated Macropudential Policy (iMaPP) database (Alam *et al.* (2019)). This database provides monthly indicators of country-level instances of regulatory tightening or loosening across seventeen metrics, including capital requirements, limits on leverage and credit growth, taxes and restrictions on foreign currency lending.[23] While long-run regulatory regimes and the delegation of regulatory power may reflect historical path-dependence (see Copelovitch and Singer (2008) and Copelovitch and Singer (2020)), the flexibility for states to alter capital adequacy requirements without requiring corresponding major reforms increases the variation in usage of this tool and facilitates cross-national comparisons (Mosley and Singer (2009)). The dataset consists of binary measures of whether a policy change tightened or loosened credit regulations across 161 countries. I aggregate the monthly data and construct a quarterly measure of whether there was a net tightening or loosening of regulations for the quarter.[24] This binary construction is not ideal,

[22]An additional consideration is which institutional agencies are responsible for financial regulation. While this regulatory power is not uniformly concentrated in the hands of central banks, there has been general cross-country convergence towards using central banks in this capacity, with some power sharing with finance ministries and separate specialized regulators Gandrud (2013).

[23]The updated iMaPP database combines information from five existing databases, supplemented by responses form the IMF's Annual Macropudential Policy Survey. It also incorporates information from official announcements from regulators. The database only includes policy actions that could be verified through cross-checking with official documents (Alam *et al.* (2019), pp. 5-6).

[24]If there were 3 instances of tightening and 1 instance of loosening in the months of a given quarter, this would have a net coding of 2 instances of tightening for the quarter.

as we would be most interested in the magnitude of the impact of these changes. However, measuring this impact on a cross-country basis is difficult, as the ultimate effect of a regulatory change depends upon the depth and a host of other characteristics of local financial markets. While there have been some efforts to convert individual regulatory changes to a comparable tax-equivalence[25], and ultimately measure the pass-through of these changes to different groups in society, a measure of tax equivalence is not widely available on a cross-country basis. A simple frequency count of regulatory changes is also problematic as it is not clear how to interpret a high number of regulatory changes. This could be indicative of a significant change in regulatory policy, or it could reflect the aggregation of many small changes. For example, beginning in August 1996 through January 1997, Brazil's central bank lowered the reverse requirement ratio on demand deposits in six consecutive months, but the net effect was a modest reduction from 83% to 75%. To avoid this issue in subsequent analysis, I focus on quarterly aggregates and a binary measure of whether net-tightening or net-loosening occurred. Despite these limitations from a binary measurement, Alam *et al.* (2019) find evidence of their usefulness in the context of housing markets where they identify consistent negative relationships between tightening of any macroprudential measure and household credit growth.[26]

Alam *et al.* (2019) document several broad trends in the use of these macroprudential tools relevant for subsequent analysis. First, while individual adjustments are less frequent, by 2012 over 90% of countries had adjusted at least one tool, and a majority of economies (both for advanced and emerging markets) had implemented a policy tool before the global financial crisis. The authors also document cross-national differences in the types of instruments used. The most popular macroprudential tool amongst advanced economies has been regulations on loan-to-value (LTV) ratios. In contrast, emerging markets' preferred tool has been regulations on foreign exchange positions. Both country groups have made wide use of controls on reserve,

[25]For example, a number of papers have examined the tax equivalence of the Chilean *encaje*. See Le Fort Varela and Lehmann (2003), Forbes (2007) and Andreasen *et al.* (2017)

[26]The largest effect is found for a tightening in the loan-to-value limit, which is also the most frequently employed macroprudential tool across the dataset.

capital and liquidity requirements.

1.6.2 Regulatory Change Motivating Examples - Brazil, Chile and Mexico

This section outlines key differences in regulatory changes related to reserve requirements for three countries beginning in the 1990s: Brazil, Chile and Mexico. All three of these countries experienced large capital inflow bonanzas in the 1970s and 1980s and subsequent crises. When capital began to flow back into these economies in the early 1990s, Mexico experienced the largest inflow boom, while inflows were more muted in Chile. Meanwhile, Brazil maintained relatively small current account deficits in the early 1990s, before a sustained deficit emerged in the late 1990s and persisted through the early 2000s before a dramatic reversal. How did countries change macroprudential regulations in response to these inflows? Chile tended to tighten regulatory controls in this period, while Brazil loosened regulations in parallel to sustained capital inflows. Mexico exhibits a very stable regulatory environment until the onset of the Global Financial Crisis, after which there was a general tightening through 2020. Figure 1.2 presents a graphic summary of the current account deficits and regulatory changes in Brazil and Chile. When Chile's current account deficit began to widen in the early 1990s, policymakers pursued a "lean-against-the-wind" strategy of tightening regulations. Brazilian regulatory changes instead appear to be *pro-cyclical* – as capital flowed into the country in the late 1990s, bank reserve requirements were progressively reduced.[27]

Brazil - Regulatory Loosening

In general, Brazil experienced regulatory loosening in parallel to sustained current account deficits in the late 1990s. Beginning in August 1996 through January 1997, the central bank lowered the reserve requirement ratio on demand deposits from 83% to 75%. Later, in 1999 there was frequent tuning of the reserve requirement for time deposits. In March 1999, this

[27]I present information on reserve requirements as it is the most frequently used regulatory tool among emerging market and developing economies (Alam *et al.* (2019)). Other common regulatory instruments employed by these countries target requirements on capital, liquidity and limits on loan-to-value and foreign exchange positions. The reported patterns are the same when aggregating across all regulatory policy instruments.

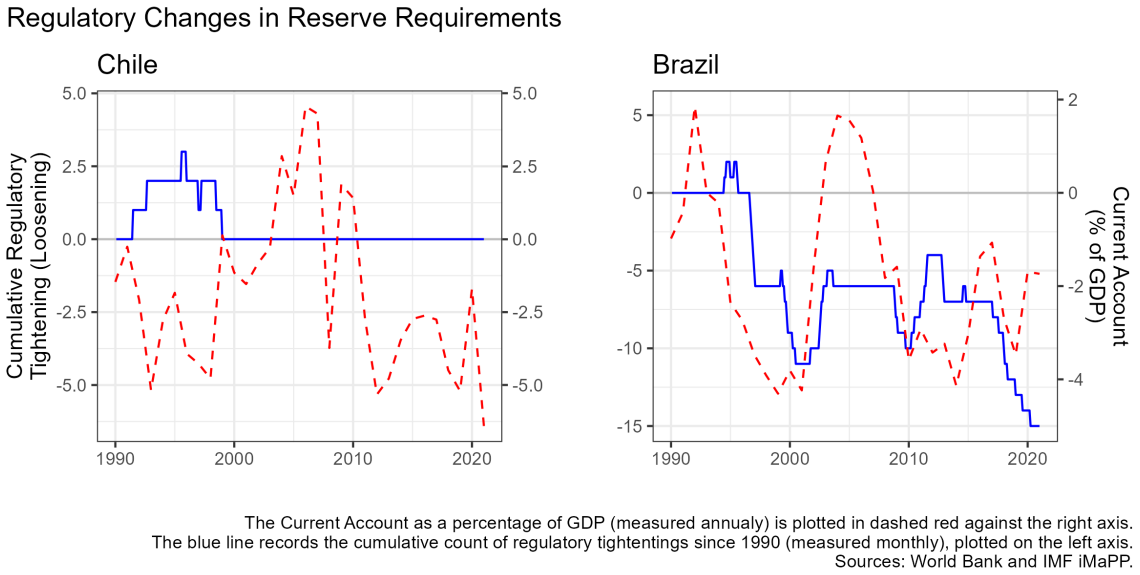


Figure 1.2: *Macroprudential Regulatory Changes in Brazil and Mexico*

reserve requirement was raised from 20% to 30%, but a series of changes through the summer reversed this trend, culminating in the central bank reducing this reserve ratio to 10% in September; further relaxation would come in October, when this reserve requirement was set to 0%. Additional loosening occurred in the reserve requirement for demand deposits which was progressively lowered from 75% to 65% and continued to fall to 45% by June of 2000. Throughout this period, Brazil responded to capital inflows by generally *loosening* its regulatory reserve requirements. When capital flows began to reverse in the early 2000s, Brazil increased the reserve requirements for both time and demand deposits. By July 2002, reserve requirements on time deposits - which had been fully eliminated in October 1999 - were restored to 20% (the level which had prevailed in March 1999). Prior loosening on demand deposits was also reversed, with this reserve requirement increasing from 45% to 65% in February 2003.

One accounting for this regulatory pattern is the relative weakness of Brazil's central bank. Figure 1.3 shows Brazilian central bank independence during this time, compared to a regional average. Brazil consistently scores low in measures of CBI for its region, and is

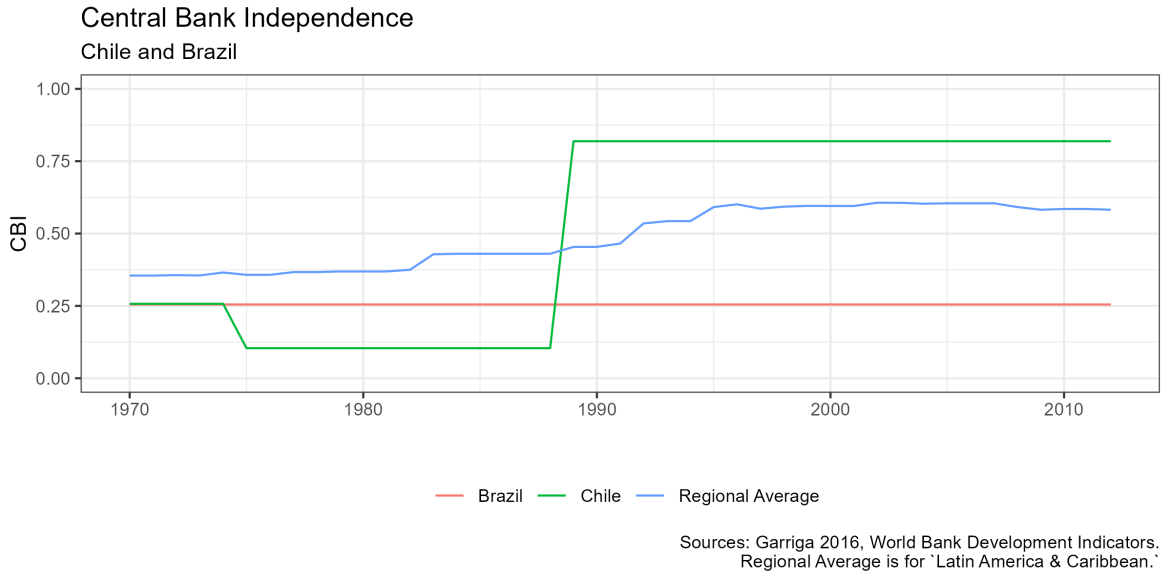


Figure 1.3: *Central Bank Independence in Brazil, Chile and Mexico*

in the bottom decile globally for much of the period (Garriga (2016)).[28] Indeed, throughout this period Brazil's central bank ranks as one of the most politically vulnerable monetary authorities Cukierman and Webb (1995)).[29] Figure 1.3 also documents the divergence in central bank independence between Brazil and Chile, which we examine next.

Chile - Regulatory Tightening

The Chilean approach to regulating reserves during inflows was generally the opposite observed in Brazil. Like Mexico, Chile began to experience a renewed wave of capital inflows in the early 1990s, with the Chilean current account deficit exceeding 5.0%. While this capital was flowing, Chile implemented general regulatory *tightening* with respect to its reserves. In June 1991, Chile's central bank implemented an unremunerated reserve requirement (URR) of 20%

[28]Brazil was in the third decile globally for CBI from 1970 - 1988. While Brazil's CBI score is constant throughout the period, failure to keep pace with global reforms resulted in Brazil falling to the bottom decile of CBI scores beginning in 1999, and the country remained there through the extent of the data coverage.

[29]Maxfield (1998) provides a detailed history of the creation of the *Banco Central do Brasil* in 1964, arguing that domestic political instability resulted in leaders having insufficient political capital to increase central bank independence. Proposed reforms in 1993 failed to generate traction, even when international creditworthiness became more important due to rapid expansion of the country's debt levels in the 1980s and 1990s.

on new short term credit. The URR was increased to 30% in August of 1992, and the extent of deposits subject to this requirement was increased in July 1995 to include secondary American Depository Receipts (ADR). This reserve requirement experienced slight adjustments in its scope before ultimately being phased out from June-September 1998.

It is noteworthy that just prior to this period, Chile reformed its central bank. Chile's 1980 constitution had called for the establishment of an independent central bank, but the Pinochet regime appeared uninterested in establishing such a body until the results of the 1988 plebiscite and 1989 general elections made clear that the center-left coalition would come to power.[30] In December 1989, the Pinochet government granted formal autonomy to the central bank, separating it from the minister of finance (see Cukierman (1994), Boylan (1998) and Boylan (2001)). The sharp contrast to Brazil is plotted in Figure 1.3. From 1975 through 1988, Chilean central bank independence scored in the lowest decile. After reforms in 1989, Chile was in the top decile of central bank independence through 1997, dipping down to the ninth decile in 1998, where it would remain through the remainder of the data coverage (Garriga (2016)). Throughout this early period, the Chilean central bank pursued an inflation-targeting regime coupled with an exchange rate band, until a fully flexible exchange rate was adopted in 1999.

Mexico - Regulatory Stability

The iMaPP database only has a record of two changes in Mexican regulatory policy prior to more frequent changes beginning in 2008.[31] In contrast to Chile and Brazil, Mexico did not amend these regulations in parallel to changes in capital flows prior to the Global Financial Crisis.

Taken together, these examples are suggestive of a relationship between regulatory changes

[30]Boylan (1998) notes the military government delayed formalizing the autonomy of the central bank until just four days before the presidential election, when the likelihood of a new left government became undeniable.

[31]The two changes both fell into the 'Other' category of the iMaPP coding. In June 2001 a limit of exposure to related parties was set at 75% of Tier 1 capital. In December 2005 additional limits on bank exposure to counterparties were enacted to limit contagion risk.

and capital flow management. Both Chile and Mexico faced renewed capital inflows in the early 1990s, but Mexico implemented relatively few checks on these flows, whereas Chile responded with regulatory tightening. Mexico's current account deficit widened to above 6.7% of GDP in 1992 before reversing in dramatic fashion during the 1994 peso crisis.

In contrast, Chile's use and expansion of its URR coincides with a less severe current account deficit. When first enacting the URR in 1991, Chile's current account deficit was negligible at 0.3% of GDP. While this deficit grew to 2.1% and 5.2% in 1992 and 1993 respectively, the URR was also being raised from 20% to 30%, and its coverage was being widened. In 1994, Chile's current account deficit shrank to a more manageable 2.8%, in line with the policy norm that had emerged to keep these deficits below 3-5%. Chile ultimately avoided the large reversal experienced by Mexico.

In the next sections, I examine to what extent regulatory loosening systemically precedes the onset of various capital flow episodes. The experiences of Brazil and Chile also highlight the degree of central bank independence as a possible mediating factor. Regulatory change has distributional consequences, and higher degrees of central bank independence may insulate policymakers from private interest group pressures and minimize the risk of regulatory capture. Resulting from its greater autonomy, did Chile's central bank have more room to manoeuvre to enact this type of regulatory response? To explore this possibility, I also examine trends in how regulation changes in the wake of extreme capital flows and if the nature of regulatory changes varies by a country's degree of CBI.

1.6.3 Regulatory Changes As Predictors of Capital Flows

The following tables report estimates of the associations between lagged measures of regulatory tightening and loosening as additional control variables in the earlier specifications predicting the onset of various capital flow episodes. The columns denote the length (in quarters) of the lag for the *Loosen* and *Tighten* variable.[32] Table 1.9 presents the relationship between regulatory changes and subsequent capital inflow surges. A commonly cited "pull" factor

[32]Each regression only includes a single lagged measure.

for capital inflows is financial market liberalization, suggesting regulatory loosening may be associated with later inflow surges. I do not find evidence for this relationship with respect to the macroprudential regulation measures in my model, as the coefficients for *Loosen* are insignificant across the lags considered. However, I do find support for this argument in the context of regulatory tightening, at least at some lags. The coefficient estimates on *Tighten* in Table 1.9 are negative for lags of one to three quarters, suggesting that capital inflow surges are less likely to occur in quarters after more strict regulations are implemented. However, this negative relationship is only significant at the third lag, and the coefficient on a lag of four quarters is virtually zero, suggesting a relationship may be short-lived. The findings for early lags however are consistent with regulatory tightening acting to dampen the returns on inflows, making a country a less desirable location for investment.

While there is some evidence regulatory tightening predates a decreased likelihood of extreme capital inflows, does tightening predate *outflows*? Tables 1.10 and 1.11 consider this by examining the relationship between regulatory changes and the onset of capital stop or capital flight episodes. More strict regulations can decrease returns on investment and encourage foreign capital to be re-deployed. Consistent with theory, I find a strong positive relationship between regulatory-tightening and capital stop onset. Capital stops are more likely to occur in quarters immediately following instances of net regulatory tightening. However, part of this relationship may be reflecting the persistence of capital flights. If a capital flight were occurring at time $t-1$, then that flight could have both persisted to time t and induced the initial regulatory tightening. In either case, as before any relationship with regulatory changes appears short-lived. At a lag of 2 quarters, the coefficient on *Tighten* remains positive, but the magnitude has fallen by more than 50 percent and the relationship is no longer significant. At further lags of three and four quarters there is no relationship between regulatory tightening and the onset of capital stop episodes.

We might also wonder if the behavior of domestic capital exhibits a similar pattern. Table 1.11 examines the relationships for domestic capital *Flights*. The patterns are less clear in this case, but at a one-year lag, regulatory tightening is associated with a subsequent increase

Table 1.9: *Capital Surges After Regulatory Changes*

	Lag 1	Lag 2	Lag 3	Lag4
Loosen	−0.15	−0.22	0.14	−0.10
	(0.24)	(0.21)	(0.15)	(0.20)
Tighten	−0.13	−0.12	−0.49**	0.04
	(0.25)	(0.23)	(0.24)	(0.21)
VXO	0.00	0.00	0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Global Growth	0.08	0.07	0.07	0.07
	(0.08)	(0.08)	(0.08)	(0.08)
Global Money Growth	−0.00	0.00	0.01	0.01
	(0.01)	(0.01)	(0.02)	(0.02)
Interest Rates	0.19**	0.19*	0.19*	0.19**
	(0.09)	(0.10)	(0.10)	(0.10)
Real GDP Growth (YoY)	0.02*	0.02**	0.02*	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)
Oil Prices	0.01**	0.00**	0.00**	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	1.81**	1.58*	1.67*	1.57
	(0.83)	(0.87)	(0.92)	(0.99)
Capital Openness	0.57	0.78*	0.83*	0.81*
	(0.42)	(0.43)	(0.44)	(0.45)
Regional Contagion	−0.08	−0.07	−0.11	−0.05
	(0.16)	(0.16)	(0.16)	(0.16)
Fixed Effects	Country, Year	Country, Year	Country, Year	Country, Year
Num. obs.	4132	4043	3947	3851
Num. groups: country	47	47	47	47
Num. groups: year	27	26	25	24

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Table 1.10: *Capital Stops After Regulatory Changes*

	Lag 1	Lag 2	Lag 3	Lag4
Loosen	0.22	0.30*	−0.13	−0.21
	(0.21)	(0.18)	(0.24)	(0.22)
Tighten	0.40***	0.15	0.01	−0.02
	(0.15)	(0.15)	(0.22)	(0.14)
VXO	−0.00	−0.00	−0.00	−0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Global Growth	0.25***	0.23***	0.25***	0.24***
	(0.08)	(0.07)	(0.08)	(0.08)
Global Money Growth	0.03*	0.03	0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Interest Rates	−0.03	−0.00	0.01	0.05
	(0.12)	(0.13)	(0.12)	(0.12)
Real GDP Growth (YoY)	−0.04**	−0.03	−0.02	−0.02
	(0.02)	(0.02)	(0.02)	(0.02)
Oil Prices	−0.01***	−0.01***	−0.01***	−0.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	1.75*	1.82*	1.70	1.58
	(1.04)	(1.08)	(1.10)	(1.10)
Capital Openness	0.35	0.17	0.11	0.11
	(0.31)	(0.30)	(0.31)	(0.31)
Regional Contagion	0.01	0.01	−0.02	−0.04
	(0.14)	(0.15)	(0.15)	(0.15)
Fixed Effects	Country, Year	Country, Year	Country, Year	Country, Year
Num. obs.	4254	4165	4069	3973
Num. groups: country	45	45	45	45
Num. groups: year	28	27	26	25

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

in the predicted likelihood of capital flight. For both foreign capital stops and domestic capital flight, regulatory tightening is associated with subsequent outflows, however foreign capital outflows commence sooner after regulations are tightened. While caution is needed in interpreting these results given the general inconsistency in the coefficients, this finding would align with domestic capital having a slower response time than international capital, but still finding a way to leave the country and ultimately subvert capital controls and other macroprudential efforts in the medium-term. This type of reaction has long been the basis for criticism against the general usefulness of capital controls, which have been accused of only restricting flows for lower income individuals in the short-run and not restricting anyone in the long-run (see Abdelal (2006) and Ghosh and Qureshi (2016)).

1.6.4 Regulatory Changes After Capital Flow Episodes

In this section, I examine if regulatory changes are more likely to occur after a country has experienced an extreme change in capital flows. Further, I consider whether the frequency of these changes are related to measures of central bank independence (CBI).[33] We may expect more independent central banks to respond to capital inflow or outflow episodes differently than banks more exposed to political forces, especially when tightening is unpopular amongst core constituencies (Broz (2002b); Bernhard *et al.* (2002a)).

To examine this, I run a series of binomial regressions predicting the onset of regulatory tightening (or loosening) in the periods after a country experienced large capital inflows.[34] Table 1.12 reports the results for regulatory tightening. The first two columns present models with no fixed effects, while columns 3-6 add date and country fixed effects. In these regressions, *Surge* is a binary indicator for whether a country experienced at least one capital inflow surge at time $t-1$ or $t-2$. This captures the potential response after time has elapsed to

[33] I use CBI measures from Bodea and Hicks (2015) and Garriga (2016), where higher values indicate a greater degree of central bank independence. This measure has been standardized in regression analyses for ease of interpretation.

[34] I use a logistic link function in these regressions. Results are robust to using a complementary log-log link. The same general patterns of significance and magnitude of predicted relationships are found when using a linear probability model.

Table 1.11: *Capital Flights After Regulatory Changes*

	Lag 1	Lag 2	Lag 3	Lag4
Loosen	−0.13	0.09	−0.05	−0.03
	(0.20)	(0.20)	(0.25)	(0.24)
Tighten	0.19	0.09	−0.11	0.37**
	(0.12)	(0.18)	(0.21)	(0.18)
VXO	0.02	0.02*	0.02*	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)
Global Growth	0.08	0.07	0.08	0.09
	(0.09)	(0.09)	(0.09)	(0.09)
Global Money Growth	−0.01	−0.00	−0.00	−0.00
	(0.01)	(0.01)	(0.02)	(0.02)
Interest Rates	0.03	0.00	0.01	0.02
	(0.11)	(0.11)	(0.11)	(0.11)
Real GDP Growth (YoY)	0.00	−0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
Oil Prices	−0.00	−0.00	−0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	1.14	1.02	0.78	0.55
	(0.83)	(0.87)	(0.87)	(0.90)
Capital Openness	−0.16	−0.09	−0.04	−0.03
	(0.37)	(0.38)	(0.42)	(0.40)
Regional Contagion	0.08	0.09	0.11	0.21
	(0.19)	(0.19)	(0.20)	(0.20)
Fixed Effects	Country, Year	Country, Year	Country, Year	Country, Year
Num. obs.	4292	4203	4107	4011
Num. groups: country	46	46	46	46
Num. groups: year	28	27	26	25

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Table 1.12: *Regulatory Tightening after Capital Surges*

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Surge	−0.34	−0.95**	−0.06	−0.69	−0.14	−0.64
	(0.31)	(0.41)	(0.28)	(0.47)	(0.33)	(0.41)
Election	−0.07	0.08	−0.06	0.14	0.01	0.21
	(0.23)	(0.23)	(0.24)	(0.26)	(0.26)	(0.27)
Left Gov.	−1.09***	−0.87***	−1.01***	−0.97***	−0.93**	−1.02**
	(0.31)	(0.28)	(0.29)	(0.31)	(0.41)	(0.44)
CBI	0.19	0.46**	−0.15	−0.03	0.89***	0.81**
	(0.26)	(0.21)	(0.21)	(0.24)	(0.32)	(0.35)
Real GDP Growth (YoY)	0.29*	0.21	0.40**	0.32**	0.43**	0.39**
	(0.15)	(0.13)	(0.16)	(0.15)	(0.17)	(0.17)
Financial Development	0.58	0.43	−0.27	−0.33	0.02	0.11
	(0.43)	(0.36)	(0.40)	(0.38)	(0.88)	(0.92)
Log Real GDP	0.06	0.19	0.14	0.23	−1.65	−1.12
	(0.33)	(0.25)	(0.25)	(0.25)	(2.20)	(2.14)
Emerging Market	1.43***	1.28***	0.37	0.37		
	(0.48)	(0.37)	(0.35)	(0.31)		
Euro Member	−0.24	−0.54	0.17	−0.03		
	(0.62)	(0.57)	(0.53)	(0.60)		
Floating ER	−0.47	−0.39	−0.28	−0.24	−0.30	−0.13
	(0.52)	(0.45)	(0.50)	(0.46)	(0.56)	(0.54)
REER Log Change	−0.15**	−0.14**	−0.19*	−0.16	−0.20*	−0.20*
	(0.07)	(0.07)	(0.11)	(0.10)	(0.11)	(0.11)
CBI:Surge		0.95***		0.87***		0.65**
		(0.32)		(0.33)		(0.29)
CBI:Election		−0.28*		−0.45**		−0.50**
		(0.16)		(0.21)		(0.23)
CBI:Left Gov.		−0.88***		−0.41		0.12
		(0.27)		(0.34)		(0.39)
Fixed Effects	None	None	Date	Date	Date and Country	Date and Country
Num. obs.	2057	2057	1243	1243	1170	1170
Num. groups: date			63	63	63	63
Num. groups: country					25	25

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

diagnose the irregular inflow. The key political economy variables are government partisanship, election proximity and *CBI*. *Financial Development* is the IMF's country-level aggregate index of financial development, where larger values indicate a more developed financial sector (Svirydzenka (2016)). The inclusion of these new variables limits the coverage of the data to 1990 - 2015.

Across all specifications, Left governments are associated with a decreased likelihood of regulatory tightening. The coefficient estimates on the *Surge* variable are negative across all models, indicating regulatory tightening is less likely to occur in the immediate aftermath of

an inflow surge, but this coefficient is only significant in the interactive model which excludes fixed effects.

The interaction models presented in columns 2, 4 and 6 examine the potential for the predicted regulatory response to surges to be conditional on the level of central bank independence. In all models, this coefficient is positive and statistically significant. Taken together, this suggests that the negative association between surges and regulatory tightening is observed primarily in country's with low levels of central bank independence. In countries with higher central bank independence, the net effect of an inflow surge on regulation is a slightly higher (but only weakly significant) probability of regulatory tightening. Given the focus of this analysis on CBI, the preferred models are those presented in columns 3 and 4 which include time fixed effects but omit country fixed effects given CBI measures are generally stable within countries during the time period considered.[35]

Figure 1.4 plots the estimated marginal effect on regulatory tightening from experiencing a capital inflow surge based on estimates from the interactive model with time fixed effects. For regulatory tightening we see a general positive slope for the estimated marginal effect of a surge as a function of CBI, consistent with the results presented in the table. While the confidence intervals are wide, the change in predicted probability is of a meaningful magnitude given regulatory tightening only occurs in 9.0% of the country-quarter observations used in the analysis. The results indicate that for countries with low levels of central bank independence, capital inflow surges are less likely to coincide with regulatory tightening, whereas more independent central banks tend to respond to capital inflow periods by tightening regulations.

Another consistent pattern emerges for the interaction terms between CBI and election proximity. These results suggest that when an election is imminent, countries with higher CBI are associated with a decreased likelihood of tightening regulations. The magnitude of this coefficient is however lower than the interaction between CBI and a Surge, and the net

[35]Country-level fixed effects would also make it difficult to examine these relationships with respect to central banks' regulatory purview. As noted in Copelovitch and Singer (2008), the variation in the regulatory responsibilities of central banks in advanced economies has been almost entirely cross-national, with little intertemporal variation until very recently.

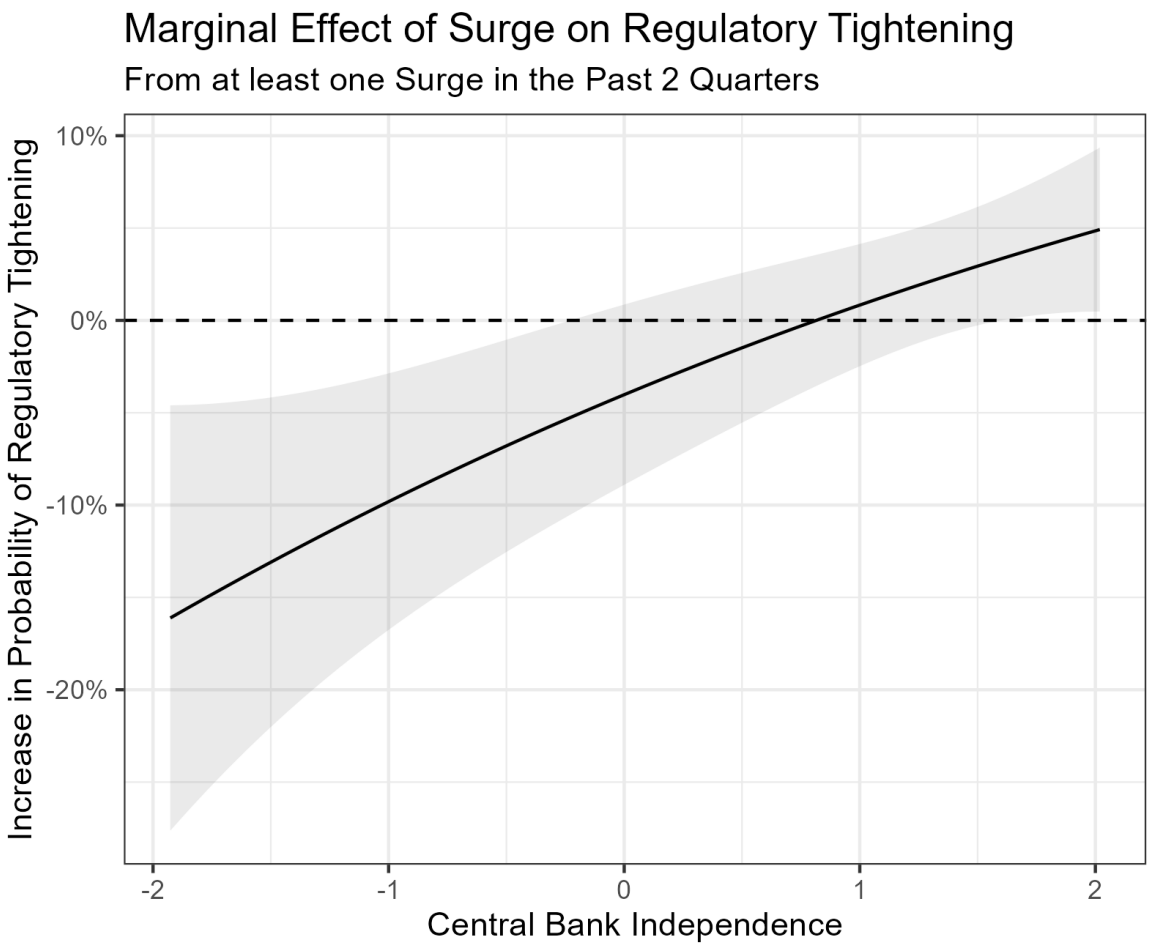


Figure 1.4: *Predicted Change in Probability of Tightening From an Inflow Surge*

marginal effect of an election is not statistically different from zero for any level of CBI. When macroprudential regulation is not solely the purview of the central bank, this result could support the argument of Aklin and Kern (2021) which asserts that after delegating monetary policy to an independent central bank governments opt to promote credit expansion through decreased regulation.

Turning to other control variables, faster growth rates in real GDP are associated with subsequent increased likelihoods of regulatory tightening, and in the models excluding country fixed effects, Emerging Market Economies are more likely to tighten regulations. Larger increases in the real exchange rate are also associated with less frequent tightening. The signs

of these relationships are generally robust to adding time fixed effects, although the precision of the estimates decreases.

Table 1.13 replicates the previous analysis examining instances of regulatory loosening. Few strong findings emerge from this analysis, but neither CBI nor inflow Surges appear to be significant predictors for easing of macroprudential regulations. This could be driven in part by the relative scarcity of regulatory loosening.[36] Figure 1.5 presents the estimated marginal effect on regulatory loosening of experiencing a capital inflow surge from the interactive models with date fixed effects. In contrast to the significantly negative marginal effect of surges on regulatory tightening for low CBI countries, the estimated marginal effect on loosening is indistinguishable from zero across all levels of CBI.

Regulatory Change Around Stops

The "crisis-begets-reform" hypothesis may suggest regulatory changes are more likely to occur after sudden stops.[37] As presented in Drazen (2000), reforms may require economic conditions not just to be bad, but rather erode to crisis levels before a policy response is expected. The threshold measures of capital flow episodes employed here may be particularly relevant in this context. Using gross capital flows, Waelti (2015) differentiates between domestic crises (sudden capital flights) and external crises (true sudden stops), finding strongest evidence for a connection between capital account reforms and sudden flights. They find true sudden stops are positively associated with reforms on interest rate controls and banking supervision, while flight episodes are only significantly associated with reforms on capital account restrictions but are not significantly associated with other types of reforms. They also examine the direction of reforms, finding external stops were followed by reductions in interest rate controls. Further, policymakers tended to ease capital account restrictions after sudden flights. This evidence suggests accounting for the origin (domestic vs. foreign) of a sudden stop is an important

[36]The dataset includes 902 country-quarter level instances of regulatory tightening, but only 400 instances of regulatory loosening.

[37]See Drazen (2000) for a useful review of theoretical arguments

Table 1.13: *Regulatory Loosening after Capital Surges*

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Surge	−0.18	−0.12	0.09	0.12	0.22	0.40
	(0.40)	(0.39)	(0.42)	(0.39)	(0.41)	(0.41)
Election	−0.33	−0.39	−0.29	−0.32	−0.20	−0.34
	(0.40)	(0.38)	(0.41)	(0.38)	(0.47)	(0.48)
Left Gov.	−0.31	−0.19	−0.37	−0.20	−0.42	−0.37
	(0.34)	(0.36)	(0.41)	(0.41)	(0.44)	(0.41)
CBI	−0.19	0.10	−0.14	0.32	−0.22	0.04
	(0.20)	(0.20)	(0.24)	(0.28)	(0.51)	(0.60)
Real GDP Growth (YoY)	0.10	0.07	0.13	0.06	0.01	−0.01
	(0.14)	(0.14)	(0.17)	(0.17)	(0.21)	(0.22)
Financial Development	−0.43	−0.47	−0.38	−0.35	−0.23	−0.18
	(0.30)	(0.29)	(0.34)	(0.31)	(0.81)	(0.84)
Log Real GDP	−0.54	−0.46	−0.56	−0.40	5.39**	5.77**
	(0.45)	(0.45)	(0.56)	(0.57)	(2.19)	(2.27)
Emerging Market	0.13	0.11	0.25	0.41		
	(0.83)	(0.77)	(0.94)	(0.89)		
Euro Member	0.94	0.83	1.08	0.89		
	(0.65)	(0.61)	(0.78)	(0.70)		
Floating ER	−0.08	−0.09	−0.04	−0.07	0.31	0.15
	(0.45)	(0.45)	(0.46)	(0.44)	(0.66)	(0.72)
REER Log Change	−0.10	−0.09	−0.10	−0.07	−0.04	−0.03
	(0.08)	(0.07)	(0.08)	(0.08)	(0.12)	(0.11)
CBI:Surge		−0.16		−0.12		−0.47*
		(0.31)		(0.32)		(0.25)
CBI:Election		0.18		0.34		0.26
		(0.36)		(0.35)		(0.28)
CBI:Left Gov.		−0.53**		−0.85***		−0.46
		(0.27)		(0.29)		(0.40)
Fixed Effects	None	None	Date	Date	Date and Country	Date and Country
Num. obs.	2057	2057	1276	1276	818	818
Num. groups: date			62	62	62	62
Num. groups: country					21	21

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

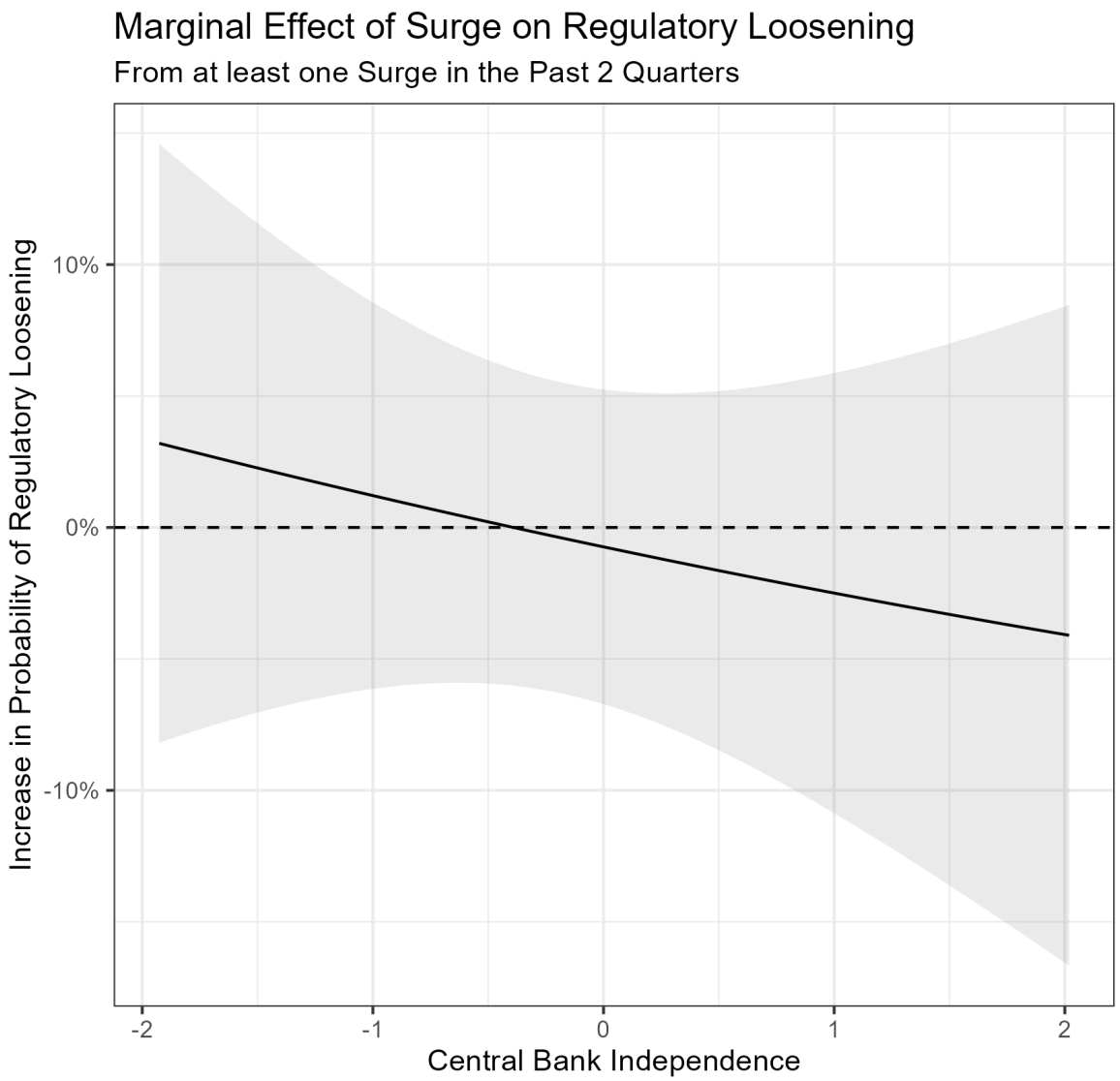


Figure 1.5: *Predicted Change in Probability of Loosening From an Inflow Surge*

consideration when examining subsequent regulatory reforms. Tables 1.14 and 1.15 present the results of testing these relationships in the current context. Neither baseline measures of CBI nor interactions with CBI and outflow episodes were found to be significant in these specifications.

Regulatory Changes By Capital Flow Type

Given the macroprudential focus of the regulatory changes in the iMaPP database, the above relationship may be more relevant for bank flows than longer term direct investment. In addition to aggregate capital flows, the data from Forbes and Warnock (2021) identifies surges in the following individual types of capital: bank, debt, equity, and direct investment. Figure 1.6 displays the marginal effects from repeating the earlier analysis for an inflow surge in either banking or debt on subsequent regulatory tightening. The full regression results are presented in Table A.7 in the appendix. Banking and debt flows are plotted as those were the only flows which yielded a significant interaction term with CBI. Surges in bank flows exhibit a positive interaction term, consistent with findings from the full sample. This is not surprising as these types of macroprudential regulations largely target the banking sector. The interaction term between a surge in debt flows and CBI is negative and also significant. Debt surges exhibit the opposite pattern as bank surges; countries with higher levels of CBI are associated with a decreased probability of regulatory tightening after a debt surge. As shown in Figure 1.6 the marginal effect is most significant for bank surges, while the negative relationship for debt surges does not lead to a significantly lower predicted probability of regulatory tightening at any levels of CBI (although there is weak significance at the extreme tails of CBI).

We next present more detailed results focusing on tightening and surges in bank capital flows. Table 1.16 shows models across surges in bank flows. Columns 1 and 2 present a baseline model with no fixed effects. Column 1 includes no interaction term between a prior surge episode and CBI. In this simple model, there is no relationship between surges and subsequent tightening, and there is a positive but non-significant association between

Table 1.14: *Regulatory Response after Capital Stops*

	Tighten	Tighten	Loosen	Loosen
Stop	−0.06	−0.02	−0.22	−0.20
	(0.34)	(0.30)	(0.35)	(0.32)
Election	−0.06	0.12	−0.30	−0.31
	(0.24)	(0.25)	(0.42)	(0.39)
Left Gov.	−1.02***	−0.90***	−0.37	−0.20
	(0.29)	(0.30)	(0.41)	(0.40)
CBI	−0.15	0.11	−0.15	0.36
	(0.21)	(0.26)	(0.23)	(0.26)
Real GDP Growth (YoY)	0.39**	0.36**	0.12	0.05
	(0.16)	(0.15)	(0.18)	(0.17)
Financial Development	−0.28	−0.35	−0.37	−0.36
	(0.40)	(0.39)	(0.33)	(0.30)
Log Real GDP	0.15	0.24	−0.55	−0.42
	(0.24)	(0.25)	(0.56)	(0.57)
Emerging Market	0.37	0.32	0.27	0.39
	(0.34)	(0.31)	(0.93)	(0.87)
Euro Member	0.16	−0.05	1.10	0.88
	(0.53)	(0.58)	(0.78)	(0.69)
Floating ER	−0.27	−0.25	−0.04	−0.07
	(0.49)	(0.48)	(0.46)	(0.45)
REER Log Change	−0.19*	−0.18*	−0.10	−0.08
	(0.11)	(0.10)	(0.08)	(0.08)
CBI:Stop		0.00		−0.40
		(0.32)		(0.37)
CBI:Election		−0.46**		0.33
		(0.21)		(0.38)
CBI:Left Gov.		−0.40		−0.83***
		(0.35)		(0.29)
Fixed Effects	None	Date	None	Date
Num. obs.	1243	1243	1276	1276
Num. groups: date	63	63	62	62

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Table 1.15: *Regulatory Response after Capital Flights*

	Tighten	Tighten	Loosen	Loosen
Flight	−0.29	−0.44	0.06	0.07
	(0.40)	(0.48)	(0.43)	(0.44)
Election	−0.06	0.13	−0.30	−0.29
	(0.24)	(0.25)	(0.42)	(0.38)
Left Gov.	−0.99***	−0.91***	−0.37	−0.22
	(0.29)	(0.32)	(0.40)	(0.40)
CBI	−0.15	0.06	−0.14	0.25
	(0.20)	(0.24)	(0.24)	(0.25)
Real GDP Growth (YoY)	0.39**	0.34**	0.14	0.05
	(0.16)	(0.15)	(0.17)	(0.17)
Financial Development	−0.29	−0.35	−0.38	−0.37
	(0.39)	(0.37)	(0.33)	(0.30)
Log Real GDP	0.16	0.25	−0.55	−0.39
	(0.24)	(0.24)	(0.56)	(0.56)
Emerging Market	0.38	0.35	0.26	0.41
	(0.35)	(0.31)	(0.93)	(0.87)
Euro Member	0.17	−0.02	1.09	0.91
	(0.53)	(0.57)	(0.78)	(0.69)
Floating ER	−0.28	−0.26	−0.03	−0.07
	(0.49)	(0.47)	(0.46)	(0.43)
REER Log Change	−0.19*	−0.18*	−0.10	−0.08
	(0.11)	(0.11)	(0.08)	(0.08)
CBI:Flight		0.37		0.30
		(0.34)		(0.40)
CBI:Election		−0.47**		0.33
		(0.21)		(0.36)
CBI:Left Gov.		−0.42		−0.89***
		(0.34)		(0.27)
Fixed Effects	None	Date	None	Date
Num. obs.	1243	1243	1276	1276
Num. groups: date	63	63	62	62

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

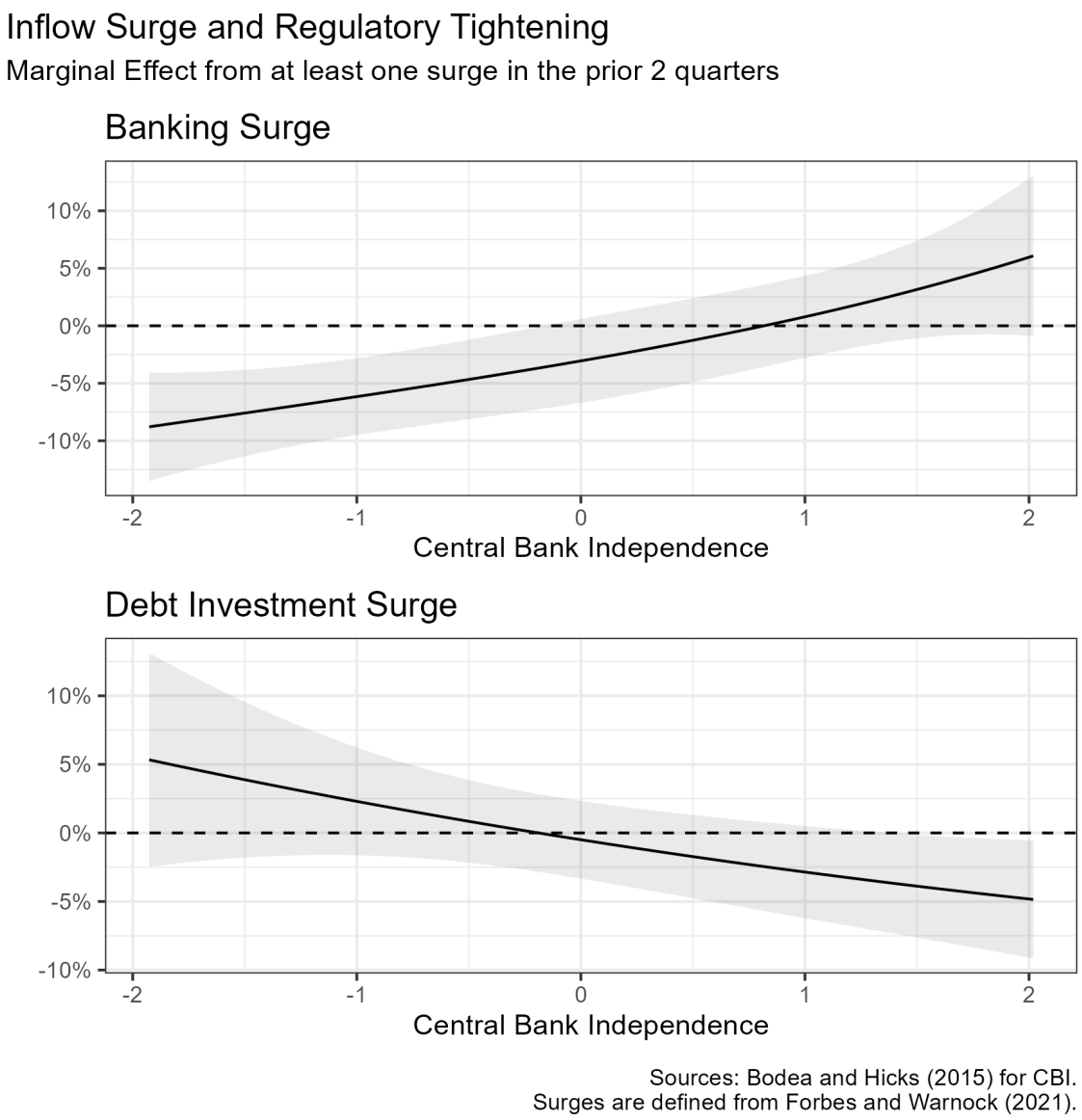


Figure 1.6: *Regulatory Tightening After Bank and Debt Surges*

regulatory tightening and CBI. Column 2 incorporates an interaction between CBI and surges. The (non-interacted) coefficient on Surge is now negative but imprecisely estimated, but there is a positive and significant coefficient on the interaction term. This finding suggests that for governments with low levels of CBI, a surge in bank inflows is associated with a decreased predicted probability of regulatory tightening, while in countries with high levels of CBI a surge in bank flows is associated with an increased predicted probability of regulatory tightening. Columns 3 and 4 incorporate time fixed effects into the analysis, and columns 5 and 6 include time and country fixed effects. The positive and significant coefficient estimate for the interaction term is robust to the inclusion of these fixed effects. Finally, columns 7 and 8 incorporate lagged measures of regulatory changes for lags of one and two quarters. These lagged measures are generally significant, but their inclusion does not significantly alter the findings related to the interaction terms.

The coefficient on both lagged regulatory loosening and tightening is negative and significant at a lag of one quarter. In quarters after a regulatory change, be it tightening or loosening, an additional round of tightening becomes less likely. This finding could be consistent with policymakers not over-regulating in the short-run but instead allowing events to unfold before committing to consecutive regulations. At a lag of two quarters, the relationship is only significant for prior loosening, which now exhibits a positive association.

There are a few other consistent findings across the specifications. As was the case when examining surges in total flows, there is a negative relationship between having a Left-wing executive and regulatory tightening. In all specifications the coefficient on Left is negative and significant, indicating regulatory tightening is less likely to occur under these regimes. Additionally, Emerging Market Economies are generally associated with more regulatory tightening. The positive association between real GDP growth indicates that countries that have been experiencing higher growth rates also tend to more frequently implement new net regulatory tightening. No strong patterns are found when examining (unreported) instances of regulatory loosening in the aftermath of surges in bank flows.

Table 1.16: *Regulatory Tightening after Bank Surges*

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Surge	−0.02	−0.62	−0.09	−0.72	−0.19	−0.62	−0.33	−0.87*
	(0.25)	(0.41)	(0.28)	(0.53)	(0.27)	(0.42)	(0.28)	(0.47)
Election	−0.06	−0.06	−0.11	−0.09	−0.01	0.01	−0.03	−0.02
	(0.21)	(0.21)	(0.21)	(0.21)	(0.22)	(0.22)	(0.22)	(0.22)
Left Gov.	−1.06***	−1.10***	−0.91***	−0.97***	−0.89**	−0.87**	−1.00**	−0.99**
	(0.30)	(0.29)	(0.26)	(0.26)	(0.38)	(0.37)	(0.43)	(0.40)
CBI	0.19	0.09	−0.16	−0.27	0.81***	0.70**	1.28***	1.16***
	(0.25)	(0.23)	(0.18)	(0.17)	(0.29)	(0.30)	(0.26)	(0.27)
Real GDP Growth (YoY)	0.29**	0.27**	0.32**	0.29**	0.38**	0.34**	0.44***	0.41***
	(0.14)	(0.13)	(0.14)	(0.13)	(0.15)	(0.15)	(0.16)	(0.16)
Financial Development	0.55	0.57	−0.25	−0.24	−0.06	−0.05	−0.22	−0.23
	(0.39)	(0.37)	(0.34)	(0.33)	(0.83)	(0.83)	(0.94)	(0.93)
Log Real GDP	−0.05	−0.08	0.17	0.17	−1.66	−1.38	−1.91	−1.61
	(0.34)	(0.32)	(0.22)	(0.23)	(1.91)	(1.88)	(2.03)	(1.98)
Emerging Market Economy	1.15**	1.12**	0.38	0.38				
	(0.45)	(0.45)	(0.34)	(0.32)				
Euro Member	−0.25	−0.25	0.25	0.20				
	(0.59)	(0.59)	(0.47)	(0.46)				
Floating ER	−0.50	−0.52	−0.24	−0.25	−0.27	−0.13	−0.34	−0.21
	(0.51)	(0.50)	(0.42)	(0.41)	(0.46)	(0.45)	(0.49)	(0.47)
REER Log Change	−0.15**	−0.15**	−0.16	−0.15*	−0.16*	−0.17*	−0.16*	−0.17*
	(0.07)	(0.06)	(0.10)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)
Regional Contagion	−0.38*	−0.42*	0.12	0.09	0.15	0.11	0.13	0.09
	(0.22)	(0.22)	(0.26)	(0.26)	(0.24)	(0.25)	(0.26)	(0.27)
CBI:Surge		0.75***		0.82***		0.56**		0.63**
		(0.27)		(0.31)		(0.24)		(0.27)
Loosen (t-1)							0.72*	0.70*
							(0.39)	(0.40)
Tighten (t-1)							0.07	0.09
							(0.37)	(0.38)
Loosen (t-2)							−0.75***	−0.78***
							(0.22)	(0.23)
Tighten (t-2)							−0.49	−0.53
							(0.38)	(0.38)
Num. obs.	2057	2057	1243	1243	1170	1170	1133	1133
Num. groups: date			63	63	63	63	60	60
Num. groups: country					25	25	25	25

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Robustness Checks

One potential concern with the previous analysis is how to treat observations from countries that have shared supranational regulators, such as countries using the euro. While the previous analyses included a measure of participation in the EMU, this measure was static and would not be able to adequately control for time-varying features that lead the entire currency bloc to update regulations in parallel. Table A.5 in the appendix presents results from two different ways to address this concern. First, columns 1 and 2 retain data from the entire sample, but include separate time fixed effects for EMU member states. As an alternative measure, Columns 3 and 4 restrict the sample to non-EMU states. The key findings remain in both cases, with a positive and statistically significant interaction between CBI and an inflow surge, indicating regulatory tightening after surges is less likely to occur in states with low-levels of CBI.

As an additional robustness check, Table A.6 in the appendix re-runs the above analysis on four different subsets of the data. I first consider splitting countries based on income status between emerging markets or advanced economies. If the long-term stability of capital inflows is connected to development levels, we might expect different regulatory responses. Advanced economies may also have greater financial market depth and regulatory tools and oversight available. I also split the sample temporally as the nature of macroprudential regulations may have changed in the wake of crises emerging in the 1980s and 1990s. It would also be interesting to examine these trends after the global financial crisis, but due to data limitations there are too few observations to treat this as a separate category.

Column 1 of Table A.6 includes the results from the full sample as a comparison, while columns 2 and 3 present the findings for subsets of advanced economies and emerging economies respectively. The findings in advanced economies are generally consistent with the full sample, but there is a significant reduction in sample size and corresponding power. In advanced economies, surges are now found to have a significant negative relationship with tightening, while the interaction between surges and CBI is no longer significant. The lack of significance on the interaction term stems from both a reduction in magnitude and increase in standard

error for this estimate. However, this interaction term remains positive and (weakly) significant after restricting the sample to only include emerging market economies. This finding could reflect greater benefits from delegating power in these country environments that might otherwise have fewer tools available for financial regulation.

Columns 4 and 5 of Table A.6 consider possible temporal changes in regulatory response to inflow surges. The main findings for measures of surges, CBI and their interaction are largely the same across time periods. In general, prior surges tended to be negatively associated with regulatory tightening before 2000, but this relationship is not significant in the post-2000 period. Partisan differences are also only significant in the post-2000 period, with Left governments being associated with lower rates of regulatory tightening. The results for Euro membership suggests general regulatory tightening in the bloc in the pre-2000 period, with lower rates of tightening since, which would reflect regulatory harmonization during the formation of the currency bloc.

1.7 Conclusion

Global capital flows have received widespread attention from economists and political economists interested in how foreign capital fosters economic economic growth while also potentially sowing the seeds for future crises. The simultaneous attractiveness and danger of these flows create the need to better understand their determinants and management. In this paper, I test the relationship between key political economy variables and the onset of large changes in capital flows. Consistent with existing theories about the role of electoral competitions and uncertainty, I find that sudden stops in foreign investment are more likely to occur around elections and this relationship is strongest when elections feature a leadership turnover. In contrast to theories that markets systemically punish left governments, I do not find evidence that the direction of a partisan switch is an important predictor. I also find supporting evidence that these relationships are not uniform for all types of capital. Executive turnover is associated with a subsequent increased probability of stops in bank and debt flows, but there is a negative relationship in the case of more fixed investments in the form of FDI.

I next analyze the evolution of macroprudential regulations around capital flow episodes. Using newly collected data from the IMF, I find a weak and negative relationship between regulatory tightening and subsequent onset of capital flow surges, consistent with literature on financial deregulation acting as a domestic "pull" factor in attracting foreign capital. Next, I examine how financial regulation changes in the wake of these inflow surges. Counter-cyclical regulation is seen as a potential tool to manage capital inflows and mitigate the emergence of asset bubbles and future collapses. While changes in macroprudential regulations are relatively rare, I find that in response to capital inflow surges, countries with low-levels of central bank independence are significantly less likely to respond with regulatory tightening, while countries with high levels of central bank independence exhibit weakly higher rates of regulatory tightening.

These findings add to a growing literature on the role of political uncertainty and trends in international finance. Further, in addition to estimating macroeconomic relationships, this paper analyzes a specific policy mechanism by considering the role of regulatory changes. Future research should aim to use more robust data measuring the intensity of regulatory change that facilitates cross-country comparisons. Additionally, research could examine alternative measures of political influences on financial regulation, including the role of partisan alignment in cabinet ministries and the range of veto players.

Chapter 2

A Conditional Political Business Cycle Approach to Reserves

2.1 Introduction

International capital inflow surges are notoriously destabilizing. Foreign capital is fickle, and benefits accrued from large inflows can quickly evaporate if investors decide to shift capital *en masse*. Infamous (but by no means exhaustive) examples of this type of reversal include Latin America in the 1980s; the Tequila Crisis; Asian Financial Crisis; Russia and Brazil in the late 1990s; and more recently the Global Financial Crisis. In the wake of these crises, policy analysts have naturally wondered if there are any safeguards countries can adopt to resist these forces.

For many, a large war chest of international reserves is seen as a prudent means of self-insurance against the vicissitudes of finance. Consequently, researchers have tried to answer the question of what economic and political factors contribute to reserve accumulation. Previous studies have argued for a monetary political business cycle of reserves, suggesting reserve accumulation is costly, and countries will lower their reserves in the run-up to elections as a form of monetary expansion. While it is true some countries tend to reduce reserve growth on average around elections, significant variation remains. Figure 2.1 plots the difference in

the average quarterly growth rate of reserves during election and non-election windows from a sample of 56 countries from 1985 through 2018 (unbalanced panel). Many states, most notably Russia, New Zealand, Denmark and Sri Lanka tend to accumulate reserves at a *faster* rate in the run-up to elections. Figure 2.1 also highlights important within-region differences: Bolivia tends to amass reserves around elections, whereas Brazil and Chile exhibited decreased growth; Estonian elections coincide with greater reserve buildup, while in Lithuania growth rates fall. Simple political business cycle models do not account for these deviances.

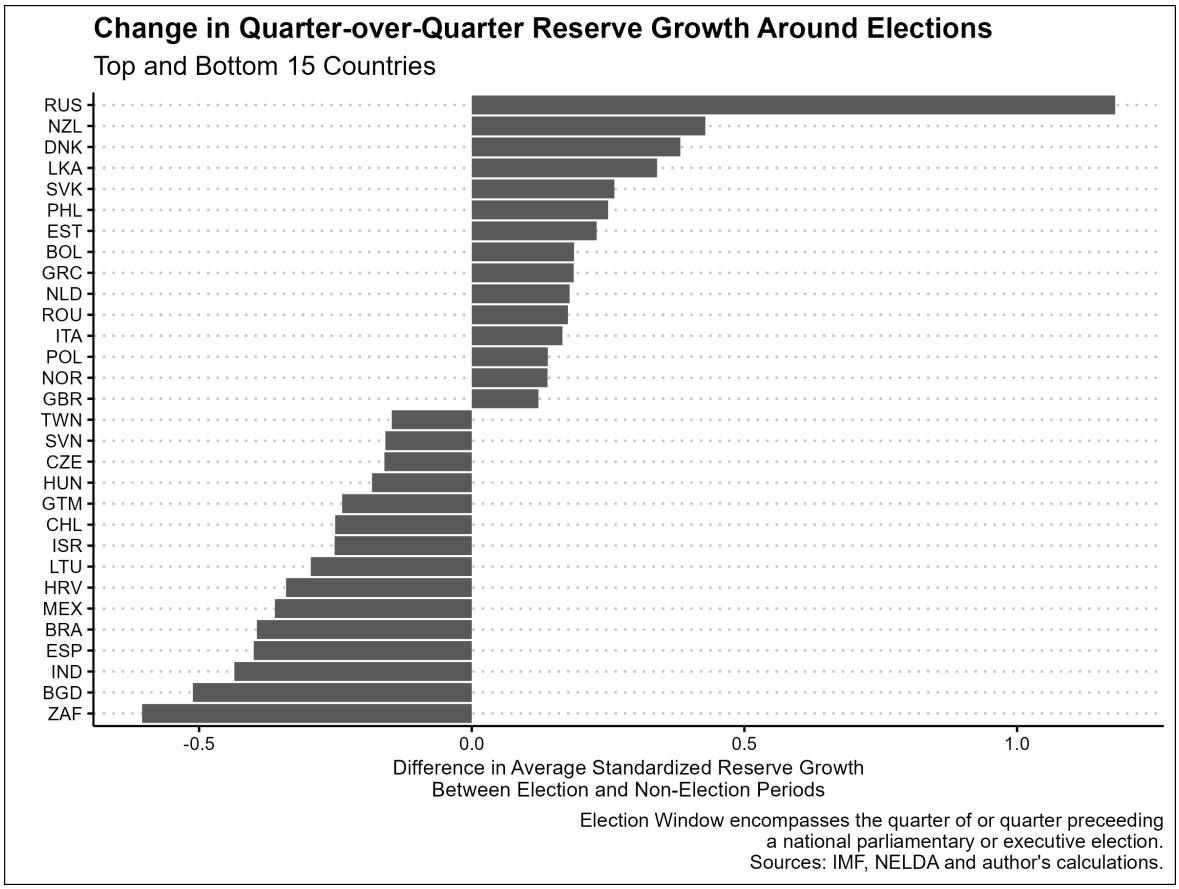


Figure 2.1: *Reserve Growth Rates in Election and Non-Election Periods*

Different patterns also emerge if we look at changes in reserves during capital inflow surges compared to normal times.[1] These results are presented in Figure 2.2. Countries

[1]A capital inflow surge is defined as in Forbes and Warnock (2021). This method is described in greater detail in later sections.

like Brazil and South Africa accumulate reserves at a faster rate during inflow surges, but many countries exhibit slower growth rates. This likely reflects both the sources of an inflows surge and countries' willingness to use reserves as a policy tool, but nevertheless the sign and magnitude of the change in reserve growth rates are not uniform across these events. South Africa displays lower reserve growth around elections, but higher growth during surges. In contrast, Bangladesh has both lower reserve growth around elections and lower growth during surges.

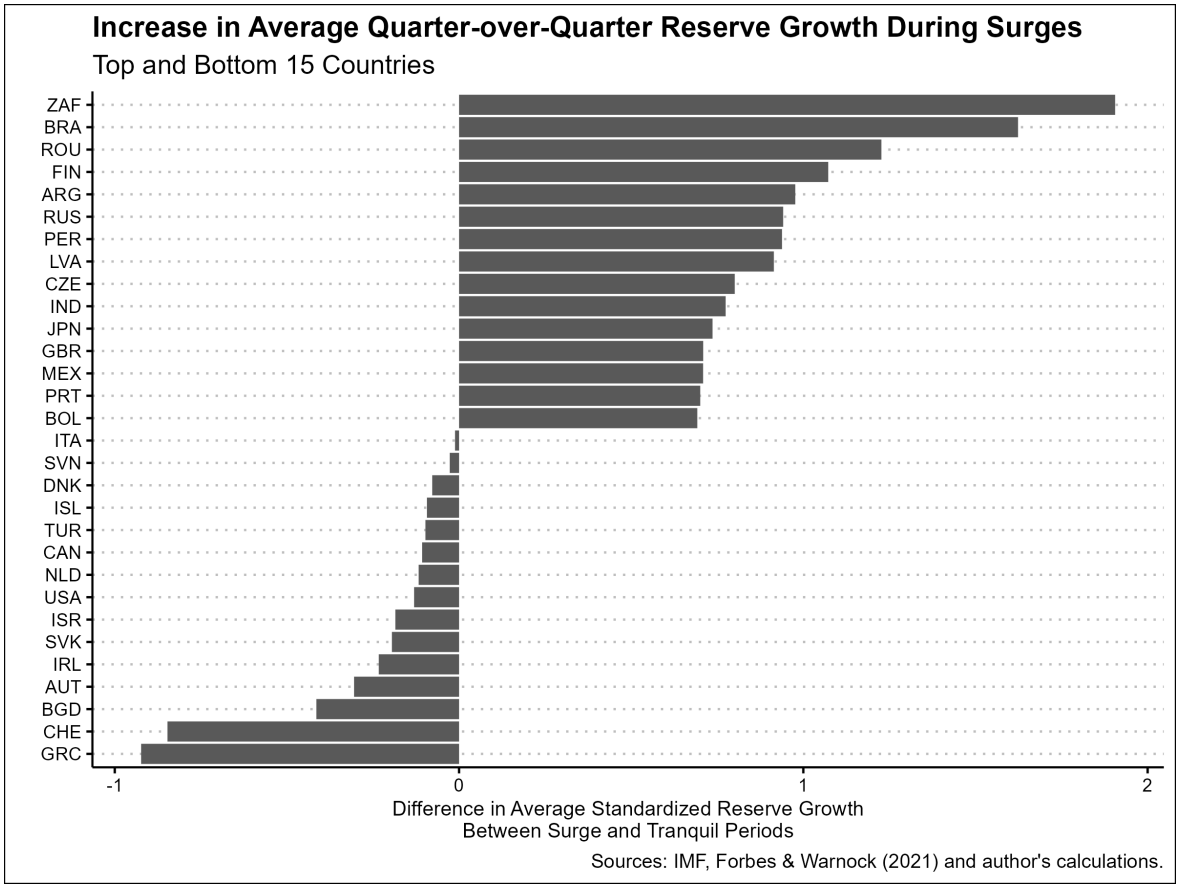


Figure 2.2: *Reserve Growth Rates in Capital Inflow Surges*

In an effort to explain this variation, this paper develops and empirically tests a conditional political business cycle theory of reserves. Conditionality is examined along two dimensions: trends in foreign capital flows and partisanship. I argue that during foreign capital inflow surges, failure to accumulate adequate reserves can generate a real appreciation of the exchange

rate, destabilizing external prices and eroding export competitiveness. These dynamics fundamentally change the costs and benefits of holding reserves to key domestic interest groups, and through these channels shape the expected impact of a political business cycle effect. I advance a theory that focuses on partisan ties to internationally or domestically-oriented groups and the interaction between partisanship and capital flows. Pressures to maintain price stability and export competitiveness in the lead-up to elections can counterbalance pressures for monetary expansion, especially amongst Right-wing parties representing internationally-oriented interests.

This paper tests these predictions with quarterly data on country-level changes in reserves, covering 36 countries from 1985 through 2018. The results suggest government partisanship and prevailing foreign capital availability interact to modify previously documented political business cycle relationships between reserve growth and election timing. I find that when large volumes of international capital are flowing into a country, Right-wing governments accumulate reserves at a significantly faster rate during election periods compared to non-election periods, while Left-wing governments exhibit more modest and non-significant changes. Further, these relationships are strongest around elections where the margin of victory was smaller. This paper's findings contribute to our understanding of how political pressures shape trends in reserve accumulation and highlight the important differences in how partisans respond. The patterns shed light on which governments may be able to sustain higher reserve levels and thus maintain an adequate war-chest of reserves for self-insurance purposes, which ultimately contributes to the risk from sudden stop episodes these countries face.

2.2 Literature Review

2.2.1 Reserves, Exchange Rate Stability and Self-insurance

Foreign exchange reserves have long been recognized as a tool for maintaining exchange rate stability and were a cornerstone of the Bretton-Woods international financial system. In the era of financial globalization since, the importance of reserves has not dissipated.

A large literature developed in the wake of the Asian Financial Crisis examining the accumulation of reserves. This literature identified the potential importance of reserves as a means of self-insurance against exposure to volatility in international capital flows. This corresponds to Feldstein's famous self-help guide, where he argues "Neither the International Monetary Fund nor a new global financial architecture will make the world less dangerous... Liquidity is the key to financial self-help" (Feldstein (1999) pp. 93). This sobering assessment puts the onus on individual countries to manage their own risk exposure. The familiar Guidotti-Greenspan rule emerged at the same time recommending countries maintain reserves adequate to cover short-term external debt. In the face of capital flight, international reserves can act to shore up gaps in credit availability and facilitate currency market intervention to maintain exchange rate stability.

Despite these recommendations, empirical findings on the role of reserve stocks and crises are mixed. Focusing on crisis onset, Rodrik and Velasco (1999) and Gourinchas and Obstfeld (2012) find higher reserve holdings are associated with reduced risk of crisis. Frankel and Saravelos (2012) identifies large losses in reserves amongst the top leading indicators for financial crisis onset and Kaminsky *et al.* (1998) find relative reserves can play an important role as an early-warning indicator for currency crises. Meanwhile Rose and Spiegel (2011) find reserves have limited explanatory power for crises in the Great Recession of 2008-09.

In parallel to the academic debate, beginning in the 1990s foreign exchange holdings amongst developing countries grew at a rapid pace, reaching an average level in excess of 30% of GDP in 2018.[2] As reserve stocks accelerated beyond traditional benchmarks for precautionary holdings, scholars began asking a new question: why are reserve levels so *high*? New literature aimed to explain the motivations for and costs of what is seen as excess reserves in developing countries. Given their direct and quasi-fiscal costs, reserves that greatly exceeded a country's short-term debt obligations became a puzzle to explain (Rodrik (2006); Summers *et al.* (2007); Obstfeld *et al.* (2010)). A leading explanation for high reserve levels

[2]As calculated in Arslan and Cantú (2019) which summarizes a variety of reserve motives and various measures of reserve adequacy, including import coverage and relative to short-term external debt or broad money (M2).

came from the "mercantilist" viewpoint that countries can accumulate reserves to combat real exchange rate appreciations and maintain export competitiveness (Polterovich and Popov (2003); Aizenman and Lee (2007); Magud and Sosa (2010); Céspedes and Velasco (2012)). Under this framework, reserve accumulation is not a direct goal per se, but rather a by-product of attempts to maintain external price stability and export competitiveness. The following sections briefly review these costs and benefits in more detail.

2.2.2 Benefits of Reserve Accumulation

The benefits of reserve accumulation are at least twofold (see Aizenman and Lee (2007) for a discussion). First, stemming back to the Bretton Woods era, international reserves can play a precautionary role, helping countries to self-insulate against shocks to international capital flows. Work has sought to differentiate the magnitude of these precautionary benefits by levels of financial development (Aizenman and Riera-Crichton (2008); Aizenman and Hutchison (2012)) and across regions (Aizenman *et al.* (2012); Aizenman *et al.* (2015)). In a similar vein, recent work by Cabezas and De Gregorio (2019) notes reserves not only act as a form of self-insurance but also can serve to deter speculative attacks.[3] More recent work develops theoretical models that highlight the additional benefits of reserve holdings on debt rollover risk (see Hur and Kondo (2016) and Bianchi *et al.* (2018)). However, these benefits are not expected to be primary drivers of political business cycle (PBC) effects. When time horizons are short, policymakers will discount the benefits of self-insurance. There is no guarantee that a crisis will emerge before the next election, so policymakers may prefer to take the risk of monetary expansion through reduced reserves. Even if a crisis does or is likely to emerge, it may occur in the future when a different government is in charge. While self-insurance may be a general motivation of reserve holdings, this motive is not expected to drive an *increase* in reserves before elections.

A separate benefit of reserve accumulation comes from its relationship with export growth.

[3]The authors note the inefficiencies that can emerge from this *comparative holding* phenomenon of over-accumulating reserves in an effort to keep pace with peer countries.

When facing large capital inflows, reserve accumulation can mitigate exchange rate appreciation, which helps sustain export growth. This channel is particularly applicable to China's accumulation of reserves through the early 2000s, but general trends of reserve accumulation have been documented in emerging markets outside of China and separate from the importance of an export led growth strategy (Rodrik (2006); Aizenman and Lee (2007)). In contrast to self-insurance, these benefits are expected to become *more* salient around elections and could generate a PBC effect to accumulate reserves. Another line of this literature argues depreciation via reserve accumulation generates additional dynamic gains through learning-by-investing externalities, further raising the benefits of this strategy (see Benigno and Fornaro (2012) and Korinek and Serven (2016)).

2.2.3 Costs of Reserve Accumulation

Despite their benefits, holding reserves is costly. Reserve accumulation involves a potentially large opportunity cost; funds held in reserve are not being deployed to finance domestic investments, nor can they be used to pay down debts and thus reduce financing spreads (Bianchi *et al.* (2018)). There is also the so-called "quasi-fiscal" cost holding reserves (Calvo *et al.* (1994)). With sterilized intervention, the central bank sells domestic government bonds to purchase foreign reserves. In doing so, central banks pay out the domestic interest rate on bonds, while receiving the foreign interest rate on holdings of foreign reserves. When domestic interest rates exceed foreign rates, countries effectively lose money from this negative spread on each unit of foreign reserves. Taken together, these costs can be substantial, with some estimates exceeding 1% of a country's GDP (Rodrik (2006); Summers *et al.* (2007)).[4] If the purchase of reserves is unsterilized, accumulating reserves is associated with higher inflation, which may be an untenable outcome for central banks given their mandates (Steinberg and Shih (2012)).

Absence of an optimal currency price-level further complicates the economic and political

[4]However, as noted by Yeyati (2008), if adequate reserves do in fact reduce the probability of a crisis onset, this would make a country's assets more safe and thus lower the spread paid on reserves, thereby reducing the magnitude of this quasi-fiscal cost.

value of reserve holdings. By accumulating reserves, a country can maintain a depreciated currency, but this comes at the cost of reducing the real purchasing power of domestic actors. This can generate PBC effects in opposite directions depending on which groups policymakers prioritize. Frieden *et al.* (2000) document how governments in Latin America tend to preside over an appreciation of the exchange rate in the months preceding an election, followed by much steeper devaluations in the months following elections. Sachs and Williamson (1985) notes the opposite pattern is found in many East Asian economies that avoid overvalued exchange rates. Frieden *et al.* (2000) argues that some of this difference could be attributed to the manufacturing sector in Latin America enjoying high trade barriers, to the point of effectively being in nontradable production. These interest groups thus benefited from the cheaper imported inputs that an appreciated exchange rate would deliver.

The mechanics of how countries accumulate reserves also determines the distribution of the costs. Sterilization may require increasing interest rates to attract actors to purchase government securities or regulatory changes to banks' reserve ratio requirements to compel financial intermediaries to purchase domestic bonds. The effect of this sterilization can lower domestic credit availability, lower bank profits and lead to higher credit rates. Sterilization via changes in bank reserve ratios or by obligating banks to hold low-yield assets may also sow the seeds for future crises. Lower returns push lenders to make riskier loans to sustain profits, leading to a subsequent debt crisis if loans go bad (Gourinchas *et al.* (2001); Lavigne (2008)). The degree to which a country can reliably sterilize may also depend on the depth of local financial markets, making sterilization easier to implement in developed financial markets.

2.2.4 Political Economy of Reserves

The theoretic possibility of political business cycles in international reserve policy dates back to the literature's conception where Nordhaus argues concern over a loss of reserves will be comparatively weaker towards the end of electoral regimes (Nordhaus (1975), p. 188). More recent political economy literature has attempted to empirically test for this relationship, exploring the impact of political pressures on reserve management. An early contribution from

Dreher and Vaubel (2009) documents a monetary political business cycle where reserves, both as a percentage of GDP and the domestic monetary base, tend to be lower in the run-up to elections. Later work from Jäger (2016) examines the influence of regime type on cross-country differences in reserve accumulation, finding democracies reduce reserves before elections, but this effect is muted where there are more veto players that can increase *de facto* central bank independence.

Another branch of the political economy literature examines how reserves are deployed in times of crisis. Broz *et al.* (2016) show that during balance-of-payments crises, countries are more likely to draw down reserves in quarters preceding elections as a first resort to restore balance. They attribute this to low political costs of deploying reserves as a tool due to the relative opaqueness of reserve holdings. When possible, governments delay disruptive and highly visible changes, such as an increasing interest rates, raising trade barriers or an outright devaluation until after elections (Blomberg *et al.* (2005)). Bianchi *et al.* (2018) identify a reduction in this type of political myopia as a key recent development in emerging markets which could account for the generally observed increase in reserve holdings.

These papers are part of a broader literature on political business cycle effects. In the classic political business cycle literature, policy changes are internally driven by re-election minded partisans. Another branch has examined the role of outside actors, such as foreign investors, currency traders and credit rating agencies (see Bernhard and Leblang (2002), Leblang (2002), Martinez and Santiso (2003), Block and Vaaler (2004)). In these studies, market expectations and uncertainty around elections can alter capital availability and borrowing rates, and these external changes may necessitate a policy response which could target reserves.

I contribute to this literature by further detailing the role of electoral pressures on reserves across three dimensions. First is the role of international capital flows. Reserve accumulation is particularly viable during periods of large capital inflows, where there is a ready pool of funds that reserves can be built up from. These periods of large capital inflows may also make reserve accumulation more attractive, as reserve accumulation can offset upward pressure on real exchange rates. By explicitly controlling for periods of large capital inflows and outflows,

this paper tests to what extent election proximity is conditional on the dynamics of foreign capital. Further, previous studies were limited to using annual data on reserve levels, which may not fully capture the exact nuances of when during the electoral cycle changes in reserves are occurring. Reserve positions can change rapidly, sometimes in a matter of weeks during sudden stops, and annual data is too coarse to reliably detect these movements. This paper measures both election timing and changes in reserves at a quarterly frequency, enabling it to detect political business cycle effects that are concentrated in more narrow election windows.

Second, while previous work focused on the role of elections in democratic and autocratic regimes, they devoted less attention to differences in ruling partisan ideologies. The benefits and costs of reserve accumulation are not expected to fall uniformly across societal actors, which can create differences along partisan dimensions. I test for this by explicitly analyzing differences in reserve trends based on the partisan ideology of a country's executive. Finally, political business cycle effects may only be relevant when elections are competitive. To test this, I supplement variables on election timing with measures of electoral competitiveness based on vote margins. As expected, I find the relationship between election timing and reserves is strongest during competitive elections.

2.3 Theory

Policymakers can in general oversee three movements in reverse holdings: an increase, a decrease, or no change.[5] Holding reserves is not free; there are both costs and benefits of not injecting these funds into the economy. Reserves represent a trade-off between monetary expansion vs. self-insurance and credit smoothing across financial shocks. These costs and benefits do not fall uniformly across societal groups, and this division generates pressure for partisans to differentially manage reserves. Further, the size and political saliency of these costs can change in response to the availability of foreign capital and election proximity.

[5]While monetary authorities have a variety of tools available to achieve these ends, direct cross-country comparison of the implementation of specific tools is difficult due to heterogeneity in local financial markets. As such, this paper focuses on reserve levels and does not explicitly evaluate the precise tools used.

Drawing from the earlier discussions on the costs and benefits of reserves, this section generates predictions about the preferences of various domestic interest groups over reserve holdings.

The remainder of this section builds this theory in the following parts. First, I describe a simple partisan cleavage with respect to groups' international orientation. Second, I outline the expected societal distributional impacts of reserve policy, and how these impacts depend on capital flow trends. Finally, I incorporate political business cycle forces to illustrate how upcoming elections magnify or dampen these forces.

2.3.1 Partisan Cleavages

To simplify exposition, I assume parties are split in their representation between internationally-oriented and domestically-oriented actors. Drawing on the partisanship literature, I assume Left parties draw support from and represent the interests of domestically oriented actors, including labor and import competing businesses. Right parties draw support and represent the interests of internationally oriented actors, including exporters and international capital interests (Alesina (1989); Goodman (1991); Simmons (1996); Bernhard *et al.* (2002b)).[6] From these differences, the parties will prioritize different policy goals.

Right parties will prioritize preserving exchange rate stability at a relatively low value to facilitate international transactions and support export growth. By representing capital interests, Right parties are also expected to be more willing to use interest rates to maintain price stability, and less willing to impose capital controls and strict banking regulation (Broz (2013)).[7] In extreme cases, Right parties are expected to have a higher tolerance for exchange rate devaluations (Walter (2009)), as the negative cost of this devaluation is partially offset by an increase in export competitiveness, and Right-wing constituencies may suffer less from the

[6]This simple dichotomy cannot capture the full differences between political parties, but it will help simplify later discussions about the differential political pressures induced by capital flow and electoral cycles. The accuracy of this Left/Right dichotomy may also be regionally dependent. However, given my focus on the interaction between election proximity and capital inflow episodes, there is limited power to analyze regional partisan variation. Recent rises in Right-wing populism also suggest the possibility of Right parties which deprioritize international interests.

[7]In the language of the Mundell-Fleming Trilemma, Right parties are expected to forgo monetary autonomy.

loss in purchasing power. Right parties are also expected to prefer sterilized intervention which can mitigate inflation and lead to a higher domestic interest rate, benefiting the financial sector (Bearce (2003)), but would be less willing to achieve this sterilization through regulatory tightening (Broz (2013)).

Left parties will prioritize domestic monetary autonomy, and prefer a relatively appreciated currency that raises the purchasing power of domestic actors. With lower ties to capital holders, Left parties will be more averse to raising interest rates, instead preferring to implement controls on capital flows and increases in liquidity, even if this increases domestic inflation. For both parties, election proximity is expected to magnify the political pressures to serve the interests of their respective groups.

2.3.2 Distributional Impacts During Inflow Surges

Large inflows of capital place upward pressure on exchange rates. Internationally oriented actors will prefer reserve accumulation because it offsets this pressure and supports price stability. Additionally, in this environment abundant foreign capital stands as a ready substitute for domestic credit. As such, the reduction in credit availability which results from reserve accumulation is expected to be more marginal. Internationally oriented actors may be insulated from this impact if they can more easily access foreign capital, and in this case the effect of reduced credit availability is expected to fall disproportionately on domestically oriented actors.

Domestically oriented actors will welcome a real appreciation of the exchange rate and prefer the country to receive these inflows without an offsetting increase in reserve. Left governments will benefit from this appreciation, especially around elections. However, domestic actors may still worry about the potential instability an appreciation could cause if it generates market expectations of a future depreciation.[8] This creates a counter-balancing self-insurance motivation to accumulate reserves, especially given the cost of accumulation (in terms of

[8]Inflows may also erode the adequacy of existing reserves relative to imports or external debt if these measures significantly increase during the inflow surge.

reduced credit availability) is lower during these inflow surges. The perceived benefit (from the perspective of policymakers) of self-insurance is expected to be lower during election windows, as insurance is less likely to be needed until after the election is resolved.

To the extent an inflow surge is driven by a larger spread between domestic and foreign returns, the quasi-fiscal cost of holding reserves is expected to be higher during these periods. The burden of this cost may be passed on to the domestic financial sector if financial intermediaries are compelled to hold assets at below market rates.[9] This cost acts as a restraint on both parties. The structure of these preferences leads to the following hypotheses:

H1a: During capital inflow surges, Right governments will accumulate reserves, and this accumulation will be higher during election periods.

H1b: During capital inflow surges, Left governments facing elections will not increase reserves. When not facing an election, Left governments will accumulate reserves during inflow surges as a form of future self-insurance.

2.3.3 Distributional Impacts During Capital Outflows

When foreign capital outflows increase, and inflows suddenly stop, there is downward pressure on the real exchange rate, price instability and reduced credit availability. In this environment, internationally oriented actors benefit from a reduction in reserves to maintain price stability. Should a devaluation become necessary, export interests will be insulated from the fullness of this shock by an offsetting increase in their global competitiveness. Holders of foreign-currency denominated debt would suffer from a devaluation.

Domestic interests, especially labor, suffer from potential credit crunches and from a reduced purchasing power for imports.[10] During outflows, these actors would prefer to maintain a degree of monetary autonomy and restore price stability and pursue expansionary

[9]This burden may further be passed on to domestic borrowers if financial intermediaries raise interest rates.

[10]Capital interests that are domestically oriented may benefit from increased interest rates due to the absence of foreign capital as a substitute.

policy via reducing reserves and/or imposing capital controls as a first resort rather than raising interest rates and further exacerbating the rising cost of capital.

Spending down reserves in this environment sustains *both* price stability and purchasing power, and thus both parties are expected to converge on reducing their reserves. During election periods, the opaqueness of reserve policy makes reducing reserves a particularly attractive strategy in lieu of changes in interest rates, trade policy or a currency devaluation. This effect is expected to be stronger for Left parties, which are more sensitive to devaluations and less likely to represent groups that would benefit from a rise in interest rates.

H2: During capital outflows, Right and Left governments will decrease reserves, and this reduction will be larger during election periods.

2.3.4 Distributional Impacts During Tranquil Times

How will reserve holdings change when capital flows are stable? During "normal" capital flow periods, prices are relatively stable, eliminating this source of pressure on reserve decisions. In this environment, the trade-off between monetary expansion and self-insurance will dominate decision making. Without offsetting concerns about price stability and export competitiveness, tranquil times appear most likely to display the classic PBC effect which predicts a reduction in reserves around elections. As elections approach, self-insurance motives wane and monetary expansion becomes more attractive. This dynamic is expected to hold regardless of partisanship, leading to the following hypotheses:

H3: During normal capital flow periods, both Right and Left governments will decrease reserves during election periods.

In the following sections I introduce the data and empirical strategy used to evaluate these predictions.

2.4 Data Description

In this section, I empirically test the relationship between political economy variables and changes in reserves with a series of panel linear models. Later sections attempt to address endogeneity concerns by considering interest rates in the United States or measures of global volatility expectations as potential instruments for the onset of a change in capital flows. The final data set comprises an unbalanced panel at a quarterly frequency. The data covers 36 countries from 1985 through 2018. The dataset includes 23 advanced economies and 13 emerging markets.[11] The full list of countries is available in Table B.3 in the appendix. The primary dependent variable is the quarter-over-quarter percentage change in a country's total reserve holdings (excluding gold).[12] The subsequent results are qualitatively similar if the growth in reserves is instead measured on a year-over-year basis.

2.4.1 Defining Capital Flow Episodes

This article adopts the definition of capital flow surges and stops based on changes in gross flows developed in Forbes and Warnock (2012) and extended in Forbes and Warnock (2021). This construction provides several benefits. First, it is available for a larger set of countries on a quarterly basis. Where political business cycle effects have been found, they tend to manifest in narrow windows around elections; annual measures are too coarse to appropriately detect these changes.[13] Further, by examining gross flows, capital flow episodes can be delineated between those arising from changes in the behaviour of domestic agents and those stemming from changes in the behaviour of international investors. Differentiating between domestic

[11]Advanced / Emerging market status is based on BIS definitions, following Forbes and Warnock (2021).

[12]Measures of reserves are from the IMF IFS database. The results are broadly consistent to scaling reserves by GDP. Quarterly data is not always available for additional scaling measures, especially for external debt and import coverage. To preserve sample size, I opt to use quarter-over-quarter growth rates in unscaled reserves. Further, scaling measures such as GDP are less variable than reserves, resulting in limited change to the estimated results.

[13]Studies using annual data on reserve changes have tried to account for this by measuring the fraction of year that occurred before an election, but this approach still aggregates changes in the outcome variable across the entire year and is unable to detect important variation within a year.

and foreign capital may be particularly important when examining capital flow shocks around elections as domestic agents may have an informational advantage during these times. Lastly, studies focusing on net capital flows have primarily been applied to emerging market economies (EMEs) and have used threshold analyses based on the ratio of net flows to GDP to identify extreme surges relative to both a country's own flows and flows in the entire sample (Reinhart and Reinhart (2008); Cardarelli *et al.* (2010); Ghosh *et al.* (2014)). This technique would fail to consistently identify capital flow episodes in advanced economies with lower net capital to GDP ratios across the entire sample, even though those countries might be experiencing large flows relative to their own history. Forbes and Warnock (2021) use gross capital inflows and outflows to measure what is happening on both sides of the account. Gross flows are particularly important for identifying events for advanced economies, which are more prone to large swings in gross inflows and outflows that may cancel each other out and show little movement in net flows; lower income countries are less prone to this problem given flows are often highly concentrated on only one side of the balance sheet (inflows or outflows).[14] Gross flows may also be particularly relevant for measuring the impact of debt flows in regards to housing price booms (see for example Ansell *et al.* (2018)). Jeanne and Ranciere (2011) presents additional justification for focusing on gross flows in a model of optimal reserve holdings and finds a positive relationship between vulnerability to sudden stops and gross financial flows as a proxy for international financial integration.

Forbes and Warnock (2021) provide binary measures on a country-quarter basis during which a country is experiencing various capital flow episodes.[15] From these measures, I construct the variable *Capital Episode*, which takes on three values: *Surge*, *Tranquil* and *Stop*, corresponding to the prevailing international capital flows a country is receiving. A country-quarter observation is coded as *Surge* if at least two of the previous four quarters

[14]Ghosh *et al.* (2014) note that this focus on gross flows can be misleading during periods of high two-way volumes of capital flows. Foreign capital inflows may be offset by domestic capital outflows, resulting in little net change which may not call for a policy response.

[15]They define four episode types: Surges, Stops, Flights and Retrenchments. Surges and Stops denote changes in foreign flows, while Flights and Retrenchments refer to changes in domestic flows. All episodes are calculated based on large (relative to 5-year rolling historical trends) deviations in gross capital flows.

exhibited an inflow surge. Further, the current quarter must also not be coded as a *Stop* episode. This construction means that countries are not coded as being in a surge window until at least the second consecutive quarter of large inflows. This surge window can persist up to two quarters beyond when inflows exhibit less extreme deviations, but only if the end of the inflow episode does not coincide with a *Stop*. Under this construction, a surge window is not recorded until after inflows have persisted, giving policymakers time to witness and react to the large changes. The definition also extends to quarters immediately following a surge to further reflect potential lags in policy changes.[16] A country-quarter observation is coded as *Stop* if the country is actively experiencing a stop in foreign capital inflows in that quarter. All other times are coded as *Tranquil*. For the dataset used in the final full analysis, this coding identifies 1940 observations as *Tranquil*, 487 as *Surge* and 374 as *Stop*.

I focus on episodes defined as these deviations from recent trends to capture periods that policymakers may be able to identify contemporaneously as being unusual and have time to react. The use of threshold analysis is in line with the crisis early warning literature. Politicians may believe these flows will be persistent, but by focusing on a binary indicator of these windows of extreme deviations the empirical strategy captures the time periods where we might most expect an active policy response as policymakers are well positioned to recognize the unusual nature of the flows (as opposed to a continuous measure of actual capital flows). How reserve holdings respond to these unusual flows, and if that response is differential based on key political economy variables is the focus of the remainder of the analysis.

2.4.2 Political Economy Variables

I incorporate variables of election timing and government partisanship based on data from The National Elections Across Democracy and Autocracy (NELDA V6), and the Database of Political Institutions (DPI). NELDA records the dates of country-level elections which I use to create an indicator variable for if country is experiencing an election in a given quarter.

[16]The findings are robust to instead defining surge windows as (1) only those individual quarters experiencing an inflow surge, or (2) quarters experiencing an inflow surge or quarters immediately after an inflow surge.

I consider both executive and parliamentary elections. I also include separate lagged and forward versions of this measure to examine relationships in a window around elections. The primary "Election Window" used in subsequent analysis is a binary indicator of whether an election occurred in a given quarter or was scheduled for the immediate upcoming quarter. Defining election timing at a quarterly frequency helps to identify the potentially narrow windows where political pressures may produce a political business cycle effect.

Party ideology is coded from the Database of Political Institutions (DPI). This measure categorizes the party affiliation of a country's executive in a given year into three categories (Right, Left, Center). Following the approach of Brooks *et al.* (2022), I create a binary indicator coding whether the executive is from a Left-wing party, and pool Right and Center governments into a single second category. Additional robustness checks consider measures of the competitiveness of elections, based on vote margin difference recorded in the Varieties of Democracy (V-Dem) database.

2.4.3 Domestic Economic Controls

I include a range of domestic-level controls that may influence reserve accumulation. Unless otherwise noted, the lagged value of these controls are included in empirical specifications to avoid problems with simultaneity.

As a measure of trade openness, I include total trade (sum of imports and exports) as a percentage of GDP. Quarterly growth in GDP is included to account for how economic growth levels may also attract capital inflows and drive changes in reserve policy. Further, following Dreher and Vaubel (2009), the standard deviation (calculated over the previous five years) of export growth is included to control for external volatility in previous quarters.

Another important consideration is a country's existing levels of capital controls. Stricter capital controls may dampen the need for self-insurance via reserves and can increase the efficacy of sterilization, changing the overall cost of holding reserves. To measure capital controls, I use the Chinn-Ito index.[17]. Additional domestic controls include the log of real

[17]Chinn and Ito (2008)

GDP, the current account balance (as a percentage of GDP) and domestic inflation.[18] The models also include the lagged dependent variable as a control to account for persistence.[19]

Foreign reserves are a key tool for stabilizing a fixed exchange rate. To control for this relationship, I include a binary measure of whether a country has a floating exchange rate (Ilzetzki *et al.* (2019).[20] Finally, the specifications include broad measures of global capital flows and measures of regional contagion as calculated in Forbes and Warnock (2021). These variables control for the capital trends in neighboring countries and reflect potential global push factors. Non-binary controls and the outcome variable are winsorized (at 1 percent) and standardized.[21] Summary statistics for the key variables are presented in Table B.1 in the appendix.

2.5 Empirical Strategy

To examine the association, I run a series of panel linear models, using the quarterly data on capital flow episodes, partisanship and election timing. For a given country i in time t, my key dependent variable y_{it} is the quarter-over-quarter proportional change in reserve holdings (excluding gold). That is, if a country's quarterly international reserve holdings are $r_{i,t}$, I calculate $y_{it} = \frac{r_{it} - r_{i,t-1}}{r_{i,t-1}}$. I then estimate the following relationship:

$$\begin{aligned} y_{it} = {} & \alpha_i + \gamma_t + \beta_1 CapitalEpisode_{it} + \beta_2 Elec_{it} + \beta_3 LeftGov_{it} + \beta_4 Elec_{it} \times LeftGov_{it} \\ & + \beta_5 Elec_{it} \times CapitalEpisode_{it} + \beta_6 LeftGov_{it} \times CapitalEpisode_{it} \\ & + \beta_7 Elec_{it} \times LeftGov_{it} \times CapitalEpisode_{it} + \beta X_{it} + \epsilon_{it} \end{aligned}$$

Where α_i and γ_t are country and date fixed effects and the main political economy variables

[18] Measured as the change in CPI relative to the previous quarter.

[19] While the inclusion of the lagged dependent variable in the context of dynamic panel data could introduce bias (Nickell (1981)), this bias is of order $1/T$ and likely to be small given the large sample period and use of quarterly measurements.

[20] A country is coded as having a floating exchange rate if the exchange rate is freely floating or freely falling based on Ilzetzki *et al.* (2019) coarse specification.

[21] Inflation is winsorized at the 5 percent level.

of interest are:

1. $CapitalEpisode_{it}$ is the indicator of whether capital flows are in a *Surge*, *Stop* or *Tranquil* category for the given country-quarter.

2. $Elec_{it}$ is a binary indicator denoting if at quarter t a country is experiencing an election, or if there is an election in quarter $t+1$. This captures the response of politicians during election quarters and in the quarters in the immediate run-up to elections.

3. $LeftGov_{it}$ is a binary measure denoting if a country has a left-wing executive in a given quarter.

4. X_{it} is a vector of the additional controls defined above

Previous results drawing upon the political business cycle literature focus on the uninteracted coefficient β_2 associated with election timing. The conditional political business cycle developed in this paper argues for a focus on the interaction coefficients in the above specification. β_4 measures to what extent the relationship between reserve growth and elections is different when left-wing governments are in power. β_5 measures if the relationship between capital flow episodes and reserve growth is different during election windows. Finally, the triple interaction term β_7 measures if this relationship between reserve growth and elections is different under left-wing governments. We may worry about the overall sample representation across the various combinations of variables for the triple interaction. Table B.2 in the appendix provides a detailed breakdown of the relative frequency of these combinations. The least common pairing is a Stop occurring during an election period with a Left incumbent, but there are still 25 instances of this combination, and all other combinations have at least 38 observations.

2.6 Results

Table 2.1 reports the results of estimating the above relationship with country and year fixed effects. Only the key political economy variables are reported, while other country-level

controls are omitted to save space (Table B.4 in the appendix reports the full results for significant variables). The outcome variable has been standardized for ease of interpretation.

Column 1 of Table 2.1 reports a baseline model with no interactions. Unsurprisingly, the lagged dependent variable is highly significant across all specifications, reflecting the autocorrelation in the outcome variable. The *Stop* indicator is negative and significant, indicating that when countries are experiencing a sudden reduction in foreign capital inflows, reserve holding growth rates are lower on average. This result aligns with existing understanding of policymakers drawing down on reserves as a form of insurance during outflow episodes. The *Election* variable is non-significant. This deviates from PBC effects that predict reserves would be run down in the lead up to elections and would expect this coefficient to be negative. Finally, the indicator of *Left* government is non-significant.

Columns 2-4 of Table 2.1 examine the pairwise interactions between the key political economy and capital flow variables. The results are broadly consistent with the non-interaction model, but a few things are worth highlighting. First, Column 2 interacts *Election* with the type of capital flow episode. The interaction between Surge and Election proximity is positive and large in magnitude. While the baseline coefficient on Surge is virtually zero, indicating no relationship with reserve accumulation in non-election periods, when surges coincide with elections there is a significant increase in reserve growth rates. After incorporating this interaction, there is still limited evidence for a negative relationship between reserves and elections; if anything there appears to be a positive association in some cases. Column 3 interacts government partisanship with the capital flow episode, but finds no significant relationships. While the coefficient on stop episodes remains negative, there does not appear to be a large partisan difference in reserve growth during stops. Column 4 interacts government partisanship and election timing and fails to find a significant political business cycle effect for either party.

Finally, Column 5 of Table 2.1 examines the triple interaction between *Election*, *Partisanship*, and *Capital Flows* to test the theoretical predictions of the differential political business cycle effect based on partisanship and flows. Interpreting the overall predicted change

Table 2.1: *Change in International Reserves During Capital Episodes*

Dependent Variable:	Reserves (Q-o-Q) Growth				
Model:	(1)	(2)	(3)	(4)	(5)
Variables					
Lagged Dependent	0.73***	0.73***	0.73***	0.74***	0.73***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Surge	0.03	0.002	0.01		-0.01
	(0.03)	(0.03)	(0.04)		(0.04)
Stop	-0.08**	-0.08*	-0.07*		-0.05
	(0.03)	(0.04)	(0.04)		(0.05)
Election	0.02	-0.009		-0.005	-0.02
	(0.02)	(0.04)		(0.03)	(0.04)
LeftGov.	0.04*		0.03	0.02	0.03
	(0.02)		(0.02)	(0.02)	(0.03)
Surge × Election		0.16*			0.21**
		(0.08)			(0.10)
Stop × Election		0.002			-0.07
		(0.08)			(0.10)
LeftGov. × Surge			0.04		0.04
			(0.06)		(0.06)
LeftGov. × Stop			-0.03		-0.07
			(0.04)		(0.05)
LeftGov. × Election				0.06	0.02
				(0.05)	(0.08)
LeftGov. × Surge × Election					-0.12
					(0.16)
LeftGov. × Stop × Election					0.20
					(0.14)
Fixed-effects					
country (36)	Yes	Yes	Yes	Yes	Yes
date (133)	Yes	Yes	Yes	Yes	Yes
Fit statistics					
Observations	2,801	2,801	2,801	2,801	2,801
R^2	0.637	0.638	0.637	0.636	0.639
Within R^2	0.570	0.571	0.571	0.569	0.572

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

associated with election proximity from these coefficients in isolation is difficult and to make interpretation more easy, Figure 2.3 plots the marginal effect on predicted reserve growth from changing from a non-election period to an election period, holding fixed all other variables in the model.[22] The marginal effects are plotted across government types and capital flow episodes, and the relevant comparison for the individual marginal effects is zero.

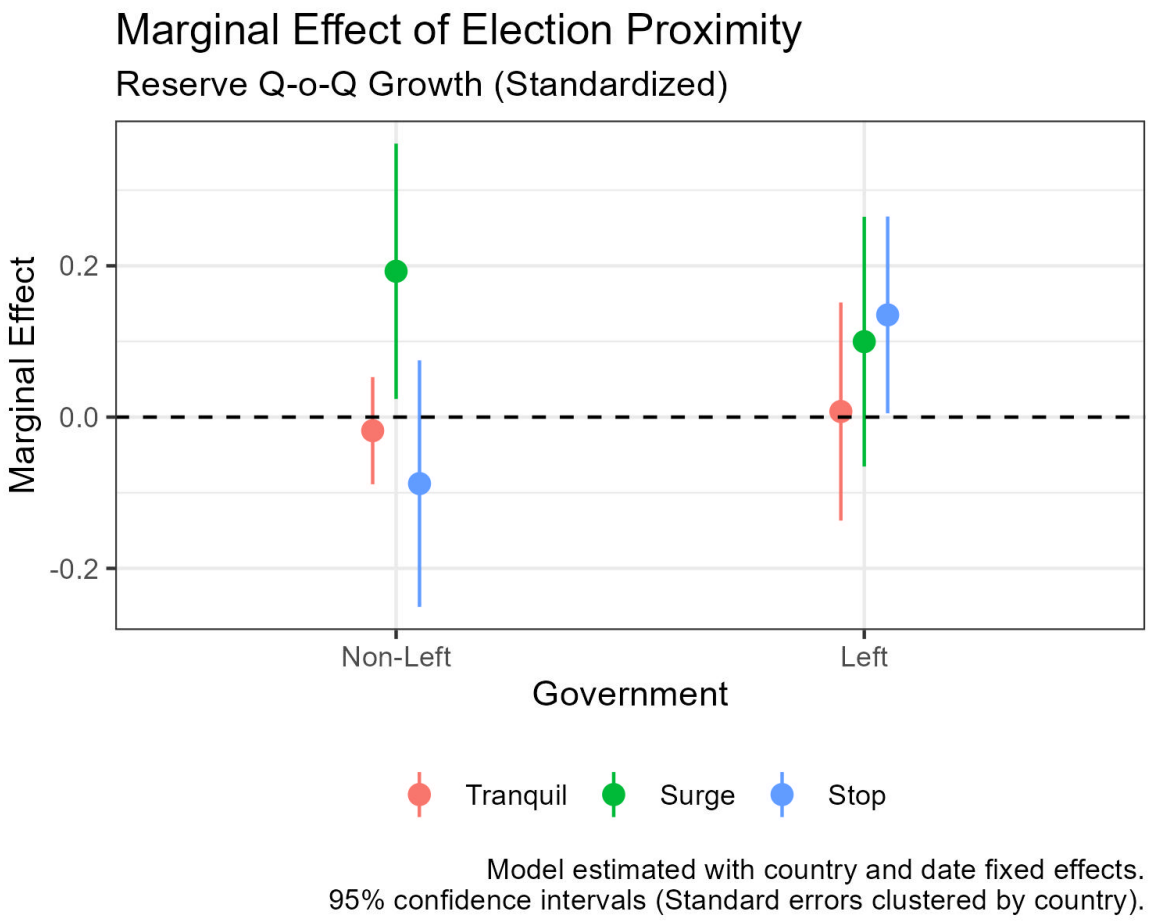


Figure 2.3: *Marginal Effect of Election Timing*

I find that for non-Left parties, the marginal effect of election timing on reserves is positive during periods of capital inflows. This effect is a meaningful magnitude at 0.19 standard deviations. This is consistent with non-Left governments accumulating reserves to combat

[22]The use of the word 'effect' in these plots should not be construed in a causal sense. These plots only show the predicted change in the outcome variable based upon a change in election timing. The empirical strategy employed in these estimates does not eliminate potential omitted variable bias or other confounders.

exchange rate appreciation and support exporting interests. Continuing the focus on non-Left parties, there is no meaningful marginal effect of elections during tranquil times, while there is a negative but statistically insignificant estimate during stops. Reserve growth rates are lower for these parties when elections occur during stop-periods, but given the limited sample size of stop episodes this effect cannot be distinguished from zero.

Examining Left governments, the predicted marginal effect of election timing on reserves is generally insignificant, and only approaches marginal significance during *Stop* times. Whereas non-Left governments accumulate reserves during election windows around *Surges*, the association is less strong for Left governments and cannot be distinguished from zero for this group.[23]

The positive, albeit insignificant, estimate for Left governments during *Stop* episodes is a puzzling result, as reserves can be reduced to shore up prices during stops, and if Left governments are more staunch defenders of price levels, we might expect them to deploy reserves quickly in these times, especially when electoral time horizons are short. One limitation of the above analysis is that it does not examine the full menu of policy responses available, such as imposing capital controls or trade barriers. This curious finding for Left governments could arise if Left governments respond more rapidly and with a wider range of policies to outflows during elections, thereby reducing their need to draw down reserves. Future research could aim to unpack the relative roll of changes in reserves during these times compared to other tools.

To summarize, I find limited evidence for a negative unconditional political business cycle relationship between elections and reserve growth rates, but I do find a positive relationship for elections that coincide with periods of large inflows. In contrast to earlier predictions, I do not find strong evidence that this effect is significantly different based on the partisan alignment of the existing executive during the inflow surge.

[23]The insignificance of the triple interaction term in the reported table suggests that while the marginal effect of elections is more positive for non-Left governments, it cannot be distinguished statistically from the smaller positive marginal effect of elections observed for Left governments.

2.6.1 Additional Marginal Effects

The above plots only consider the change in predicted reserve growth rates from being in an election period. In this section, to better examine the dynamics of partisanship and capital flows, I repeat this analysis based on a change in partisanship or a change in the capital flow environment. Examining these marginal effects plots for the other political economy variables yields additional insights.

Figure 2.4 plots the marginal effects from the full model in Table 2.1 from a change to a Left-government, conditional on election timing and the state of capital flows. Focusing first on non-election periods (plotted in the left-side of the figure), there is no meaningful partisan effect during any of the three capital flow periods. Turning to election periods, there are fewer observations, and the estimates are less precise, but there is a large and weakly significant positive association between left governments and higher reserve growth during stop episodes, mirroring the earlier findings.[24]

The final set of marginal effects is plotted in Figure 2.5. These plots examine the marginal effect of moving *from* a tranquil time *to* a capital flow episode. The left-hand-side of the plot examines the marginal effect of moving to a capital stop episode, the right-hand-side of the plot examines the marginal effect of moving to a capital surge episode.

Focusing on the left-hand-side, the point estimates are primarily negative, reflecting the fact that in most cases the predicted change in reserves is smaller during *Stop* episodes, but these estimates are only significant for Left governments not facing an election. This further clarifies the earlier positive marginal effect of elections on Left governments during Stop episodes. During non-election times, *Stops* generate predictions of significantly lower reserve growth for these left governments, but this point estimate is essentially zero during election periods. Taken together, this suggests that when not facing electoral pressures, Left governments oversee lower reserve growth rates during a Stop (compared to normal capital

[24]There were 25 instances of this combination of variables in the final regression specification, which is the least frequent combination across the data. This relative infrequency explains the large standard errors and noisy estimates.

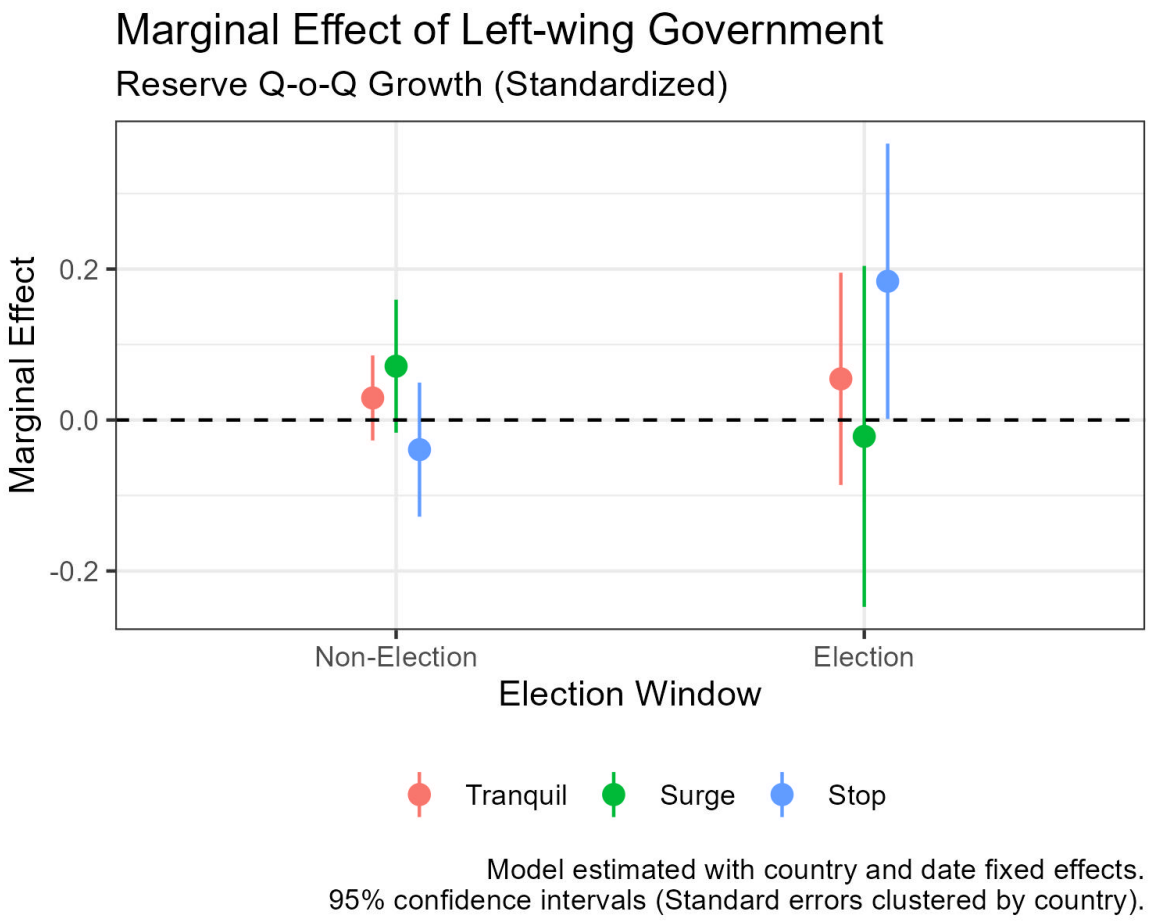


Figure 2.4: *Marginal Effect of Left Government*

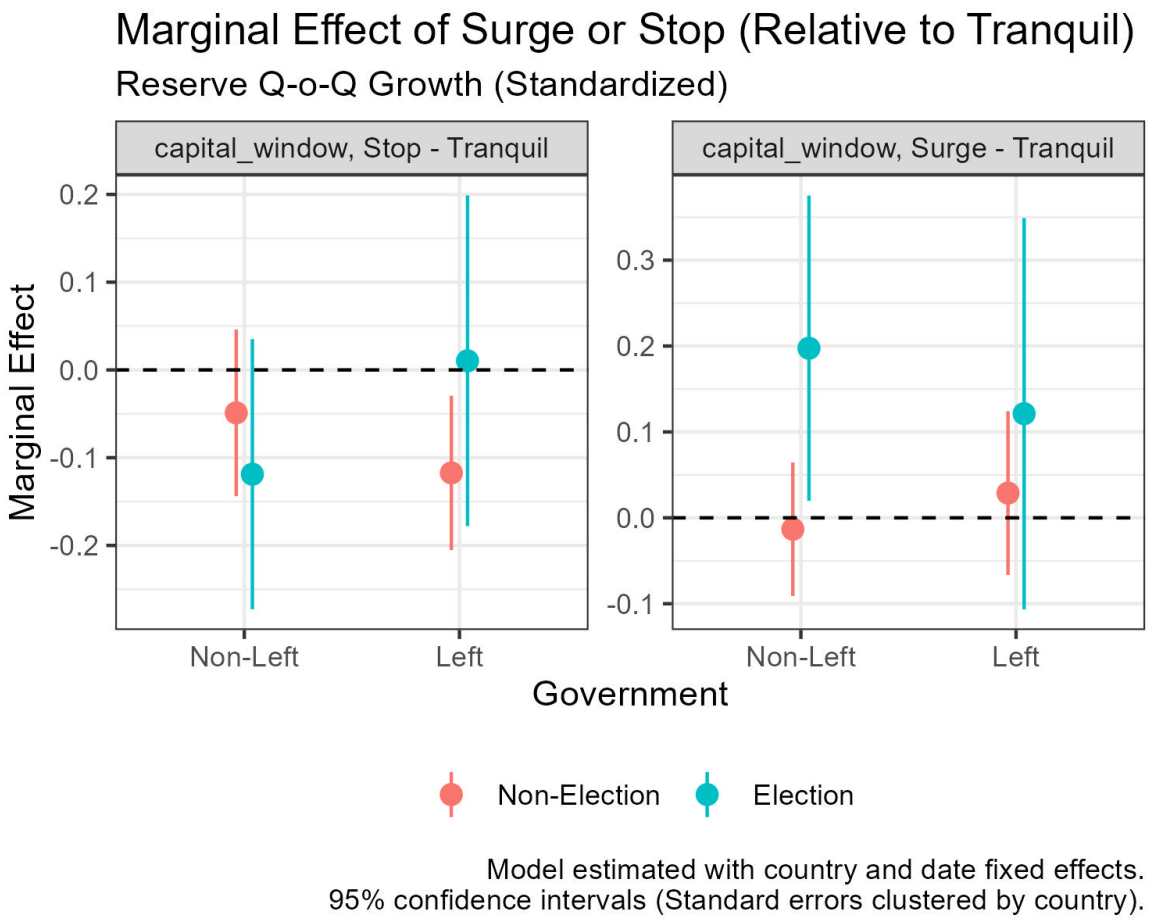


Figure 2.5: *Marginal Effect of Change in Capital Flows*

flow periods). The positive marginal effect of elections identified above is acting to net out this prior negative relationship, rather than to imply Left governments accumulate reserves after stops around elections – the point estimate of this marginal effect indicates no relationship in election periods, but this is a 'positive effect' relative to the significant negative relationship observed in non-election periods. The opposite pattern emerges for Right parties. When not facing an election, *Stop* episodes under Right governments are not associated with a change in reserve growth; when election pressures coincide with the *Stop* episode, reserves exhibit more negative growth, but this estimate is not statistically significant.

The right-hand-side of Figure 2.5 focuses on the predicted change from a capital inflow surge and further illustrates the partisan differences in the political business cycle predictions. For Left parties, the point estimates in this panel are non-significant. I do not find evidence that Left parties respond to inflows by building up foreign reserves at a faster rate. This finding is consistent with Left parties being more tolerant of exchange rate appreciation and price instability. The same pattern is found for surges that occur under Right parties not facing elections.

The lone exception is the positive and significant coefficient for Right governments during election years. For these governments, moving from tranquil times to an inflow surge is associated with a 0.20 standard deviation increase in the reserve growth rate. This finding is in-line with Hypothesis 1 and the prediction that Right parties prefer to deliver price stability around elections, even if that stability entails preventing a real appreciation as this real appreciation can undermine export competitiveness.

Given the overall limited significance in the party interaction terms, Figures 2.6 and 2.7 present the marginal effects plot from election proximity and a change in capital flows from a model estimated without additional partisan interactions. The marginal effect of election remains positive and significant for inflow surges, and virtually zero for both tranquil times and stop episodes. Further, we see that during *Stops* countries tend to oversee lower reserve growth rates, with no meaningful change between election and non-election times. However,

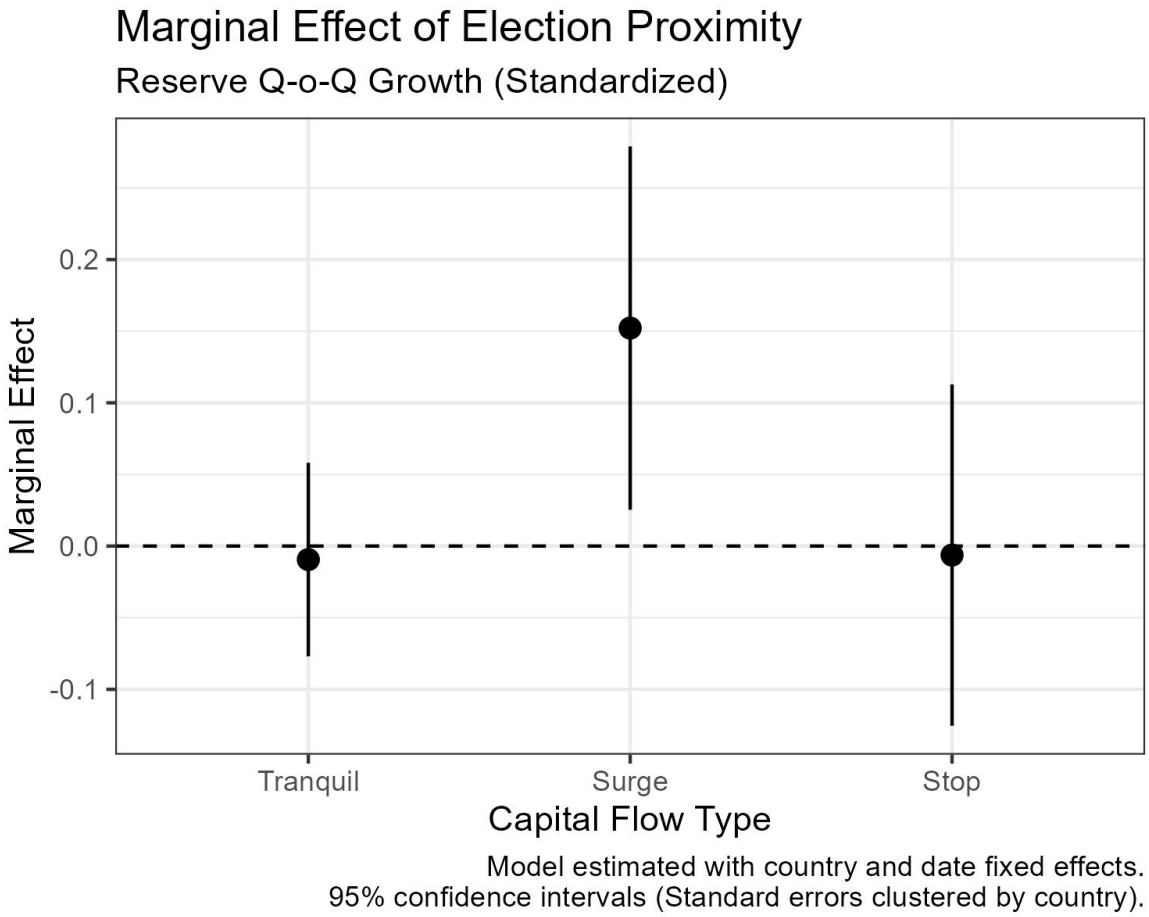


Figure 2.6: *Marginal Effect of Election Pooling Across Partisans*

the onset of a *Surge* is associated with an increase in reserves but only around elections.[25]

Taken together, these variations of predicted marginal effects underscore how a potential political business cycle effect on reserves can be highly conditional on trends in external capital flows. In contrast to earlier studies, when looking at more granular quarterly data on reserve growth, I do not find evidence for a generally negative relationship between reserves and elections. Electoral pressures alone are not a satisfactory explanation, and the observed relationship between reserve growth and elections changes depending on the availability of foreign capital. I argue this should not come as a surprise as trends in international capital flows shape the underlying costs, benefits and corresponding domestic preferences that could

[25]The underlying regressions behind these models are excluded to save space but are available upon request.

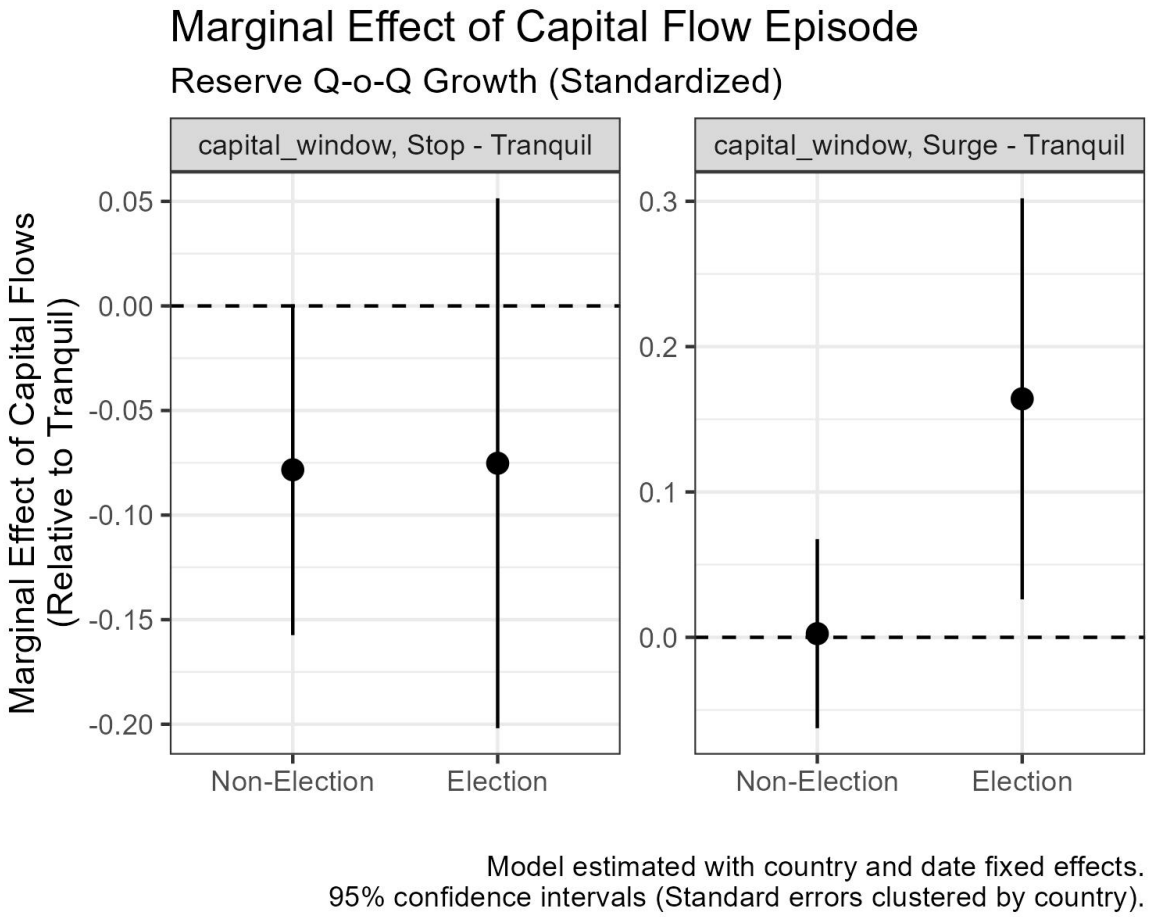


Figure 2.7: *Marginal Effect of Change in Capital Flows Pooling Across Partisans*

drive a political business cycle change in reserves.

2.6.2 Reserves Around Competitive Elections

The logic behind political business cycle effects suggests re-election minded politicians alter policy to increase support and political security. This motivation should be strongest in competitive elections when there is a greater chance for political turnover. When a politician's position is secure, elections pose less of a threat and there is less need to alter policies to deliver value. To test for this, I re-run the earlier analysis with a new measure of election timing that gauges the competitiveness of an election. The results of this analysis are presented in Table 2.2. In these models, 'Close Election' is a binary indicator denoting if a country had a

competitive election in a given quarter. I consider four different definitions of competitive election depending on margin of victory and the type of election. The two two types of elections are: (1) executive and (2) legislative / parliamentary. For margin of victory, I define close elections with a backward-looking measure based on the final results of the election. Following the approach of Brooks *et al.* (2022), I consider vote margins of 5 percent and 10 percent as thresholds for competitive elections.

As before, the results in Table 2.2 identify a weak decrease in reserve growth during *Stop* episodes in all models, but this decrease is significantly larger for *Stops* that coincide with competitive executive elections. Given the backward-looking nature of the definition for close elections, this results could reflect the fact that the onset of a stop in capital flows raises the competitiveness of elections in many jurisdictions. Competitive legislative elections do not exhibit this pattern. [26]

The marginal effects are again easiest to interpret through plots, which are presented in Figures 2.8 and 2.9. The broad patterns in these plots align with earlier results, although the confidence intervals are wider given elections have been defined in a more narrow manner. The greatest change is seen in the point estimate for Left governments in *Surges* during election windows where the legislative election margin was less than 10 points. The marginal effect of this election variable is now negative, whereas this same point estimate was positive under the broader election definition used earlier, but in both cases these estimates were imprecise and non-significant.

[26]Note, that due to relatively sparse data, the triple interaction terms cannot be estimated for close executive elections. In the sample, there are no observations where a *Stop* occurred with a Left government that also had a close executive election. This fact itself may be interesting and could reflect Left governments being heavily punished during *Stop* windows, but that cannot be identified statistically in this model.

Table 2.2: *Change in International Reserves Around Close Elections*

Dependent Variable:	Reserves (Q-o-Q) Growth			
Model:	Exec. (5pt)	Exec. (10pt)	Leg. (5pt)	Leg. (10pt)
Variables				
Lagged Dependent	0.73***	0.73***	0.73***	0.73***
	(0.02)	(0.02)	(0.02)	(0.02)
Surge	0.01	0.01	0.003	0.0008
	(0.04)	(0.04)	(0.04)	(0.04)
Stop	-0.06	-0.06	-0.06	-0.05
	(0.04)	(0.04)	(0.04)	(0.04)
Close Election	-0.20	-0.005	-0.05	-0.02
	(0.13)	(0.09)	(0.08)	(0.05)
LeftGov.	0.03	0.03	0.03	0.03
	(0.02)	(0.02)	(0.03)	(0.03)
Surge × Close Election	0.12	-0.08	0.29	0.18
	(0.16)	(0.12)	(0.18)	(0.12)
Stop × Close Election	-0.37**	-0.18	-0.03	-0.08
	(0.16)	(0.31)	(0.17)	(0.11)
Surge × LeftGov.	0.04	0.04	0.04	0.06
	(0.06)	(0.06)	(0.05)	(0.06)
Stop × LeftGov.	-0.03	-0.03	-0.04	-0.05
	(0.04)	(0.04)	(0.04)	(0.05)
Close Election × LeftGov.	0.22	0.03	0.09	0.04
	(0.17)	(0.18)	(0.14)	(0.09)
Surge × Close Election × LeftGov.	-0.29	0.08	-0.23	-0.25
	(0.25)	(0.20)	(0.27)	(0.18)
Stop × Close Election × LeftGov.			0.15	0.21
			(0.22)	(0.17)
Fixed-effects				
country (36)	Yes	Yes	Yes	Yes
date (133)	Yes	Yes	Yes	Yes
Fit statistics				
Observations	2,801	2,801	2,801	2,801
R^2	0.638	0.637	0.638	0.638
Within R^2	0.571	0.571	0.572	0.571

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

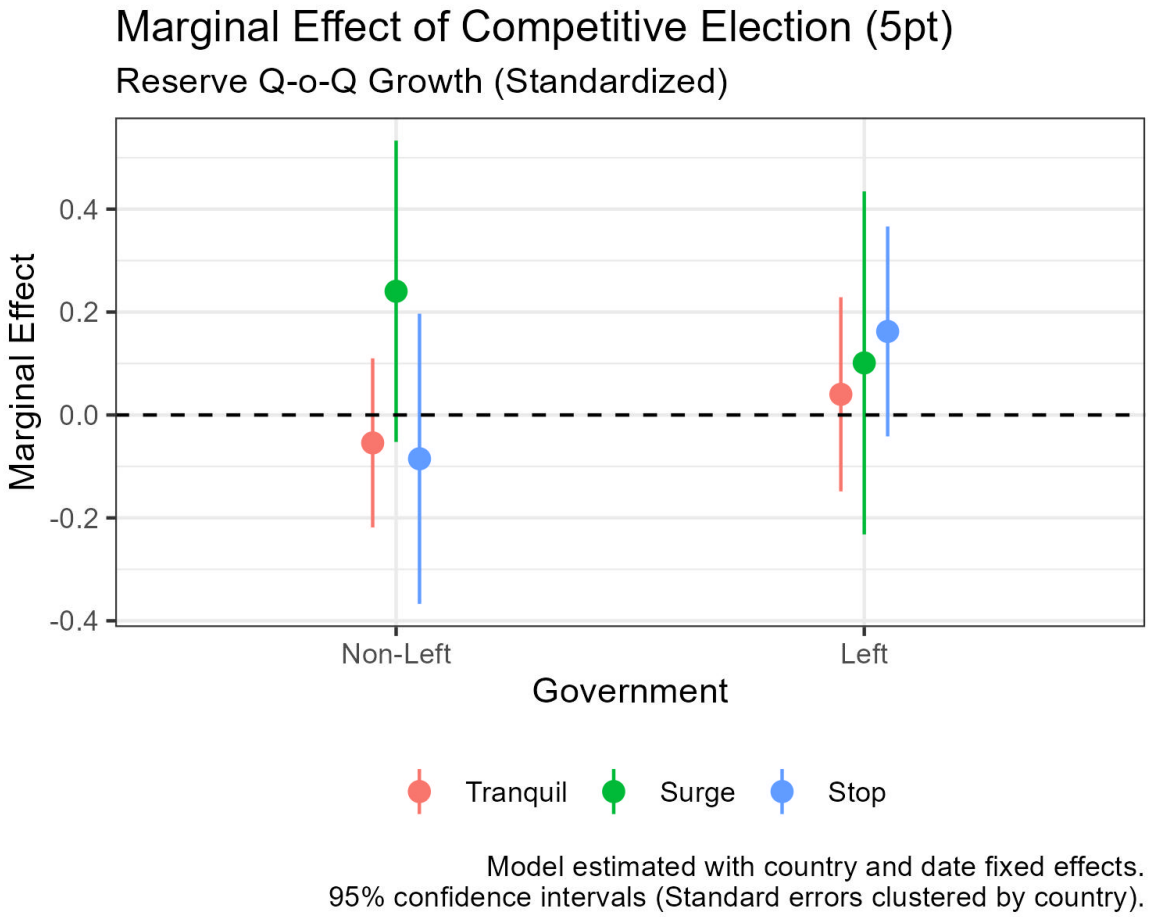


Figure 2.8: *Marginal Effect of Close Legislative Elections (5 point margin)*

2.6.3 Addressing Potential Endogeneity

A key limitation of the previous analysis is the endogeneity of capital inflows. An ideal way to resolve this concern would be to identify an exogenous variable that could be used as an instrument for the onset of a capital inflow surge or stop episode. The earlier discussion of global push factors suggests a few candidate variables that could act as an external shock for purposes of inducing a large change in capital flows. In this section I evaluate results from using two instruments: (1) the US federal funds rate and (2) the VXO measure of volatility, which was discussed earlier in Chapter 1. US interest rates could be a valid instrument under the "search-for-yield" hypothesis, where a reduction in US interest could cause capital to

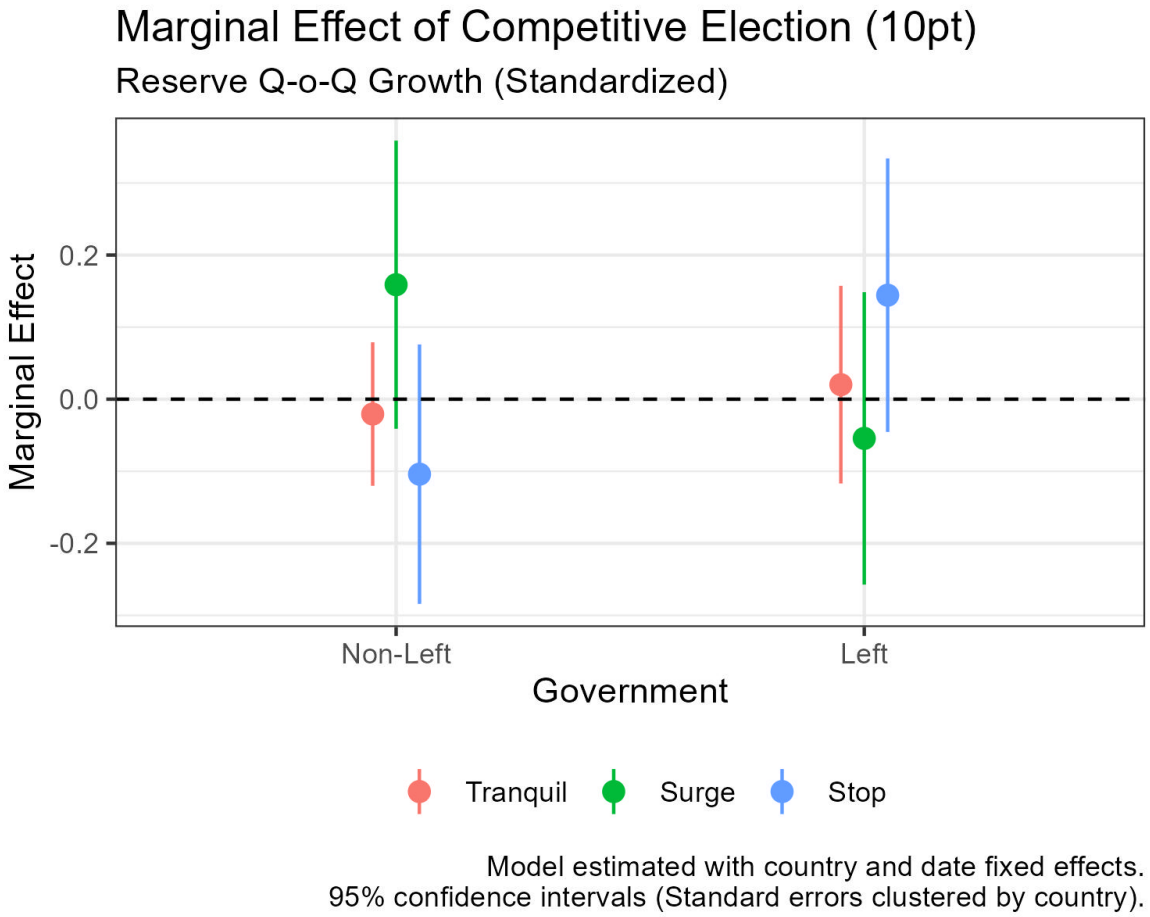


Figure 2.9: *Marginal Effect of Close Legislative Elections (10 point margin)*

seek the higher returns available in foreign destinations. This relationship may be especially pronounced for emerging markets and has been employed by Kuttner (2001) and Gertler and Karadi (2015), which use changes in the US federal funds futures to estimate the impact of unanticipated monetary policy surprises.

Another popular variable used to identify exogenous shocks, especially amongst commodity exporters, is a shock to a commodity price index. This approach has been used to isolate the impact of commodity shocks on a range of outcomes, including: fuel prices (Gelos and Ustyugova (2017)), grain prices and civil unrest (Smith (2014)), and real exchange rates (Chen and Rogoff (2003)). Commodity prices also open another channel for the role of US monetary policy shocks. Hammoudeh *et al.* (2015) report evidence of US monetary contraction leading

to an increase in broad commodity price indexes. However, given the focus here is on changes around domestic elections, and given the relatively small sample of countries classified as primarily commodity exporters, there is limited power to evaluate this relationship in the context of this sample.

In order to deploy these measures as instruments, I adjust the data used in the previous analysis in the following ways. First, I exclude the United States, United Kingdom and Japan given the global importance of their interest rates and currencies. Given the global nature of the instrumental variables used, I also exclude the previous year-quarter time fixed effects, but do include year fixed effects as a robustness check in the following models. Lastly, the fact that capital flows are decidedly endogenous means the interaction terms between these flows and election proximity will also be endogenous. Fortunately, if election timing is exogenous, and if the instruments being used are valid, then interacting these instruments with election proximity yields a valid instrument for the endogenous interaction term. To minimize the number of endogenous interaction terms to estimate, I collapse my previous capital flow measure into a simple indicator variable denoting if a country is experiencing a *Surge*. Table B.9 in the appendix reports the results from retaining the distinction between *Stop* episodes and *Tranquil* times.

The IV regression results are reported in Table 2.3. Column 1 presents results from only using the US Federal Funds Rate as an instrument for capital flows, without time fixed effects. In this model, the coefficient on the interaction between Surge and Election remains positive and is weakly significant. The first-stage results from this model are reported in Table 2.4 and are less encouraging. There is a positive and highly significant relationship between US Interest Rates and the onset of a surge, contrary to what a search-for-yield theory would predict. This relationship could be driven by the lack of time controls, resulting in a spurious correlation given large US interest rates in the 1980s coincided with general high inflows to many developing regions. To try to adjust for this, the model presented in Column 2 of Table 2.3 includes time fixed effects.[27] The reported F-stats indicate that once these time controls

[27]Time fixed effects are included at a yearly frequency instead of quarterly frequency given the instruments

are included the instruments weaken substantially, making drawing valid inferences from these models difficult.

Column 3 reports results after restricting the sample to emerging market economies, which suffers from a similar weak instrument problem. Lastly Column 4 uses the VXO measure of volatility as an instrument instead of US interest rates. In this model, the sign of the estimated coefficient on the interaction term changes, but the instrument is weak and the estimate is non-significant.[28] The first-stage estimates for these additional models are reported in the appendix. The general weakness of these instruments could be due to the use of binary indicators of extreme capital flow episodes, as opposed to more continuous measures of gross flows.

2.6.4 Robustness Checks

Table B.5 in the appendix presents the results of several robustness checks of the earlier analysis on reserve accumulation. While the coefficient sizes on the primary interaction terms display some stability across models, they do differ in interesting ways that merit discussion.

First, trends around the accumulation of reserves have differed over time (Rodrik (2006); Ghosh *et al.* (2017)). In the wake of the Asian Financial Crisis, developing countries began accumulating reserves at a rapid pace, which might reflect a greater acknowledgment of the importance of reserves as a means of self-insurance, or other local factors driving reserve policies. If the self-insurance motive becomes of primary importance, reducing reserves in the run-up to elections may entail additional costs, making it a less attractive option.

The first and second columns of Table B.5 examine this possibility by replicating the previous analysis after splitting the data into two distinct time periods. The first column restricts the data to years on or before 1998. The findings remain largely the same as earlier, with stronger results identified on the interaction terms for the earlier period. In this restricted

do not vary at the cross-country level. Instrumenting by the change in the US Federal Funds rates instead of the level yields similarly weak instruments.

[28]Attempting to use both volatility and US interest rates would violate the over-identifying restrictions of the Sargan-Hansen test (p-value 0.01).

Table 2.3: *Results from Instrumental Variable Regression - Second Stage*

Dependent Variable:	Reserves (Q-o-Q) Growth			
Model:	(1)	(2)	(3)	(4)
Variables				
Surge	-0.01	1.4	0.51	1.6
	(0.17)	(2.1)	(0.46)	(1.1)
Surge:Election	0.83*	0.75	0.13	-0.81
	(0.43)	(0.62)	(0.68)	(1.2)
LeftGov.	0.02	-0.004	0.08	-0.01
	(0.03)	(0.06)	(0.06)	(0.06)
Election	-0.10	-0.09	0.02	0.18
	(0.07)	(0.10)	(0.05)	(0.21)
Total Trade (% of GDP)	-0.004**	-0.005	-0.004	-0.007*
	(0.002)	(0.004)	(0.002)	(0.004)
Real GDP Growth	0.009	0.0002	0.01	-0.004
	(0.006)	(0.02)	(0.009)	(0.01)
Real GDP (log)	-0.04	-0.35	-0.08	-0.05
	(0.06)	(0.60)	(0.08)	(0.15)
Capital Openness	0.002	-0.0006	0.007	0.003
	(0.01)	(0.05)	(0.02)	(0.05)
Floating Exchange Rate	0.02	0.08	0.06	0.07
	(0.04)	(0.13)	(0.07)	(0.06)
Export Volatility	5.7×10^{-5}	0.65	0.19	0.64
	(0.25)	(1.2)	(0.41)	(0.63)
Current Account (% of GDP)	0.009**	0.010	0.02	0.01
	(0.004)	(0.008)	(0.01)	(0.009)
Lagged Dependent	0.73***	0.64***	0.71***	0.64***
	(0.02)	(0.13)	(0.09)	(0.07)
Fixed-effects				
country	Yes	Yes	Yes	Yes
year		Yes		
Fit statistics				
F-test (1st stage), Surge	27.0	0.518	7.15	7.75
F-test (1st stage), Surge:Election	54.2	46.8	12.9	13.1

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table 2.4: *Results from Instrumental Variable Regression - First Stage*

Dependent Variables:	Surge	Surge:Election
Model:	(1)	(2)
Variables		
US Interest Rates	0.03***	0.0009
	(0.008)	(0.002)
US Interest Rates × Election	0.006	0.03***
	(0.009)	(0.008)
LeftGov.	0.02	0.01*
	(0.03)	(0.009)
Election	-0.03	0.07**
	(0.03)	(0.03)
Total Trade (% of GDP)	0.001	0.0003
	(0.001)	(0.0003)
Real GDP Growth	0.006	0.001
	(0.005)	(0.001)
Real GDP (log)	0.21**	0.05**
	(0.09)	(0.02)
Capital Openness	0.007	0.0005
	(0.03)	(0.009)
Floating Exchange Rate	-0.03	-0.009
	(0.02)	(0.02)
Export Volatility	-0.36	-0.06
	(0.33)	(0.12)
Current Account (% of GDP)	-0.0009	-0.0004
	(0.005)	(0.001)
Lagged Dependent	0.06***	0.004
	(0.02)	(0.007)
Fixed-effects		
country	Yes	Yes
Fit statistics		
Observations	2,454	2,454
R^2	0.103	0.199
Within R^2	0.065	0.187

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

sample, the triple interaction term between Left, Election and Surge is now significant and negative. This corresponds to the positive relationship between election timing that coincide with surges only existing for Right governments. In fact the marginal effects plot confirms this (Figure B.1). The marginal effect of election proximity on non-Left governments is now more negative and statistically significant during stops. For Left governments in this earlier time period, there remains a positive and weakly significant marginal election effect on reserves during stops.

When restricting the model to post-1998 data the magnitude and significance of all the interaction terms fall and the marginal effects are non-significant across all categories of capital flow periods and government types. Elections that coincide with surges are associated with an increase in reserve growth rates for both parties, but in this post-period this increase is weakly significant and larger for Left parties than Right parties.

We also might wonder if the identified relationship differs based on country levels of development or democratization. Developing countries have exhibited a larger increase in their relative reserve holdings compared to developed countries in recent years and Aizenman and Riera-Crichton (2008) presents evidence that the "cushioning" effect of international reserves after terms-of-trade shocks is particularly important for developing economies, but less so for industrial countries. Brooks *et al.* (2022) argue that election dynamics should have greater effects in emerging markets stemming from greater diversity in political institutions and policy outcomes. Columns 3 through 6 of Table B.5 test for this by replicating the initial analysis across different subsets of the data. Columns 3 and 4 rerun the analysis for Advanced Economies (AE) and Emerging Market Economies (EME)[29]. The coefficient estimates change slightly and there is a reduction in statistical power from the smaller samples, but a few patterns emerge. The marginal effect of election timing on reserves is strongest for advanced economies, especially amongst non-Left parties. Non-Left parties in AE accumulate reserves more during surges around elections, and decrease there reserves significantly more during stops, each compared to non-election periods. More limited effects are found for Left

[29]Replicating the coding found in Forbes and Warnock (2021) based on definitions from the BIS

governments of advanced economies.

Emerging market economies exhibit the opposite pattern. In these countries, there are no meaningful effects of election timing for non-Left governments, but the marginal effect of elections on Left governments is significantly positive for Stops and weakly significant during Surges. This evidence is consistent with the conditionality between *both* partisanship and capital flows of the PBC effect on reserves, but it suggests the partisan tools may be different depending on development levels. Left governments in developing countries appear to change reserve holdings more frequently, whereas Left governments in advanced economies do not alter these policies as much. Non-Left parties in advanced economies however do exhibit a significant relationship with reserves around election times. This suggests the findings are not merely a result of greater central bank independence for advanced economies, as we would expect this to display muted effects across party lines.

Column 5 presents results from excluding countries in Western Europe and North America. *Surges* are now found to generally coincide with a significant increase in reserves. Finally, elections may only display a significant relationship in democracies. Column 6 of Table B.5 restricts the sample to include only democracies.[30] There is some reduction in magnitudes and statistical power when examining this subset of countries, but the overall marginal effects pattern remains the same.

2.7 Conclusion

Foreign exchange reserves have received increased attention due to their potential to act as a safeguard against international liquidity shocks and as a possible mercantilist means of driving export growth. Understanding when nations acquire and spend reserves has important implications for when foreign capital flows are likely to induce unsustainable imbalances and subsequent destabilizing and painful readjustment. However, the macroeconomic usefulness of reserves does not preclude their politicization. In this paper, I contribute to a growing

[30]Defined as having a polity2 score greater than or equal to 7 in the Polity IV dataset

literature which examines the political determinants of reserve holdings. Reserves can be spent as a form of monetary expansion, leaving them susceptible to political business cycle forces. Still, reserves play a special role in exchange rate management, and this impact should not be ignored when considering the potential impact of political variables.

I argue that pressures to reduce reserves for monetary expansion are offset by pressures to hold reserves as a means of self-insurance and to deliver price stability. This offsetting pressure creates divergent domestic interests over reserve policy, and parties follow suit. In-line with my theory, I find that during capital inflow surges, reserve accumulation is greater around elections. However, I find limited evidence for strong partisan differences in these responses, except a weak relationship that Left governments oversee slower reserve growth rates around Stop episodes, but only when not facing electoral pressures. These results help us to understand when economies use reserves for trade promotion, to shore up gaps in domestic credit or to lean against the wind of turbulent foreign capital.

Chapter 3

Multinationals as Global Financiers[1]

3.1 Introduction

The U.S. economy is often quoted as the "global venture capitalist" due to its exclusive role in international financial markets (Gourinchas and Rey 2007). US multinational companies (MNCs), in particular, play a prominent role in raising capital abroad and investing in high-yield business opportunities across the globe. Yet, the focus of recent studies on MNCs has largely prioritized their outsize role in international trade. Relatively little attention has been paid to study the effect of global investment activity on financial performance of an individual firm.

This paper explores the role of MNC activity on the wider return spread between American firms with foreign operations. Our evidence indicates US multinational firms enjoy a 0.9% larger spread between their return on asset (i.e., profits divided by book value of assets) and average interest rate compared to when these same firms were not engaged in substantial overseas investment. This spread suggests that US multinationals on average generate higher profits relative to their invested capital and pay lower interest rates on their liabilities.

[1]Co-authored with Taehoon Kim. We acknowledge support from the NSF/BEA/ASA Fellowship, and Molly and Domenic Ferrante Fund. The statistical analysis of firm-level data on U.S. multinational companies was conducted at the Bureau of Economic Analysis (BEA) U.S. Department of Commerce under arrangements that maintain legal confidentiality requirements. The views expressed herein are those of the authors and do not necessarily reflect the views of the Department of Commerce. All errors are our own.

Motivated by this evidence, we develop a quantifiable model to further decompose several possible causal channels of this gap, such as incomplete financial markets and risk premia on global investment. We examine this model with simulated data, and our simulation suggests some of the variation in this spread can be accounted for by the first channel; cross-country investment barriers allow MNCs to borrow at a lower interest rate and earn a higher return, relative to domestic-oriented companies.

Our analysis highlights the role of US multinationals as a global arbitrageur that exploits return differentials across countries. The main contribution of this paper is to provide a unified framework to quantitatively decompose various channels that account for the superior performance of US multinational firms. We shed light on the international finance dimension of multinational firms as a crucial driver for the recent changes in the US corporate sector.

This paper begins by reporting that there is a widening spread between the weighted averages of firms' physical rate of return and interest rate amongst non-financial firms in the United States.[2] The first measure is a widely used metric for evaluating capital's profitability. The second measure accounts for the cost of debt capital. They both reflect foreign operations, if any, as well as domestic earnings of US headquartered firms. The standard neoclassical theory suggests that the spread between the average return on capital and interest rate should be constant.[3]

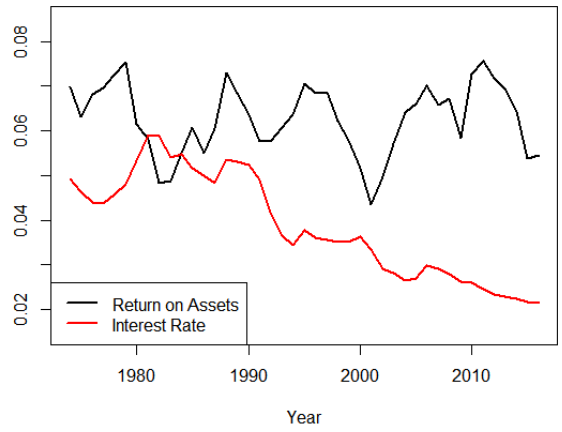
What is striking about these measures is that over the last 40 years Return on Assets (ROA) has fluctuated around a relatively stable constant value, while the interest rate actually paid by these firms has steadily declined since 1980s. This divergence has resulted in a growing spread between firm ROAs and average cost of capital, which appears in Panel (a) of Figure 3.1. The data exhibits a fluctuating, but still steadily increasing difference between ROA and interest rate, with the largest differential emerging in years immediately preceding at the onset of the global financial crisis (with interest rates briefly exceeding ROA in the years

[2]Source: Compustat data. We restrict our sample to the post-1972 period to cover all publicly traded firms.

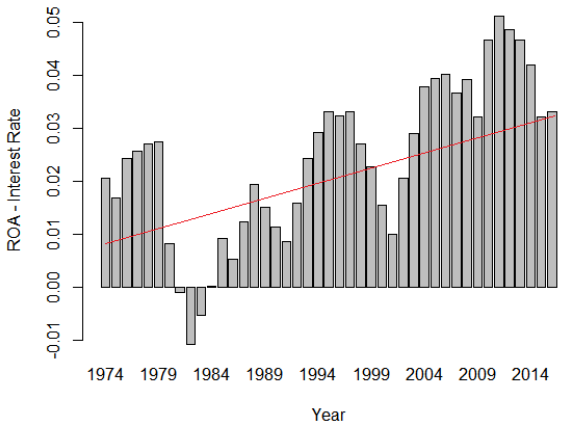
[3]Under constant return-to-scale production function, the average return on capital is equal to the marginal return on capital.

Figure 3.1: *Motivating Evidence*

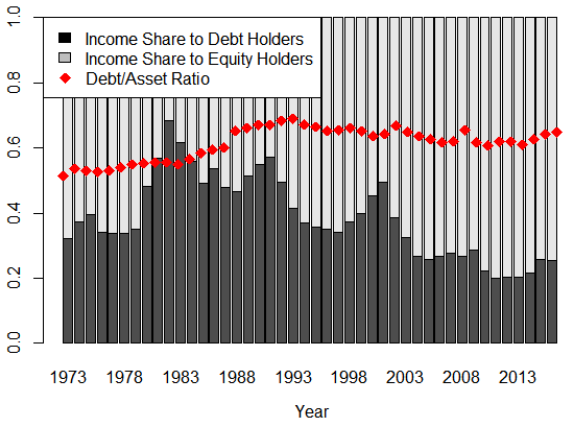
(a) *Return on Asset and Interest Rate*



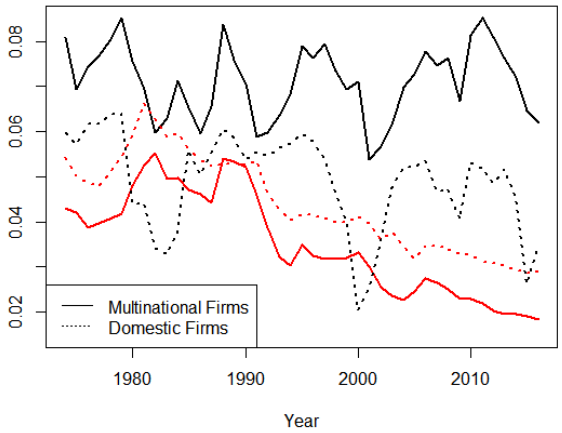
(b) *Spread between Return on Asset and Interest Rate*



(c) *Leverage Ratio and Equity Income Share*



(d) *Multinationals and Domestic-oriented Firms*



Notes. Panel (a): The black line displays a time series of the average return on asset among publicly-traded non-financial US firms, while the red line displays a time series of the average interest rate paid by these firms. Both measures are weighted by firm sizes. Panel (b): Bar plot displays the spread between the average return on asset and interest rate. Panel (c): Red dots indicate the average debt-to-asset ratio. Black bars are defined as the total interest expenses divided by the total earnings. Gray bars are one minus the values from the black bars. Panel (d): The solid lines (black and red) indicate the average return on asset and interest rate paid among multinational firms. The dotted lines indicate the average return on asset and interest rate paid by domestic-oriented firms. A firm is coded as being an MNC if it has a non-zero value for foreign income tax paid. Source: Compustat data.

around the Volcker Shock). Two natural questions emerging from this figure are the following: what accounts for this increased return gap, and where are the excess profits going?

Turning to where the excess profits are going, we see that over the same period income shares are increasingly being paid out to equity holders. (See Figure 3.1 plot c). This increase in the income share to equity holders does not appear to be related to any systematic changes in firms' aggregate capital structure, as the debt-to-asset ratio has remained approximately constant over this time period.

As for the source of this increased return gap, the differential appears more pronounced amongst US Multinational Companies (see Figure 3.1 plot d)[4]. The dotted lines display the average ROA and interest rate of US firms that pay no foreign income taxes, which we use as a proxy for activities abroad. Later sections in this paper confirm this result holds for recent years with more accurate measures of MNC activity at both the extensive and intensive margins obtained from confidential microdata collected by the US Bureau of Economic Analysis (BEA). Solid lines indicate the average ROA (in black) and interest rate (in red) of US multinational firms, at the fully consolidated level. This same analysis for non-MNCs is presented with dashed lines. The gap between ROA and interest rate has been increasing among multinationals over the past decades. Domestic firms, on the other hand, have shown relatively parallel trends between the average ROA and interest rate. MNCs appear to have been able to generate persistently higher ROAs than their domestic counterparts while also benefiting from a larger reduction in borrowing costs.

Motivated by these patterns, we develop theory and empirics to understand the effect of MNC activity on the spread between the ROA and interest rate of a firm. The aim of this analysis is twofold: first, identify the key channels of this spread such as risk premia and market imperfections. Second, quantify the relative magnitudes of these different channels. Our analysis proceeds in two steps.

First, we explore parent firm-level evidence to determine if multinationals do in fact earn

[4]Source: Compustat data. A firm is coded as being an MNC if it is has a non-zero value for foreign income tax.

a higher accounting return on capital and pay a lower interest rate. Our baseline analysis employs fixed-effect regressions. Our evidence indicates MNCs enjoy a 0.9% larger spread between ROA and average interest rate compared to when these same firms operated only domestically. Multinationals engaged in primarily vertical FDI exhibit a 1.2% larger spread, while horizontally oriented MNCs enjoy a slightly lower spread of 0.8%.

Second, we develop a model to explore the channels that account for the widened spread between ROA and interest rate of multinational firms. We describe two types of MNC premia in the model. The first is a simple risk-premium story: if MNCs engage in riskier investments, they demand higher returns to compensate for these risks. MNCs face several new risks in the form of potential supply chain disruptions, adverse currency movements, and in some sectors outright expropriation. The second channel we consider is the role of incomplete financial markets: if MNCs have greater access to foreign investment opportunities (either through direct market access or differential credit constraints), these companies can use this access to pursue different ideal portfolio and leverage compositions which allow these firms to generate greater returns. We build a multi-sector model that incorporates sector-specific FDI potentials and fixed costs across different regions of the world to predict observed patterns of foreign investment (although to-date we only test this model with simulated data).

The structure of the model enables separable identification of the FDI potential and fixed cost of entering markets. Our three-step estimation method follows from Antràs *et al.* (2017). Unlike these authors, whose focus is primarily on input sourcing decisions, we shed light on the investment and funding decisions of a multinational firm. Our simulation results show that a large portion of the MNC premia could be potentially attributed to the financial market incompleteness. For this paper, we do not use any BEA microdata to directly test this model model. Instead we use pseudo-data to assess the validity of our estimation strategy and investigate qualitative patterns of the model. Our simulated model suggests that multinational firms on average can take a lower risk due to the global diversification effect. Despite the lower volatility, their intrinsic advantage in market access generates a higher profitability and lower funding cost in the partially segmented global financial market.

Our results highlight the role of US multinationals as global arbitrageurs in addition to being global risk-takers. Previous studies have documented return differentials of foreign assets and liabilities, including foreign direct investment, at the macro-economy level (e.g. Caballero *et al.* (2008), Gourinchas and Rey (2007), Gourinchas and Rey (2010)). Yet, little attention has been paid to micro-level sources of the return differentials. Our paper sheds light on new channels to account for these differentials. On the international trade side, conventional trade models have largely focused on the advantages of high productivity firms with respect to exporting products (Melitz (2003)), importing inputs (Antràs *et al.* (2017)) or both concurrently (Bernard *et al.* (2018)). In this paper, we extend this conceptual framework to the context of global investment and funding. Namely, firms are economic entities that import foreign assets and export domestic liability in global capital markets. The key contribution of this paper is to develop a unified framework to understand the role of MNCs in global financial markets, which has been studied largely independently in the literature on international trade and international finance.

The rest of our paper is organized as follows. Section 3.2 describes the data and presents motivating evidence. Section 3.3 introduces the baseline model. Section 3.4 extends this model and provides an estimation strategy. Section 3.5 displays quantitative results with simulated data. Section 3.6 concludes. Detailed proofs and computation algorithms not appearing in the main text are included in the appendix.

Literature Review Through this study, we aim to contribute to three strands of the academic literature. First, as previously mentioned, we shed light on firm-level analysis of global capital flows. Unlike previous studies focusing on aggregate statistics (e.g. Caballero *et al.* (2008), Gourinchas and Rey (2007), Gourinchas and Rey (2010), Curcuru *et al.* (2013)), we bring to the fore the importance of firm-level analysis in studying global capital movements and their returns. We provide a novel mechanism to account for the return differentials, which stems from the incomplete integration of global capital markets. Ours is distinct from previous channels such as intangible assets (McGrattan and Prescott (2010)) and risk premium (Fillat and Garetto (2015)). Our methodology allows us to decompose the quantitative magnitudes

of these channels.

We also contribute to the literature on the financing activities of MNCs. Most of this literature focuses on the sources of financing for their foreign affiliates (Manova *et al.* (2015)), financial frictions faced by them (Bilir *et al.* (2019)) and the role of these firms as *de facto* financial intermediaries (Antràs *et al.* (2009)). Our paper also relates to the literature on intra-firm credit spillovers and borrowings within a multinational firm (e.g. Desai *et al.* (2004), Manova *et al.* (2015)). We shed light on a mechanism that MNCs' abilities to tap into local foreign credit markets promote their financial performance and excess profits.

Third, there is a growing interest in the rise of "superstar" firms and its implications on income share and corporate inequality (e.g. Karabarbounis and Neiman (2013), Autor *et al.* (2017)). Most of these studies focus on domestic market shares, domestic markups and wages. In contrast, we augment this literature by investigating the international asset and liability sides of U.S. multinational firms. We hope to gain an understanding of how the global expansion of U.S. firms has affected the sub-components of capital income such as interest rates, risk premium and excess profits. The macro-level trend in the U.S. domestic market has been documented recently (Caballero *et al.* (2017), Farhi and Gourio (2018)) but there is a lack of understanding on theoretical channels, micro-level evidence and connections to globalization. Our model provides a quantitative framework highlighting the role of financial globalization in the trends.

3.2 Motivating Evidence

A key limitation of the data presented in Figure 1 is the coarse definition of MNC status obtained from Compustat. To address this issue, our analysis merges the key ROA and interest rate measures available from Compustat with more accurate measures of MNC activity collected by the US Bureau of Economic Analysis (BEA) in its annual and benchmark survey data on U.S. Direct Investment Abroad.

3.2.1 Data Description

We merge firm-level financial data from Compustat with confidential micro-data collected by the United States Bureau of Economic Analysis on the extensive and intensive margins of activities of foreign affiliates of US MNCs.

Compustat provides financial accounting data for US firms on a fully consolidated basis. We use this data to calculate our firm level measures of return on assets and interest rate. This data also includes operating sector indicators (4-digit) and a wide array of other accounting measures, including Total Assets which we use to create a measure of a firm's relative size in its sector. Our primary outcome variables are calculated using exclusively this data as: (i) roa = (Earnings Before Interest and Taxes (EBIT) - Tax Expense)/Total Assets, (ii) interest rate = Interest Expense / Total Liabilities and (iii) spread = roa - interest rate. These heuristic measures are intended to capture return on investment and cost of debt capital at the firm level.

While Compustat provides the accounting information used to calculate roa and interest rate at the fully consolidated level, we use the annual (Form BE-11) and benchmark (Form BE-10) BEA survey data on U.S. Direct Investment Abroad to identify U.S. firms with foreign affiliates and to identify those MNEs that are primarily engaged in horizontal and vertical FDI. This data is derived from information collected in surveys of U.S. multinational enterprises and surveys of U.S. affiliates of foreign multinational enterprises that are conducted by BEA, and the data includes annual financial and operating data of the U.S. reporter and its foreign affiliates. U.S. parents must report on the operations of both majority and minority owned foreign affiliates that are sufficiently large.[5] Additionally, every five years the BEA conducts a benchmark survey (Form BE-10, the most recent benchmark survey with available data was in 2014). These benchmark surveys provide greater coverage as a response is required from entities subject to the reporting requirements of the BE-10, whether or not they are

[5]For the 2015 BE-11, the most recent filing year used in this analysis, a U.S. parent has to report information on a foreign affiliate if the foreign affiliate has a value of more than $60 million for any of the following: total assets; sales or gross operating revenues, excluding sales tax; or net income after provision for foreign income taxes.

contacted by BEA. Our reported results are not materially changed if we restrict the sample to only these years when the more complete benchmark survey was conducted.

With this microdata, we obtain a variety of measures for the extensive and intensive margins of foreign activities at the reporting parent level, including:

- Total number of foreign affiliates
- Sales of foreign affiliates broken down by industry classification
- Sales of foreign affiliates by destination of sale (host country, US, or rest of the world)
- Sales of foreign affiliates by whether the purchaser is an affiliated party

The regression results reported in the next section use the BEA data collected above to create three variables of MNC activity at the firm-level[6]

- *FDI* - A binary indicator of whether firm i reported at least one foreign affiliate in the annual (or benchmark) BEA survey data on U.S. Direct Investment Abroad collected in year t
- *VerticalFDI* - A binary indicator of whether firm i reported at least one foreign affiliate in the annual (or benchmark) BEA survey data on U.S. Direct Investment Abroad collected in year t *and* the percent of total foreign affiliate sales to related parties (summing across all foreign affiliates) exceeded 25%
- *HorizontalFDI* - A binary indicator of whether firm i reported at least one foreign affiliate in the annual (or benchmark) BEA survey data on U.S. Direct Investment Abroad collected in year t *and* the percent of total foreign affiliate sales to related parties (summing across all foreign affiliates) did not exceed 25%

While we recognize this is a coarse measure of vertically and horizontally oriented FDI, our measure does capture the potential for firms to use sales with related parties to achieve

[6]These binary indicators are based on data for affiliates that are sufficiently large to report sales by affiliation. We do not include foreign affiliates which only completed a form BE-11D (BE-10D for benchmark years) filing. For the 2015 BE-11, form D was filed for a foreign affiliate established or acquired during a fiscal year that the affiliate has total assets, sales or gross operating revenues, or net income of more than $25 million (positive or negative) but for which none of these exceed $60 million (positive or negative) at the end of the affiliate's fiscal year.

internal cost-savings or benefit from transfer pricing decisions. This measure could however assign a firm as being engaged in primarily vertically oriented FDI if it has a large volume of sales to related parties, but little product transformation (such as sales to affiliated local dealers who resell a product with no additional transformation). Given the model in this paper does not rely on a distinction between vertical and horizontal FDI, and the fact that our regression results in the next section do not suggest there is evidence of the effect of MNC status differing significantly across this classification, we use this as prima facie evidence to justify looking at aggregate FDI values in our structural model. While we do not analyze this distinction further in this paper, subsequent work could use more traditional measures of FDI type, such as International Surveys Industry (ISI) product transformations between affiliates or direct shipments to the parent alone to measure vertically-oriented FDI.

The outcome variables (roa, interest rate and spread) are all calculated as outlined above using only Compustat data. Finally, it is well known that firm-size is an important predictor of profitability. To control for this, we use Compustat data exclusively to calculate each firm's asset quartile by year. This calculation is done by first assigning firms to one of five sectors (manufacturing, retail, wholesale, services or other) and calculating asset quartiles at the sector-year level.

3.2.2 Fixed-effects Regression

The aim of this paper is to explore a relation between the expansion of multinational operations and a higher spread between return on asset and interest rate. To this end, our initial regression framework implements the following fixed effect specification for firm i at time t

$$y_{it} = \alpha_i + \alpha_t + \beta FDI_{it} + \gamma X_{it} + \varepsilon_{it}$$

where $FDI_{i,t}$ is the binary measure of whether a given parent firm i completed a BEA filing for at least one foreign affiliate in year t. X_{it} is a matrix of time-varying company controls. α_i is the firm-level fixed effect, α_t is time fixed effect. $FDI_{i,t}$ can be (a) binary or (b) the number of countries that firm i has entered. Here, we focus on the binary indicator; the sign and

magnitude of our results are robust to using these alternative measures of foreign activity. Our sample period uses data from 1998 to 2015. While data is available in earlier years, earlier surveys do not all collect the same intensive margin measures we initially considered.

3.2.3 Results

Table 1 displays the results from a simple linear regression, where we add year fixed effects and controls for company size. This model confirms the graphical intuition presented in the motivating evidence; firms engaged in FDI exhibit greater spreads between their ROA and interest rate. In column (1), we run a simple linear regression. FDI does generate a positive gap in this simplest setup. In column (2) and (3), we add year-fixed effects and time-varying sizes of firms. The last column suggests that the spread between the roa and interest rate is a higher among multinational firms by 5.0 percentage points. Note that the coefficient estimate for FDI_{it} in the simple regression can be interpreted as the average gap between multinational firms and domestic firms at year t. This specification does not allow us to rule out unobservable differences between multinational and domestic firms, such as

Table 3.1: *Simple Regression - Full Sample*

	Dependent variable: ROA Interest Spread		
	(1)	(2)	(3)
FDI	0.013** (0.002)	0.196** (0.005)	0.050** (0.003)
1st Asset Quartile			-0.495** (0.011)
2nd Asset Quartile			-0.058** (0.005)
3rd Asset Quartile			0.018** (0.005)
4th Asset Quartile			0.032** (0.005)
Fixed Effects	None	Year	Year
Observations	68,949	68,949	68,949

Notes: This table presents results from the simple linear regression. Column (1) indicates the values when only the binary indicator is used. Column (2) adds the year fixed effect. Column (3) controls for size quartiles. Size quartiles are calculated on a yearly basis with firms grouped into five broad sectors (manufacturing, retail, wholesale, services and other). The standard errors are clustered at the firm-level. *p<0.05; **p<0.01;

productivity and industry-level characteristics, could act as confounding factors. To address this concern, we next employ a fixed effects regression framework. Table 2 displays the results, and the coefficient on FDI indicates an increase in the spread when we compare the same firms prior to and after initiating foreign direct investment, thereby controlling for static firm-level characteristics.

Table 2 displays results from the full fixed effect specification. The model in column (1) estimates that after a company begins engaging in FDI, these firms on average generate a 0.9% larger spread between their ROA and interest rate compared to these same firms when they did not report any foreign ownership. Column (2) classifies a parent's foreign affiliates as being primarily engaged in vertical or horizontal FDI based on the percentage of total affiliate sales which are to related parties (both domestic and international related parties). If the percent of affiliate sales to related parties is less than 25%, a parent firm is coded as being engaged in primarily horizontal FDI. There does not appear to be evidence based on this measurement that the effect of MNC status on the estimated ROA interest spread is systemically different for vertical or horizontal MNCs.

Next, we replicate this same fixed effect analysis across different sectors of the data and for outcome variables focusing on only the ROA generated by or only the interest rate paid by these firms. The following three plots, along with Table 3 display these results across three data samples (the full sample, manufacturing firms only, and services firms only) and for our three outcome variables of interest. Across industry sectors, MNCs generate both higher ROAs and pay lower interest costs. Interest rate channels appear smaller in magnitude yet statistically more robust across different specifications. These findings motivate further examining how MNCs are different on both their operating and financing channels.

Table 3.2: *Fixed Effect Regression - Full Sample*

	Dependent variable: ROA Interest Spread	
	(1)	(2)
FDI	0.009* (0.004)	
Vertical FDI		0.012** (0.004)
Horizontal FDI		0.008** (0.004)
1st Asset Quartile	-0.256** (0.013)	-0.256** (0.013)
2nd Asset Quartile	-0.053** (0.006)	-0.053** (0.006)
3rd Asset Quartile	-0.005 (0.003)	-0.005 (0.003)
4th Asset Quartile	-0.065** (0.005)	-0.065** (0.005)
Fixed Effects	Firm and Year	Firm and Year
Observations	68,949	68,949

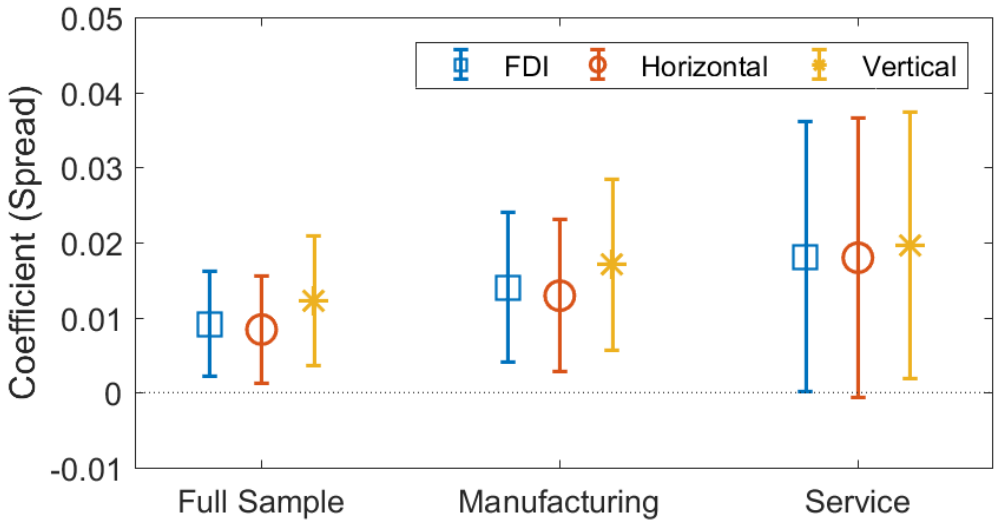
Notes: This table presents results from the fixed-effects regression. Column (1) indicates the values when only the binary indicator is used. Column (2) decomposes this explanatory variable into two: horizontal FDI and vertical FDI. Size quartiles are calculated on a yearly basis with firms grouped into five broad sectors (manufacturing, retail, wholesale, services and other). The standard errors are clustered at the firm-level. *p<0.05; **p<0.01;

Table 3.3: *Summary of Regression Coefficients*

		Dependent Variable		
Sample	Type	(Spread)	(ROA)	(Interest Rate)
Full	FDI	0.0091* (0.0035)	0.0071* (0.0034)	-0.0020** (0.0005)
	Horizontal	0.0084* (0.0037)	0.0064 (0.0035)	-0.0020** (0.0005)
	Vertical	0.0122** (0.0043)	0.0100* (0.0041)	-0.0022**(0.0006)
Manufacturing	FDI	0.0140** (0.0051)	0.0117* (0.0049)	-0.0023** (0.0008)
	Horizontal	0.0129* (0.0052)	0.0108* (0.0050)	-0.0021** (0.0008)
	Vertical	0.0170** (0.0058)	0.0144* (0.0055)	-0.0026** (0.0009)
Service	FDI	0.0181* (0.0091)	0.0155 (0.0090)	-0.0026** (0.0011)
	Horizontal	0.0180 (0.0094)	0.0151 (0.0093)	-0.0028** (0.0011)
	Vertical	0.0196* (0.0090)	0.0190* (0.0085)	-0.0006 (0.0019)

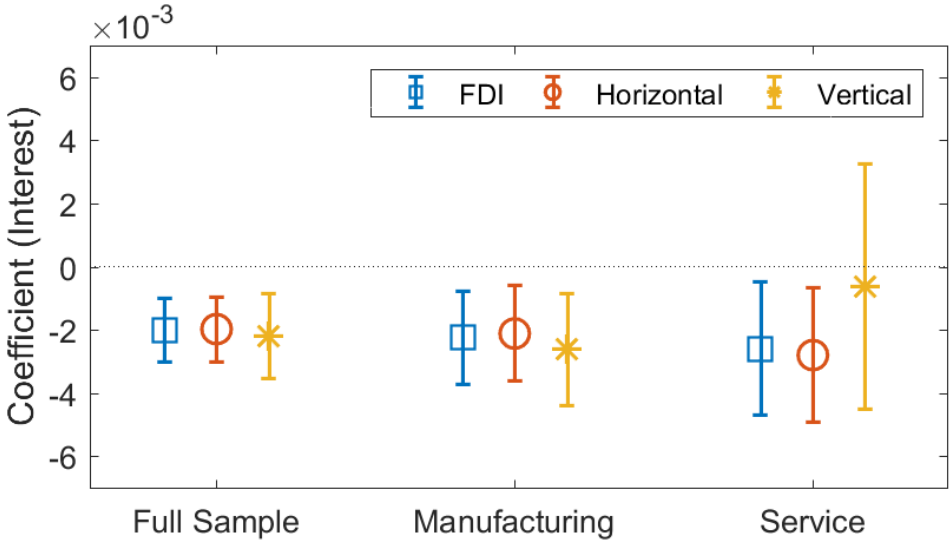
Notes: This table presents results from the fixed-effects regression along three dimensions: sector subsamples, main explanatory variables (types of foreign direct investment) and dependent variables, controlling for time-varying sizes of firms. *p<0.05; **p<0.01;

Figure 3.2: *Spread - FDI Regression Coefficient*



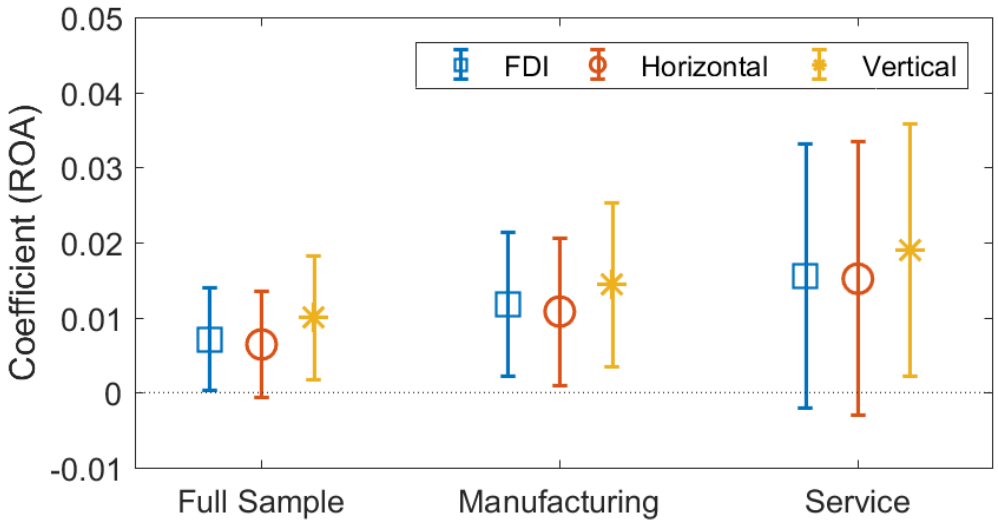
Notes: This figures displays 95 percent confidence intervals for regression coefficients when the dependent variable is given by the spread between return on asset and interest rate. Intervals on the manufacturing (service) column indicate confidence intervals when only manufacturing (service) firms are considered in a subsample. The blue bar indicates general foreign direct investment, while red and yellow bars indicate horizontal and vertical FDI defined before.

Figure 3.3: *Interest Rate - FDI Regression Coefficient*



Notes: This figures displays 95 percent confidence intervals for regression coefficients when the dependent variable is given by the average interest rate. Intervals on the manufacturing (service) column indicate confidence intervals when only manufacturing (service) firms are considered in a subsample. The blue bar indicates general foreign direct investment, while red and yellow bars indicate horizontal and vertical FDI defined before.

Figure 3.4: *ROA - FDI Regression Coefficient*



Notes: This figures displays 95 percent confidence intervals for regression coefficients when the dependent variable is given by the average return on asset. Intervals on the manufacturing (service) column indicate confidence intervals when only manufacturing (service) firms are considered in a subsample. The blue bar indicates general foreign direct investment, while red and yellow bars indicate horizontal and vertical FDI defined before.

3.3 Model

In this section, we describe two types of MNC premia. The first hypothesis is a risk exposure story, in which foreign investment involves intrinsically higher risk than domestic investment. The second hypothesis is an incomplete integration, under which multinational firms serve as global arbitrageurs through investment; multinationals raise funds at a lower interest rate country and, at the same time, invest in countries with a higher marginal product of capital. Finally, we assess a possibility that some of the spread between return on asset and cost of debt capital is driven by measurement errors of intangible assets.

3.3.1 Setup

The global economy consists of N countries. Each country is denoted by $n = 1, ..., N$ and has two types of entities: households and firms. Households invest in risk-less domestic deposits at period $t = 0$ and receive interest at period $t = 1$. Firms take deposits from households, invest in physical capital and make profits. Capital is the only factor of production. Capital markets are isolated prior to globalization so each country faces its own interest rate and risk premium. Upon financial globalization, firms can pay a fixed cost to tap into foreign capital markets. Below, we elaborate on details of households, firms and our equilibrium concept.

Households The representative household in country $n \in \{1, 2, ..., N\}$ is endowed with W_n units of consumption goods in period 0. The price of a consumption good in country 0 acts as the numeraire. All values are measured in terms of these goods. For expository purposes, we often call country 1 as the US and their currency as the dollar. Besides consumption goods, households are endowed with K_n units of capital goods. The price of a capital good in period 0 is given by q_n. Households sell these capital goods to firms as they have no production technology. We model the household's problem in country n as maximizing a two-period utility

$$u(C_{0n}) + \delta u(C_{1n})$$

subject to

$$C_{0n} = W_n + q_n K_n - D_n$$

$$\tilde{x}_n C_{1n} = \tilde{x}_n (1 + r_n) D_n$$

Here, $\tilde{x}_i$ represents the period-1 exchange rate against the dollar, which is a stochastic variable. Assume $\mathbb{E}_0[\tilde{x}_n] = 1$. The period-0 exchange rate is given by 1. Essentially, households can save only in risk-less deposits D_n, denominated in their home currency. δ is the time discount factor.

Firms There are I firms in the global economy. Each firm is managed by a single entrepreneur denoted by $i = 1, ..., I$. I use index i to indicate a firm and its entrepreneur interchangeably. Firm i has non-movable headquarters at country $n_i \in \{0, 1, 2, ..., n\}$, which we call its nationality. The entrepreneur who manages firm i is endowed with e_i units of goods for investment in period 0. Their role is to raise outside capital and invest by purchasing capital goods.

Unlike households, firms have production technology. Let $\alpha_i \equiv (\alpha_{i,0}, ..., \alpha_{i,N})'$ denote a vector of capital goods invested by firm i across different countries. Technology is assumed linear. That is, firm i generates

$$f(\alpha_i) \equiv \sum_{n=1}^{N} (\pi_i + \pi_n + \sigma_n \tilde{z}_n) \alpha_{k,i}$$

units of consumption goods in period 1 where π_n is a country-specific component of the return, π_i an idiosyncratic return of firm i and $\tilde{z}_n$ represents a random component. The random variable is drawn from the standard normal distribution with σ_n being the standard deviation. Since the price of a capital good is q_n, the expected return on capital is $\frac{\pi_i + \pi_n}{q_n}$ when firm i invests in country n. The expected return on bearing one unit of risk is $s_{i,n} \equiv \frac{\pi_i + \pi_n}{q_n \sigma_n}$.

With this technology in place, the decisions makings of firms are two-fold. First, firm i chooses a set of countries, $X_i \subseteq \{1, 2, ..., N\}$, in which to operate their business. The firm has to pay a fixed cost $\tau_i f_n$ to enter foreign country n. Only after paying this fixed cost, the firm

is able to buy physical assets or issue debt securities in country n outside their home country. No cost is incurred for home country investment. Second, the firm determines a business portfolio weight $\alpha_i \equiv [\alpha_{i,1}, ..., \alpha_{i,N}]'$ and debt weight $\beta_i \equiv [\beta_{i,1}, ..., \beta_{i,N}]'$ over different countries. Naturally, the investment country set can be expressed as $X_i \equiv \{n : \alpha_{i,n} \neq 0 \text{ or } \beta_{i,n} \neq 0\}$. All firms are price takers.

An entrepreneur who owns a firm has exponential utility over period-1 consumption and the risk aversion parameter is given by γ. Thus, the objective function of entrepreneurs can be simply transformed to $\mathbb{E}[C^e_{i0}] - \frac{\gamma}{2}\mathbb{V}[C^e_{i1}]$. In the model, firms face two types of risks: production risks and exchange rate risks. Production risks stem from $\sum_n \alpha_{i,n}\sigma_n\tilde{z}_n$, while exchange rate risks stem from $\sum_n \beta_{i,n}(1+r_n)\tilde{x}_n$. Let Ω_0 denote the variance-covariance matrix stemming from a vector of random variables $[\sigma_1\tilde{z}_1, ..., \sigma_N\tilde{z}_N, (1+r_1), (1+r_2)\tilde{x}_2, ..., (1+r_N)\tilde{x}_N]'$ in country 0. Putting all these ingredients together, we can state an entrepreneur's problem in country 0 as

$$\max_{\{\alpha_i,\beta_i\}} \left\{ \left[\underbrace{\sum_{n\in X_i} \alpha_{i,n}(\pi_i + \pi_n) - \sum_{n\in X_i} \beta_{i,n}(1+r_n)}_{\text{(i) Expected Return on Levered Capital}} \right] - \underbrace{\frac{\gamma}{2}[\alpha_i', \beta_i']\Omega_0 \begin{bmatrix} \alpha_i \\ \beta_i \end{bmatrix}}_{\text{(ii) Volatility of Returns}} \right\} - \underbrace{\sum_{n\in X_i\setminus\{0\}} \tau_i f_n}_{\text{(iii) Fixed Costs}}$$

subject to

$$\sum_{n\in X_i} q_i\alpha_{i,n} = e_i + \sum_{n\in X_i} \beta_{i,n} \tag{3.1}$$

$$\alpha_{i,n} \geq 0, \beta_{i,n} \geq 0 \text{ for all } n \tag{3.2}$$

The second constraint rules out short-selling of productive capital and net positive savings in deposits. The former is a natural assumption. The latter limits the ability of firms as arbitrageurs in global debt markets.

Market Clearing Conditions We define a market equilibrium as a price vector such that the supply and demand for all assets are equalized. The price of debt securities is clear: we can regard the interest rate, r_n, as the price that coordinates savings of households and debt issuance of firms. As for productive capital, we use q_n as the main variable that determines compensation for taking one unit of risk in country n.

Definition 1. *Equilibrium is defined as a price vector* $\{q_n, r_n\}_{n=1}^{N}$ *that clears financial markets in all countries: (i)* $\sum_{i=1}^{I} \beta_{i,n} = D_n$ *and (ii)* $\sum_{i=1}^{I} \alpha_{i,n} = K_n$ *for all* $n = 0, ..., N$.

Condition (i) means that the total debt issuance in country i is equal to the demand for deposits in country i. Condition (ii) shows that the total market value of productive capital should be equal to the total investment of firms in each country.

3.3.2 Discussion on the Model

Three features of the model are worth noting. First, our model can be extended to incorporate intangible assets, which may act as a confounding factor in our analysis. Firms with intangible assets can be thought of as having a higher π_i. It provides excess profits for firms relative to others with the same investment strategy.

Second, the objective function of firm i can also be interpreted as capturing technological complementary/substitutability of multinational investment. A typical way to interpret the CARA utility is that the agent likes a higher expected payoff but hates its volatility. Instead, in our context, one can view the whole objective function as profits so term (ii) in the objective function of a firm represents an additional incentive for a firm to invest in a country-specific asset which increases payoffs of assets in other countries. A good real-world analogy is a firm acquiring a warehouse in Brazil to serve marketing units in other Latin American countries. Later, we will try to back out this technological complementarity in the empirical section.

Third, our framework dispenses with pricing decision (e.g. mark-ups) in the goods market but it still capture competitive forces between firms operating in the same country. As more firms enter country n by paying a fixed cost, the price of productive capital, q_n, rises in equilibrium so that incumbent firms in country n begin to yield a lower expected rate of return on their investment. We view that the expected return on productive capital is a sufficient statistics summarizing various profitability factors in country n, including mark-ups and technological efficiency.

3.3.3 Main Results

The questions we are going to be most interested in are the following: (i) what are the sources of MNC premia in the spread between RoA and CoC and (i) how it varies with sector-level and firm-level characteristics? To answer these questions in a more stark way, we begin with a stylized model in which cost structure, $\{\tau_i, f_n\}_{\forall i,n}$, is simplified. We next extend the model to match with data and do quantitative analysis.

Suppose that, in country 1, there are only two firms, a multinational and a domestic-oriented company. Their indexes are denoted by m and d. Assume for the moment that there is no idiosyncratic return differentials i.e. $\pi_m = \pi_d = 0$. The only difference between these two types of firms is a technological barrier to foreign investment i.e. $\tau_d > \tau_m$. This feature reflects the fact that, as we will see in data analysis, firms in certain industries face higher barriers for entering foreign markets. To illustrate the main point, we first consider three extreme cases

[Case 1.] Financial markets are disintegrated. Both firm m and d face an infinitely large entry cost for foreign investment.

[Case 2.] Financial markets are fully integrated i.e. $\tau_m = \tau_d = 0$. But firm m and d have different investment profiles as their risk aversions differ i.e $\gamma_m < \gamma_d$.

[Case 3.] Financial markets are incompletely integrated. Multinational firms have $\tau_m = 0$ while domestic oriented firms have an infinitely large τ_d.

In Case 1, no firm is able to initiate foreign operation so all have the same rate of returns. In Case 2, multinational firms may exhibit a higher rate of return as they bear a higher risk than domestic oriented firms. What about Case 3? In the model, we can compute return on assets and the average interest rate as

$$Roa_i = \frac{\sum_{n \in X_i} \pi_n \alpha_{i,n}}{\sum_{n \in X_i} q_n \alpha_{i,n}}, \quad \text{and} \quad Int_i = \frac{\sum_{n \in X_i} r_n \beta_{i,n}}{\sum_{n \in X_i} \beta_{i,n}}$$

Let $\mathcal{S}_i = Roa_i - Int_i$ denote the spread between the two. The following proposition presents a

basic decomposition of MNC premia in the case where global capital markets are incompletely integrated.

Proposition 1. *In country* 1*, MNC premia in the spread between return on assets and interest rate on debt can be decomposed into three parts:*

$$\mathbb{E}_0[\mathcal{S}_m] - \mathbb{E}_0[\mathcal{S}_d] = \underbrace{\Big\{ \sum_{n \in X_m} s_n \sigma_n \omega_{\alpha,n} - s_1 \bar{\sigma}_m \Big\}}_{\textit{(i-a) Incomplete Integration}} - \underbrace{\Big\{ \sum_{n \in X_m} r_n \omega_{\beta,i} - r_1 \Big\}}_{\textit{(i-b) Incomplete Integration}} + \underbrace{\{ s_1 \bar{\sigma}_m - s_1 \sigma_1 \}}_{\textit{(ii) Difference in Risk}}$$

where $\omega_{\alpha,n} = \frac{q_n \alpha_{m,n}}{\sum_{i \in X_m} q_n \alpha_{m,n}}$ $\omega_{\beta,n} = \frac{\beta_{m,n}}{\sum_{n \in X_m} \beta_{m,n}}$*, and* $\bar{\sigma}_m \equiv \sqrt{[\alpha'_m, \beta'_m] \Omega_0 [\alpha'_m, \beta'_m]'}$ *is the average volatility faced by multinational firm* m*.*

The core message of Proposition 1 is that an increase in MNC premia that we saw in the previous section can stem from two broad factors. One is simply that multinational firms bear more risks so they are compensated by a higher expected return on investment. This is consistent with the view proposed by (Fillat and Garetto, 2015) and many others that multinational investment is riskier. The second channel, which is novel in the literature, presents the view that multinational firms are global financiers. Because entry is restricted, some countries provide a higher rate of return on capital relative risks than other countries. Bond markets are also incompletely integrated due to exchange rates so r_n is different across countries. What multinational firms do is to take arbitrage between countries that provide a higher risk compensation and countries that have a lower interest rate.

Remark 1: Intangible Asset Another factor one may consider is firms' abilities to generate excess profits from their investment, namely intangible assets. High productivity firms self-select into foreign markets, so the higher return on asset among multinational firms could be attributed to intangible assets rather than risk premium or return differentials. Our model can accommodate this feature as profits of firms have different idiosyncratic components i.e. π_i. The formula below handles this case.

Proposition 2. *Suppose that firm* m *has intangible assets providing* $\pi_m > 0$*. MNC premia*

can now be decomposed into

$$\mathbb{E}_0[\mathcal{S}_m] - \mathbb{E}_0[\mathcal{S}_d] = \underbrace{\sum_{n \in X_m} \pi_m \omega_{\alpha,n} / q_m}_{\text{(0) Intangible Assets}} + \underbrace{\Big\{ \sum_{n \in X_m} s_n \sigma_n \omega_{\alpha,n} - s_1 \bar{\sigma}_m \Big\}}_{\text{(i-a) Incomplete Integration}} - \underbrace{\Big\{ \sum_{n \in X_m} r_n \omega_{\beta,n} - r_1 \Big\}}_{\text{(i-b) Incomplete Integration}}$$

$$+ \quad \underbrace{\{ s_1 \bar{\sigma}_m - s_1 \sigma_1 \}}_{\text{(ii) Difference in Risk}}$$

Term (0) is added to the previous decomposition.

This formula shows that intangible assets provide an additional margin for the MNC premia due to the market expansion. Firms with a higher idiosyncratic return are more likely to initiate multinational operation after global capital markets are integrated. Essentially, foreign expansion allows firms to replicate their high-yield business in different markets. This effect is captured by the first term, $\pi_m \sum_{i \in X_m} \alpha_{m,i}$. Capital market integration allows firm m to increase investment share in capital goods in different markets. The rest of the terms, incomplete integration and differences in risk-takings, remain unchanged.

3.4 Structural Estimation

In this section, we develop a structural model to estimate the contribution of the three channels, which we identified in the previous section, to the rising premium of US multinational firms. In this draft, we use pseudo-data artificially generated by a simulation which was blind to any microdata collected by the BEA. The focus of this simulation exercise is to study identification issues, conduct sensitivity checks and investigate quantitative patterns of the model.

Given the simulated data, the estimation proceeds in three steps. First, we extend the model to fit to the data. We consider a multi-sector model that incorporates sector-specific FDI potentials and fixed costs across different regions of the world. Second, with this extension in place, we estimate the sector-specific FDI potentials with the data. Finally, we run a method of simulated moments to compute estimates for fixed costs and derive standard errors. Our three-step estimation method follows from (Antràs *et al.*, 2017). Unlike these authors, whose focus is primarily on input sourcing decisions, we shed light on the investment and

funding decisions of a multinational firm.

3.4.1 Data Generating Process

We maintain the two-period model structure. An implicit assumption behind this framework is that corporate decisions only take into account current state variables, which characterize all the past and present information, and future expectation about business environment. An application of our methodology begins by picking a baseline year for quantitative analysis. A natural choice could be a benchmark year in which the BEA conducts its benchmark survey. These surveys contain more detailed information on affiliate-level variables than regular annual surveys.

Geographically, we consider six regions: US, European Union, China, Mexico, Canada and the rest of the world. US acts as the home country and is indexed by 1. The other regions are indexed from 2 through 6 respectively. The variance-covariance matrix Ω is defined among these regions. In the simulation exercise, we assume that Ω is know to researchers a priori. In practice, one can use covariances between the US gdp growth with exports growth rates to the other regions as a proxy for investment risks. Similarly, one can use region-level exchange rates to calibrate currency risks.

In the simulation, we investigate two non-financial sectors: manufacturing and service. As will be shown later, our estimation strategy can easily accommodate an arbitrary number of sectors with minimal computational burdens. In actual data, for example, one may turn on 3-digit non-financial SIC industries. Whichever layer we use, we assume that the equity size of each firm is randomly drawn from a lognormal distribution. The mean and standard deviation of the natural logarithm of sizes are given by $(\mu_k, \sigma_k^2)_{k=1}^K$ where k indexes industry and K is the number of sectors. Each sector is characterized by a pair of these parameters.

Our data generating process is the following: each firm draws their sector, equity size and idiosyncratic preferences, $\varepsilon_{i,n}$, over geographic locations. To model the idiosyncratic preferences, note that the first-order condition of the firms' maximization problem in Section

3.3.1 are given by

$$\begin{bmatrix} \alpha_{i,1} q_1 \\ \dots \\ \beta_i \end{bmatrix} = \frac{\Omega^{-1}}{\gamma} \begin{bmatrix} s_{n,1}\sigma_1 - r_1 \\ \dots \\ r_1 - r_N \end{bmatrix}$$

We assume that a firm's actual investment and funding choices are given by $\{\alpha_{i,1} q_1 e^{\varepsilon_{i,1}}, ..., \beta_i e^{\varepsilon_{i,2N}}\}$ where $\varepsilon_{i,n}$ follows a normal distribution with mean zero and variance σ_p^2. Parameter σ_p determines the variability of idiosyncratic investment and funding choices.

Finally, we extend the baseline model to improve the fit. We make two additional assumptions. First, we assume that the risk aversion of a firm is proportional to the equity size of the firm. In the baseline model, firms are mean-variance maximizers, and have constant absolute risk aversion. This assumption implies that these firms, no matter how large they are, conduct the same amount of risky investment in absolute terms. Second, we assume that firms pay an additional fixed cost to maintain their business. The additional cost is given by $f_e \sum_{n \in X_i} q_i \alpha_{i,n}$, which increases proportionally with the size of assets, This additional fixed cost helps match the model-implied average ROA of firms to the actual average of ROA in the data. We will revisit these two points, the risk aversion and fixed cost, in more detail later.

Table 3.4 provides a summary of parameters that are used for our simulation exercise. The aim of this quantitative extension is to quantify the channels we identified in Proposition 1 in light of the estimates from the simulated data.

3.4.2 Step 1: External Calibration

The first step of quantitative analysis is to calibrate primitive parameters. Among others, the parameters below are calibrated externally from the data. In the simulation exercise, we assume that these parameters are known to researchers a priori.

$$\{r_1, s_1, \Omega\,;\ (\mu_k, \sigma_K^2)_{k=1}^K\}$$

r_1 is the real risk-free interest rates in the U.S., s_1 is the Sharpe ratio of real investment in the U.S. corporate sector, Ω is the variance-covariance matrix and (μ_k, σ_k^2) are the parameters

Table 3.4: *List of Simulation Parameters*

Parameter	Description	True Value
γ	Risk aversion	3
f_e	Fixed operation cost	0.06
σ_p	Variability of idiosyncratic preferences	0.2
Ω	Variance-Covariance Matrix	See *Notes*
$(f_n)_{n=2}^6$	Foreign market entry costs	$(5, 7, 6, 6, 6)$
$(\mu_k, \sigma_k^2)_{k=1}^2$	Log-normal distribution of equity sizes	(2.2, 1): Manu. (2.2, 1): Serv.
$(s_n^k)_{\forall n,k}$	FDI potentials	(1.1, 1.4, 1.5, 2.1, 1.4, 1.3): Manu. (1.4, 1.4, 1.6, 1.8, 2.1, 1.3): Serv.
$(r_n)_{n=1}^6$	Interest rates	(0.03, 0.15, 0.02, 0.02, 0.02, 0.02)

Notes: This table presents the list of parameters in our structural model. True values represent parameter values used for our simulation exercise. Manu. indicates manufacturing sector, while Serv. indicates service sector. In the simulation exercise, we draw a randomly-generated symmetric and positive semi-definite matrix for Ω.

that determine the distribution of equity size in sector k. When using actual data, one can externally calibrate $(\mu_k, \sigma_K^2)_{k=1}^K$ from Compustat dataset. One may also calibrate r_1 from the average yield of U.S. corporate bond index, and s_1 from the mean divided by the standard deviation of profits in the U.S. corporate sector. The remaining model parameters are internally estimated as we explain below.

3.4.3 Step 2: Estimation of FDI Potentials

The next step is to estimate FDI potentials, $(s_n^k)_{\forall n,k}$, and average interest rates, $(r_n)_{n=1}^6$ across regions. Our estimation framework allows us to estimate these parameters separately from other parameters, thereby involving less computation. Consider a firm, indexed by i in sector k, which engages in foreign direct investment across all regions. Note that the first-order conditions of the firm's maximization problem can be rearranged as

$$\underbrace{\log(\alpha_{i,n}) - \log(\alpha_{i,0})}_{\text{log (Asset in country i / Asset in the US)}} = \log\left[\Omega^{-1}\boldsymbol{\pi}^k\right]_n - \log\left[\Omega^{-1}\boldsymbol{\pi}^k\right]_0 + \varepsilon_{i,n}$$

where $\boldsymbol{\pi} \equiv [s_1^k\sigma_1 - r_1, ..., s_N^k\sigma_N - r_1, r_1 - r_2, ..., r_1 - r_N]$ represents the risk premia, $[\boldsymbol{x}]_i$ represents i's element of a vector $\boldsymbol{x}$ and $\varepsilon_{i,n}$ is an error term that arises due to idiosyncratic preferences we defined earlier. If a firm enters only a subset of countries, one can extract the corresponding columns and rows from Ω and rewrite the above empirical specification.

Using these first order conditions, we employ non-linear least squares to estimate $\hat{\boldsymbol{s}}^{\boldsymbol{k}}$ for each sector k, and $\{r_n\}_{n=1}^N$. The property that these estimates are not dependent on the values of other parameters reduces computational burden of the quantitative analysis. Standard errors of these estimates are jointly estimated when we run a simulated method of moments in the next subsection. The estimated values are reported in Table 3.5.

3.4.4 Step 3: Estimation of Fixed Costs

The final step of the quantitative analysis is to estimate the remaining parameters, denoted by $\hat{\boldsymbol{\eta}} \equiv \{\hat{f}_e, (\hat{f}_n)_{n=1}^N, \hat{\gamma}, \hat{\sigma}_p\}$. We run the simulated method of moments to estimate $\hat{\boldsymbol{\eta}}$ to match quantitative patterns in the data. We use two sets of empirical moments to estimate the data. First, we utilizes the share of firms that enter each region n (i.e. $\frac{1}{I}\sum_{i=1}^I \mathbb{I}_{i,n}$) where $\mathbb{I}_{i,n}$

Table 3.5: *Estimates for FDI Potentials and Interest Rates*

	Region				
Sector	EU ($\hat{s}_2$)	China ($\hat{s}_3$)	Mexico ($\hat{s}_4$)	Canada ($\hat{s}_5$)	ROW ($\hat{s}_6$)
Manufacturing	1.2113	1.5296	1.6017	2.0873	1.5712
	(0.0234)	(0.0195)	(0.0272)	(0.0205)	(0.0181)
Service	1.2113	1.1577	1.3474	1.4566	1.6682
	(0.0136)	(0.0157)	(0.0174)	(0.0248)	(0.0135)
Sector	EU ($\hat{r}_2$)	China ($\hat{r}_3$)	Mexico ($\hat{r}_4$)	Canada ($\hat{r}_5$)	ROW ($\hat{r}_6$)
Manu. & Service	0.0170	0.0170	0.0205	0.0211	0.0215
	(0.0008)	(0.0004)	(0.0005)	(0.0005)	(0.0005)

Notes: This table presents estimates for FDI potentials and interest rates from non-linear least-squared estimation. Standard errors are based on 100 bootstrap samples drawn with replacement.

is an indicator variable that equals one if firm i engages in investment in country n. These moments help identify the size of fixed market entry cost in each region. Second, we use the average return on assets, the average equity/asset ratio and the standard deviation. The third moment is used to find f_x. The final moment helps identify the common risk aversion shifter, γ. The simulated moments under $\hat{\boldsymbol{\eta}}$ are denoted by $\hat{m}(\hat{\boldsymbol{\eta}})$. Essentially, we select the model parameters that minimize $\hat{\boldsymbol{\eta}} = \text{argmin}_{\eta}\ [m - \hat{m}(\boldsymbol{\eta})]' W [m - \hat{m}(\boldsymbol{\eta})]$ where W is an identity (weighting) matrix. Standard errors based on 100 bootstrap samples drawn with replacement. The results are reported in Table 3.6. These estimates allow us to conduct counter-factual analysis in the following section.

3.5 Simulation Results

3.5.1 Fit of the Model

This subsection evaluates the general fit of our model to the simulated data. Figure 3.5 suggests that our estimation procedure overall provides a good fit to the simulated data. In Figure 3.5, the dark color bars represent model-implied values, while the light color bars represent values generated by the simulated data. More specifically, Panel (a) displays the shares of firms that engage in foreign direct investment hosted by each country, which we

Table 3.6: *Estimates for the Fixed Costs, Risk Aversion and Variability*

	Parameters			
	$\hat{\gamma}$	$\hat{f}_e$	$\hat{\sigma}_p$	EU ($\hat{f}_2$)
Estimates	2.8723	0.0594	0.2332	5.6536
	(0.1142)	(0.0052)	(0.0149)	(0.3541)
	China ($\hat{f}_3$)	Mexico ($\hat{f}_4$)	Canada ($\hat{f}_5$)	ROW ($\hat{f}_6$)
Estimates	6.3520	5.0829	5.1976	5.9054
	(0.3502)	(0.3087)	(0.3052)	(0.3986)

Notes: This table presents estimates for the fixed costs, risk aversion and variability from the simulated method of moments. Standard errors based on 100 bootstrap samples drawn with replacement.

often call as extensive margins. Panel (b) displays the share of investment aggregated across different regions, or namely intensive margins. The barplot in Panel (c) groups firms by the number of countries they have invested in. Panel (d) provides a comparison between the model and the simulated data in terms of their average returns on assets and interest rates The length of each grey interval represents the spread between the average return on asset and interest rate.

Table 3.7: *Fit of the Model*

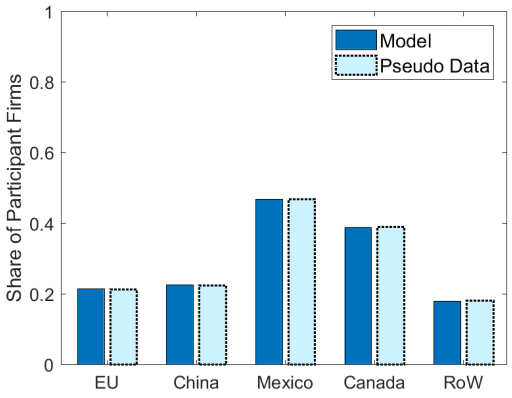
	Moments			
	(EU)	(China)	(Mexico)	(Canada)
Model	0.2135	0.2255	0.4680	0.3885
Simulated Data	0.2130	0.2240	0.4675	0.3890
	(ROW)	(Leverage)	(ROA)	(Variability)
Model	0.1795	0.5636	0.0615	0.3251
Simulated Data	0.1810	0.5631	0.0619	0.3264

Notes: This table presents the fit of the model to the simulated data. The first five columns represent the share of firms that enter each geographic region. The sixth column represents the average equity/asset ratio. The seventh column represents the average ROA and the last column represents the variance of investment shares in the US.

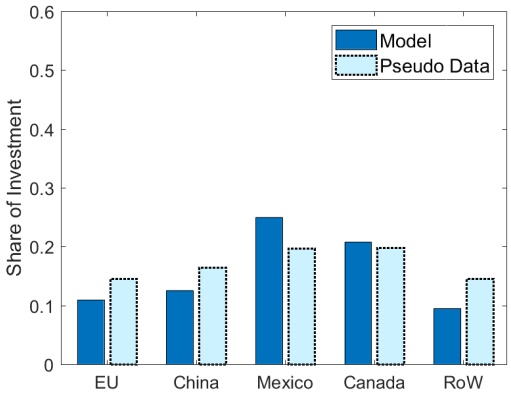
Table 3.7 displays the moments associated with the fit of the model. The first five columns represent the share of firms that enter each geographic region. Each of these columns corresponds to the values in Panel (a) of Figure 3.5. The sixth column represents the average equity/asset ratio, which we use to estimate the general risk aversion of shareholders in the U.S. corporate sector. The seventh column represents the average ROA and the last column represents the variance of investment shares in the US. The overarching message of this subsection is that our identified parameters generate a good fit to the simulated data.

Figure 3.5: *Fit of the Model*

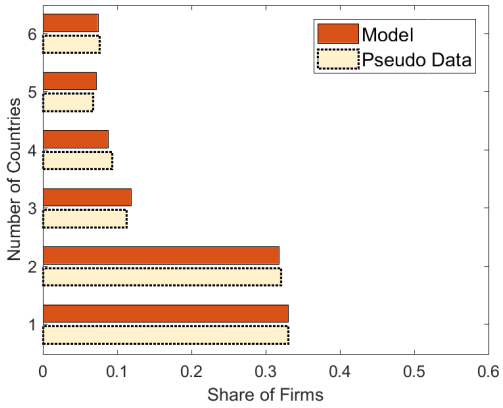
(a) *Extensive Margins*



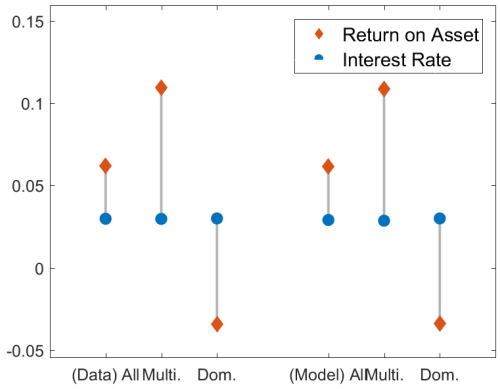
(b) *Intensive Margins*



(c) *Number of Invested Countries*



(d) *Multinationals and Domestic-oriented Firms*



Notes. In the figures, the dark color bars represent model-implied values, while the light color bars represent values in the simulated data. Panel (a) displays the share of firms that engage in foreign direct investment hosted by each country. Panel (b) displays the share of investment aggregated across different regions. Panel (c) groups firms by the number of countries they have invested in. Panel (d) compares the average return on assets and interest rates between the model and simulated data.

3.5.2 Counterfactual Analysis: Disintegration of Global Capital Markets

Given these estimates, we can conduct counterfactual simulations to quantify the contribution of various channels to the gap between multinational and domestic firms. Recall that we derived the formula for decomposing the MNC premia. In the baseline setup, we can write the formula as

$$\mathbb{E}_0[\mathcal{S}_m] - \mathbb{E}_0[\mathcal{S}_d] = \underbrace{\Big\{ \sum_{n \in X_m} s_n \sigma_n \omega_{\alpha,n} - s_1 \bar{\sigma}_m \Big\}}_{\text{(i-a) Incomplete Integration}} - \underbrace{\Big\{ \sum_{n \in X_i} r_n \omega_{\beta,n} - r_1 \Big\}}_{\text{(i-b) Incomplete Integration}} + \underbrace{\{ s_1 \bar{\sigma}_m - s_1 \sigma_1 \}}_{\text{(ii) Difference in Risk}}$$

where $\omega_{\alpha,n} = \frac{q_n \alpha_{m,n}}{\sum_{i \in X_m} q_n \alpha_{m,n}}$ $\omega_{\beta,n} = \frac{\beta_{m,n}}{\sum_{n \in X_m} \beta_{m,n}}$, and $\bar{\sigma}_m \equiv \sqrt{[\alpha'_m, \beta'_m] \Omega [\alpha'_m, \beta'_m]'}$ is the average volatility of multinational investment. In the general setup, the formula should be modified to incorporate fixed market entry costs. These costs are subtracted from (i-a) as they reduce the numerator (=earnings) in ROA.

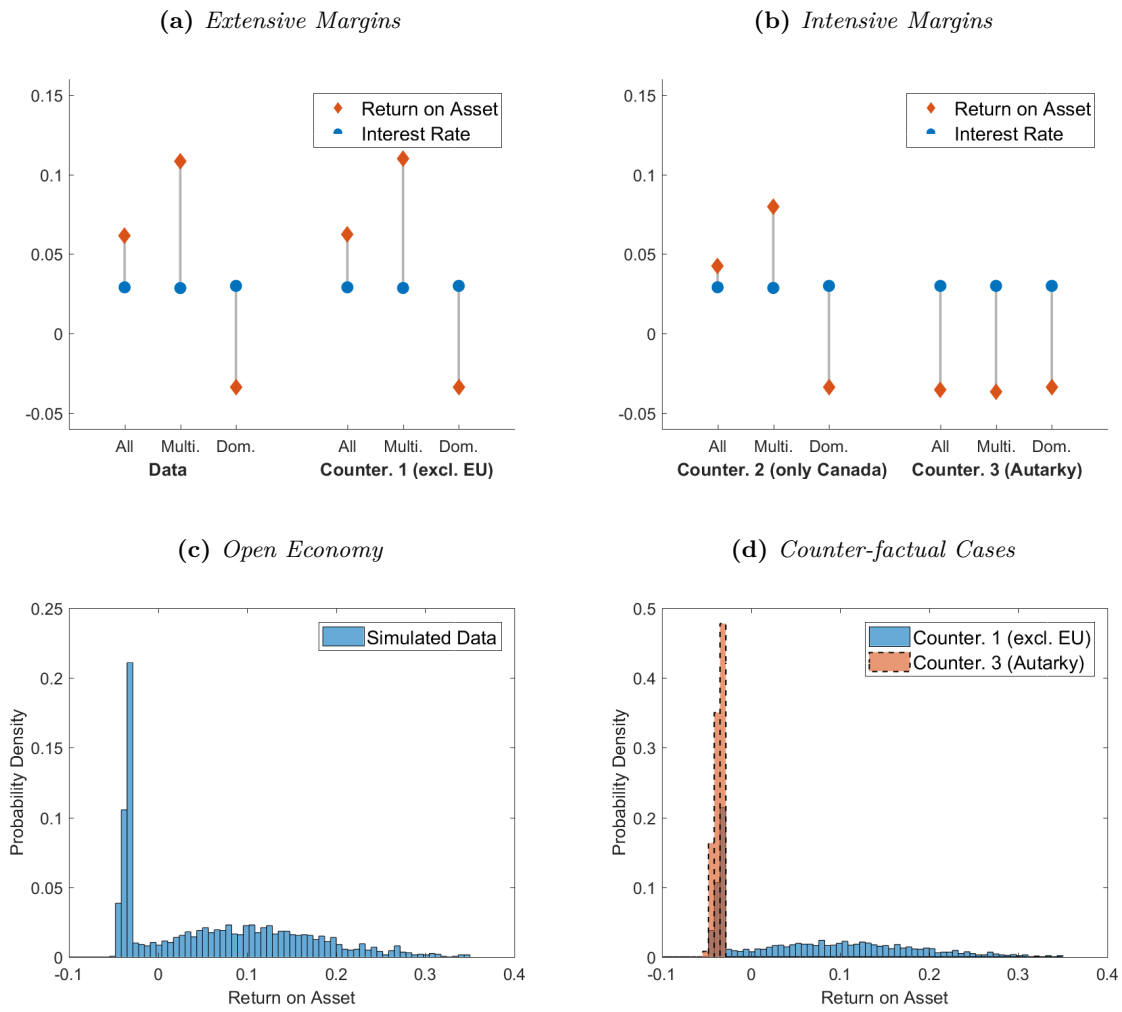
We compute each term through counterfactual simulations. Let m denote the index of a multinational firm. Index d in the above formula corresponds to the same firm when it faces infinitely large fixed costs for entering foreign markets. One implicit assumption behind this exercise is that the general equilibrium effect on $\{s_n, r_n\}_{n=1}^N$, stemming from a change in the global supply and demand upon financial integration, is negligibly small. Essentially, our analysis here only captures partial equilibrium effects.

Table 3.8: *Decomposition*

Term	(i-a)	(i-b)	(ii)
Values	14.5%p	0.03%p	-0.2%p

Table 3.8 presents the estimated values of these terms. In our simulation, (i-a) and (ii-b) account for 14.5%p and 0.03%p respectively, indicating that multinational firms can indeed benefit from its special position as global arbitrageurs. Quantitatively, the sum of these two terms can account for most of the gap between the pre- and post-globalization spreads among

Figure 3.6: *Counterfactual Analysis*



Notes. This figure displays the effect of access to global capital on the MNC premia. We consider three counterfactual simulations which represents a gradual process of global capital market integration. Panel (a) shows that excluding one region has a relatively mild effect on the average size of the MNC premia. Panel (b) shows that driving out regions with a higher marginal product capital has a much greater impact. Panel (c) and (d) confirm these effects with histograms.

firms. In the simulation, the return-on-asset component on average plays an outsize role while its variability is much higher than that of the interest rate component. These patterns are consistent with our observations in Section 3.2 qualitatively, although the quantitative magnitudes are off the range as we use artificially-generated data in this draft. It is also worth noting that (ii) could have a negative value, which is the case in our simulation exercise. Multinational firms on average can bear a lower volatility due to geographic diversification.

Figure 3.6 displays the effect of access to global capital on the MNC premia. We present three counterfactual simulations in this analysis, each of which represents a gradual process of global capital market integration. In the first scenario, we only exclude one region, the EU, from the global markets. Panel (a) shows that it has a relatively mild effect on the average size of the MNC premia. This is because, in our simulation, the EU is set to have a lower FDI potential than the other regions. In the second scenario, only Canada is left in the global capital markets. Panel (b) shows that this has a much greater impact as it drives out regions with a higher marginal product capital. In the final scenario in which the US is a financial autarky, all firms have a similar range of financial performances regardless of their sizes or their multinational status in the full integration case. Panel (c) and (d) confirm these effects with histograms. These results indicate that global capital market integration can account for the rising MNC premia in the spread between the return on asset and the interest rate.

3.5.3 Further Applications

Our results and data provide several avenues for future research. First, the results from the structural estimation can be used as both an outcome variable and an independent variable in future work. As a LHS variable, we can relate our parameter estimates derived from observed patterns of MNC investment to a range of country and sector level characteristics to better understand what makes regions most attractive for foreign investment.

Second, we have provided evidence that MNCs pay lower interest rates. One source of risk mitigation for MNCS may be their ability to use their global relationships and supply chain networks to mitigate the negative impact of trade and credit shocks. In times when credit is

unavailable, MNCs with robust affiliate relations may be better equipped to maintain their cash balances by increasing the amount of trade receivables outstanding with their foreign affiliates. We have begun an analysis of how these trade balances, collected on a quarterly basis, respond to exogenous credit shocks to test the degree to which MNCs rely on this type of internal financing.

3.6 Conclusion

US multinational firms have acted as a de facto financial intermediary in the world economy. On the one hand, multinational firms provide a vehicle for foreign investment and access to foreign returns that would otherwise be unavailable to individuals. On the other hand, they provide access to foreign debt issuance by tapping into local financial markets. The rapid advancement of financial globalization over the past decades has allowed an increasing number of US firms to accrue these advantages while, due to the sectoral-specific barriers, other firms still remain in domestic markets.

Using confidential data collected by the US Bureau of Economic Analysis, this paper documents a wider spread between the average return on assets and interest rates in the US corporate sector for multinational enterprises. These firms on average pay a lower interest rate and earn a higher return on investment. Motivated by these patterns, we develop a quantifiable model to assess the extent to which this gap is driven by global arbitrage opportunities in real investment, rather than risk exposure. Our simulation results show that a sizable portion could be due to the incomplete integration channel, suggesting that US multinational firms can be characterized as global arbitrageurs in addition to being risk takers.

Financial globalization is an important milestone in the history of the U.S. corporate sector. It is our hope that this paper promotes a better understanding of the recent trends surrounding US multinational firms, their size distribution and capital income shares. This deeper understanding would help government authorities to better evaluate the decision making processes of these large firms and armed with this knowledge design corresponding policies.

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Appendix A

Appendix to Chapter 1

A.1 Descriptive Statistics

Table A.1: *Summary Statistics of Key Variables*

Variable	N	Mean	St. Dev.	Min	Max
Surge	3,843	0.137	0.344	0	1
Stop	3,843	0.154	0.361	0	1
Flight	3,843	0.145	0.352	0	1
Retrench	3,843	0.138	0.345	0	1
Left Gov.	3,843	0.409	0.492	0	1
VXO	3,843	20.337	8.315	8.660	61.970
Global Growth	3,843	2.694	1.441	−3.708	5.433
Global Money Growth	3,843	5.328	5.155	−8.193	19.738
Interest Rate Change	3,843	−0.331	1.138	−2.988	2.742
Real GDP Growth (YoY)	3,843	3.036	3.505	−8.638	14.121
Oil Prices Change	3,843	9.608	33.123	−56.142	120.794
Capital Openness	3,843	0.775	0.418	0	1
Log(Real GDP)	3,843	10.208	0.604	8.279	11.440

Country	Region	Start Year	End Year	AE	N
Argentina	LatinAmerica	1992	2016	0	98
Australia	Asia	1987	2018	1	128
Austria	WesternEurope	1991	2018	1	112
Bolivia	LatinAmerica	1994	2016	0	89
Brazil	LatinAmerica	1997	2018	0	88
Canada	NorthAmerica	1987	2018	1	128
Chile	LatinAmerica	1997	2013	0	65
CostaRica	LatinAmerica	2005	2018	0	53
Croatia	EasternEurope	1999	2018	0	77
CzechRepublic	EasternEurope	1999	2017	0	41
Denmark	WesternEurope	1991	2018	1	112
Estonia	EasternEurope	1998	2001	1	13
Finland	WesternEurope	1991	2018	1	112
France	WesternEurope	1987	2018	1	128
Germany	WesternEurope	1991	2018	1	112
Greece	WesternEurope	2005	2018	1	49
Hungary	EasternEurope	1997	2018	0	88
Iceland	WesternEurope	1999	2016	1	56
Ireland	WesternEurope	1997	2018	1	88
Israel	Other	1987	2018	0	128
Italy	WesternEurope	1991	2011	1	84
Japan	Asia	1987	2009	1	92
Korea	Asia	1991	2017	0	108
Latvia	EasternEurope	1999	2018	1	57
Mexico	LatinAmerica	1987	2018	0	128
Netherlands	WesternEurope	1991	2018	1	112
NewZealand	Asia	1987	2018	1	128
Norway	WesternEurope	1987	2018	1	128
Peru	LatinAmerica	1997	2016	0	74
Philippines	Asia	1993	2018	0	96
Poland	EasternEurope	1997	2018	0	88
Portugal	WesternEurope	1991	2018	1	112
Romania	EasternEurope	1997	2004	0	29
Russia	EasternEurope	2009	2015	0	28
SlovakRep	EasternEurope	2007	2016	1	40
Slovenia	EasternEurope	1998	2014	1	65
SouthAfrica	Other	1991	2017	0	105
Spain	WesternEurope	1991	2018	1	112
Sweden	WesternEurope	1991	2018	1	112
Thailand	Asia	1995	2000	0	24
Turkey	Asia	1991	2015	0	100
UK	WesternEurope	1987	2018	1	128
US	NorthAmerica	1987	2018	1	128

Table A.2: *Country List*

Table A.3: *Predictors of Capital Flow Episodes*

	Surge	Stop	Flight	Retrench
Election Window	0.08	0.24**	0.19	0.09
	(0.14)	(0.10)	(0.12)	(0.14)
Left Gov.	0.28**	0.01	0.32**	0.13
	(0.13)	(0.13)	(0.13)	(0.15)
VXO	−0.02*	0.02**	−0.01	0.01*
	(0.01)	(0.01)	(0.01)	(0.01)
Global Growth	0.09	0.20***	0.06	0.12*
	(0.09)	(0.07)	(0.06)	(0.07)
Global Money Growth	0.01	0.01	0.01	0.02
	(0.02)	(0.02)	(0.01)	(0.01)
Interest Rates	0.25***	−0.38***	0.14**	−0.44***
	(0.06)	(0.07)	(0.06)	(0.09)
Real GDP Growth (YoY)	0.16*	−0.06	0.12	−0.03
	(0.10)	(0.06)	(0.09)	(0.08)
Oil Prices	0.01***	−0.01***	0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	−0.07	−0.01	−0.04	0.28***
	(0.10)	(0.10)	(0.12)	(0.10)
Capital Openness	0.21	0.05	−0.08	−0.03
	(0.24)	(0.17)	(0.24)	(0.16)
Regional Contagion	0.07	−0.02	0.06	0.08
	(0.14)	(0.12)	(0.17)	(0.12)
Fixed Effects	None	None	None	None
Num. obs.	3848	3848	3848	3848

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

A.2 Models Without Fixed Effects

Table A.4: *Predictors of Capital Flow Episodes*

	Surge	Stop	Flight	Retrench
Election Window	0.04	0.26**	0.12	0.10
	(0.14)	(0.10)	(0.11)	(0.15)
Left Gov.	0.43**	0.19	0.34**	0.40**
	(0.18)	(0.17)	(0.16)	(0.19)
VXO	−0.03***	0.02**	−0.02*	0.01*
	(0.01)	(0.01)	(0.01)	(0.01)
Global Growth	0.08	0.21***	0.04	0.12*
	(0.09)	(0.08)	(0.06)	(0.07)
Global Money Growth	−0.00	0.01	0.00	0.02
	(0.02)	(0.02)	(0.01)	(0.02)
Interest Rates	0.25***	−0.37***	0.14**	−0.45***
	(0.06)	(0.08)	(0.06)	(0.09)
Real GDP Growth (YoY)	0.20*	−0.09	0.12	−0.04
	(0.11)	(0.06)	(0.09)	(0.10)
Oil Prices	0.01***	−0.01***	0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Log(Real GDP)	−1.42***	0.13	−1.46**	0.80**
	(0.42)	(0.40)	(0.61)	(0.40)
Capital Openness	0.56	0.20	−0.10	−0.05
	(0.41)	(0.26)	(0.38)	(0.24)
Regional Contagion	−0.00	−0.04	0.03	−0.04
	(0.16)	(0.14)	(0.21)	(0.12)
Fixed Effects	Country	Country	Country	Country
Num. obs.	3806	3814	3819	3814
Num. groups: country	42	42	42	42

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

A.3 Robustness Checks

Table A.5: *Regulatory Tightening after Capital Surges*

	Full Sample	Full Sample	Non-EMU	Non-EMU
Surge	−0.07	−0.66	−0.11	−0.84
	(0.30)	(0.46)	(0.32)	(0.57)
Election	0.02	0.18	−0.09	0.05
	(0.23)	(0.25)	(0.21)	(0.23)
Left Gov.	−1.02***	−0.99***	−1.03***	−1.01***
	(0.29)	(0.32)	(0.31)	(0.34)
CBI	−0.15	−0.03	−0.17	−0.02
	(0.21)	(0.25)	(0.23)	(0.26)
Real GDP Growth (YoY)	0.39**	0.34*	0.37*	0.31*
	(0.19)	(0.18)	(0.20)	(0.18)
Financial Development	−0.25	−0.41	−0.20	−0.38
	(0.44)	(0.43)	(0.45)	(0.43)
Log Real GDP	0.13	0.23	0.13	0.25
	(0.26)	(0.26)	(0.27)	(0.26)
Emerging Market	0.38	0.25	0.47	0.33
	(0.37)	(0.34)	(0.38)	(0.34)
Floating ER	−0.30	−0.21	−0.28	−0.16
	(0.51)	(0.48)	(0.52)	(0.48)
REER Log Change	−0.20*	−0.18*	−0.18	−0.16
	(0.11)	(0.10)	(0.11)	(0.10)
CBI:Surge		0.90***		1.06***
		(0.34)		(0.40)
CBI:Election		−0.37*		−0.35
		(0.21)		(0.21)
CBI:Left Gov.		−0.45		−0.55
		(0.34)		(0.35)
Fixed Effects	Date:EMU	Date:EMU	Date	Date
Num. obs.	1120	1120	1088	1088
Num. groups: date_euro_fe	65	65		
Num. groups: date			60	60

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Table A.6: *Regulatory Tightening after Surges*

	Full	AE	EME	Pre-2000	Post-2000
Surge	−0.69	−0.66	−0.52	−2.31***	−0.70
	(0.47)	(0.46)	(0.93)	(0.87)	(0.58)
Election	0.14	0.78*	−0.23	0.97	0.04
	(0.26)	(0.45)	(0.25)	(1.09)	(0.20)
Left Gov.	−0.97***	−1.06**	−0.91**	−0.20	−1.00***
	(0.31)	(0.51)	(0.44)	(0.59)	(0.36)
CBI	−0.03	−0.32	0.21	−1.03	0.04
	(0.24)	(0.32)	(0.41)	(0.70)	(0.29)
Real GDP Growth (YoY)	0.32**	0.62***	0.27	0.24	0.41**
	(0.15)	(0.21)	(0.21)	(0.42)	(0.16)
Financial Development	−0.33	−0.86*	−0.11	−2.39***	−0.04
	(0.38)	(0.50)	(0.64)	(0.78)	(0.35)
Log Real GDP	0.23	0.43	0.12	−0.62	0.17
	(0.25)	(0.99)	(0.31)	(1.10)	(0.26)
Emerging Market Economy	0.37			−2.18	0.46
	(0.31)			(1.85)	(0.37)
Euro Member	−0.03	0.19		0.71	−0.02
	(0.60)	(0.65)		(1.27)	(0.69)
Floating ER	−0.24	0.07	−0.67	1.20	−0.59
	(0.46)	(0.58)	(0.93)	(0.74)	(0.38)
REER Log Change	−0.16	−0.22	−0.09	−0.46	−0.12
	(0.10)	(0.23)	(0.14)	(0.33)	(0.11)
CBI:Surge	0.87***	0.65	1.00	−1.01	0.90**
	(0.33)	(0.55)	(0.64)	(0.76)	(0.37)
CBI:Election	−0.45**	−0.57	−0.26	0.19	−0.49**
	(0.21)	(0.36)	(0.25)	(0.77)	(0.21)
CBI:Left Gov.	−0.41	0.29	−0.87**	0.70	−0.41
	(0.34)	(0.53)	(0.40)	(0.82)	(0.39)
Num. obs.	1243	404	545	231	1012
Num. groups: date	63	38	54	11	52

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Table A.7: *Regulatory Tightening after Surges*

	Bank	Equity	Debt	FDI
Election	0.11	0.12	0.16	0.12
	(0.26)	(0.28)	(0.25)	(0.25)
Left Gov.	-0.95^{***}	-0.83^{***}	-0.87^{***}	-0.91^{***}
	(0.30)	(0.30)	(0.30)	(0.30)
CBI	-0.03	0.12	0.22	0.05
	(0.23)	(0.24)	(0.22)	(0.27)
Real GDP Growth (YoY)	0.33^{**}	0.38^{**}	0.39^{**}	0.36^{**}
	(0.15)	(0.15)	(0.15)	(0.15)
Financial Development	-0.33	-0.45	-0.34	-0.36
	(0.39)	(0.41)	(0.38)	(0.38)
Log Real GDP	0.23	0.40	0.23	0.23
	(0.25)	(0.27)	(0.24)	(0.25)
Emerging Market Economy	0.34	0.25	0.24	0.31
	(0.30)	(0.32)	(0.32)	(0.32)
Euro Member	-0.03	-0.11	-0.13	-0.17
	(0.59)	(0.61)	(0.58)	(0.58)
Floating ER	-0.25	-0.20	-0.30	-0.24
	(0.48)	(0.48)	(0.48)	(0.46)
REER Log Change	-0.17^{*}	-0.19	-0.19^{*}	-0.18^{*}
	(0.10)	(0.12)	(0.11)	(0.11)
Bank Surge	-0.64			
	(0.51)			
CBI:Election	-0.42^{**}	-0.49^{**}	-0.48^{**}	-0.46^{**}
	(0.20)	(0.24)	(0.22)	(0.20)
CBI:Left Gov.	-0.38	-0.39	-0.42	-0.40
	(0.34)	(0.35)	(0.36)	(0.34)
CBI:Bank Surge	0.78^{**}			
	(0.32)			
Equity Surge		0.30		
		(0.25)		
CBI:Equity Surge		-0.00		
		(0.20)		
Debt Surge			-0.07	
			(0.25)	
CBI:Debt Surge			-0.46^{**}	
			(0.23)	
FDI Surge				0.16
				(0.29)
CBI:FDI Surge				0.20
				(0.24)
Num. obs.	1243	1184	1229	1243
Num. groups: date	63	63	64	63

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors clustered by country.

Appendix B

Appendix to Chapter 2

B.1 Descriptive Statistics

Table B.1: *Summary Statistics of Key Variables*

Variable	N	Mean	St. Dev.	Min	Max
Reserve Q-o-Q Growth Rate	2,801	−0.156	0.706	−2.012	3.312
Trade Total	2,801	11.835	12.742	−39.255	68.881
Real GDP Growth	2,801	3.042	3.203	−8.638	14.121
Capital Openness	2,801	1.405	0.961	−2	2
Floating Exchange Rate	2,801	0.195	0.396	0	1
Export Volatility	2,801	0.103	0.042	0.009	0.196
Current Account (% GDP)	2,801	−0.570	4.557	−13.361	16.124
Inflation (Y-o-Y)	2,801	0.803	0.893	−0.379	4.968
Flight Contagion	2,801	0.673	0.469	0	1
Stop Contagion	2,801	0.556	0.497	0	1
Log Real GDP	2,801	13.308	1.454	9.125	16.818

Left Gov.	Elec. Window	Capital Flow Type	N
Non-Left	Non-Election	Tranquil	977
Non-Left	Non-Election	Surge	243
Non-Left	Non-Election	Stop	179
Non-Left	Election	Tranquil	209
Non-Left	Election	Surge	38
Non-Left	Election	Stop	48
Left	Non-Election	Tranquil	635
Left	Non-Election	Surge	160
Left	Non-Election	Stop	122
Left	Election	Tranquil	119
Left	Election	Surge	46
Left	Election	Stop	25

Table B.2: *Relative Frequency of Elections, Government Types and Capital Flows*

Country	Region	Start Year	End Year	AE	N
Australia	Asia	1985	2018	1	97
Austria	WesternEurope	1990	2018	1	99
Bolivia	LatinAmerica	1998	2015	0	52
Brazil	LatinAmerica	1996	2016	0	64
Canada	NorthAmerica	1985	2018	1	95
Chile	LatinAmerica	1998	2013	0	34
CostaRica	LatinAmerica	2006	2018	0	33
Croatia	EasternEurope	2000	2018	0	58
Denmark	WesternEurope	1990	2018	1	99
Finland	WesternEurope	1990	2018	1	93
France	WesternEurope	1985	2018	1	117
Germany	WesternEurope	1990	2018	1	99
Greece	WesternEurope	2006	2018	1	41
Hungary	EasternEurope	1996	2018	0	71
Iceland	WesternEurope	1998	2016	1	44
Ireland	WesternEurope	1996	2018	1	75
Israel	Other	1986	2016	0	114
Italy	WesternEurope	1990	2011	1	87
Japan	Asia	1985	2009	1	97
Korea	Asia	1990	2017	0	92
Latvia	EasternEurope	2000	2009	1	37
Mexico	LatinAmerica	1988	2018	0	79
Netherlands	WesternEurope	1990	2018	1	99
NewZealand	Asia	1987	2018	1	109
Norway	WesternEurope	1985	2018	1	101
Poland	EasternEurope	1996	2016	0	79
Portugal	WesternEurope	1990	2018	1	96
SlovakRep	EasternEurope	2007	2016	1	25
Slovenia	EasternEurope	1999	2014	1	34
SouthAfrica	Other	1992	2017	0	71
Spain	WesternEurope	1990	2018	1	99
Sweden	WesternEurope	1990	2018	1	99
Thailand	Asia	1994	2000	0	27
Turkey	Asia	2002	2015	0	35
UK	WesternEurope	1985	2018	1	117
US	NorthAmerica	1985	2018	1	133

Table B.3: *Country List*

B.2 Full Regression Results

Table B.4: *Change in International Reserves During Capital Episodes*

Dependent Variable:	Reserves (Q-o-Q) Growth				
Current Account (% of GDP)	0.008**	0.008**	0.008**	0.008**	0.008**
	(0.003)	(0.004)	(0.003)	(0.004)	(0.004)
Lagged Dependent	0.73***	0.73***	0.73***	0.74***	0.73***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Flight Contagion	-0.06**	-0.06**	-0.06**	-0.06**	-0.06**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Surge	0.03	0.002	0.01		-0.01
	(0.03)	(0.03)	(0.04)		(0.04)
Stop	-0.08**	-0.08*	-0.07*		-0.05
	(0.03)	(0.04)	(0.04)		(0.05)
Election	0.02	-0.009		-0.005	-0.02
	(0.02)	(0.04)		(0.03)	(0.04)
LeftGov.	0.04*		0.03	0.02	0.03
	(0.02)		(0.02)	(0.02)	(0.03)
Surge × Election		0.16*			0.21**
		(0.08)			(0.10)
Stop × Election		0.002			-0.07
		(0.08)			(0.10)
LeftGov. × Surge			0.04		0.04
			(0.06)		(0.06)
LeftGov. × Stop			-0.03		-0.07
			(0.04)		(0.05)
LeftGov. × Election				0.06	0.02
				(0.05)	(0.08)
LeftGov. × Surge × Election					-0.12
					(0.16)
LeftGov. × Stop × Election					0.20
					(0.14)
Observations	2,801	2,801	2,801	2,801	2,801
R^2	0.637	0.638	0.637	0.636	0.639
Within R^2	0.570	0.571	0.571	0.569	0.572

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*
The following non-significant variables are omitted to save space: Total Trade, Real GDP Growth, Capital Opennes, Inflation, Floating Exchange Rate, Export Volatility, Stop Contagion. All models include country and date fixed effects.

B.3 Robustness Checks

Table B.5: *Models Across Subsamples*

Dependent Variable:	Reserves (Q-o-Q) Growth					
Model:	Pre-1999	Post-1999	AE	EME	Non-NA/WE	Polity
Variables						
LeftGov.	0.06	0.01	0.01	0.08	0.10*	0.03
	(0.06)	(0.03)	(0.03)	(0.07)	(0.05)	(0.03)
Surge	0.11	-0.05	0.002	0.10*	0.08*	0.001
	(0.08)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)
Stop	-0.06	-0.06	-0.04	-0.06	-0.04	-0.01
	(0.09)	(0.04)	(0.05)	(0.06)	(0.05)	(0.04)
Election	0.09	-0.05	-0.003	-0.003	0.01	-0.01
	(0.09)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)
Current Account (% of GDP)	0.02**	0.008**	0.006	0.01**	0.02***	0.009***
	(0.009)	(0.004)	(0.004)	(0.006)	(0.004)	(0.003)
Lagged Dependent	0.67***	0.76***	0.71***	0.76***	0.73***	0.72***
	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)
Flight Contagion	-0.10**	-0.05*	-0.07*	-0.06*	-0.06**	-0.05**
	(0.05)	(0.03)	(0.04)	(0.04)	(0.03)	(0.02)
LeftGov. × Surge	-0.007	0.01	0.05	-0.12	-0.14	0.04
	(0.11)	(0.06)	(0.06)	(0.10)	(0.09)	(0.06)
LeftGov. × Stop	-0.13	0.008	-0.03	-0.13	-0.09	-0.09
	(0.11)	(0.06)	(0.07)	(0.09)	(0.07)	(0.06)
LeftGov. × Election	0.02	0.001	0.04	-0.06	-0.10	0.03
	(0.15)	(0.08)	(0.09)	(0.09)	(0.11)	(0.07)
Surge × Election	0.29	0.16	0.20*	0.11	0.03	0.16*
	(0.20)	(0.11)	(0.12)	(0.13)	(0.16)	(0.10)
Stop × Election	-0.41**	0.08	-0.19**	0.11	0.08	-0.14*
	(0.16)	(0.09)	(0.10)	(0.14)	(0.10)	(0.07)
LeftGov. × Surge × Election	-0.48*	0.15	-0.17	0.33	0.37	-0.06
	(0.26)	(0.19)	(0.17)	(0.24)	(0.26)	(0.15)
LeftGov. × Stop × Election	0.52*	0.03	0.20	0.24	0.19	0.26*
	(0.26)	(0.15)	(0.16)	(0.20)	(0.18)	(0.13)
Fixed-effects						
country	Yes	Yes	Yes	Yes	Yes	Yes
date	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics						
# country	29	36	23	13	19	34
# date	53	80	133	126	133	133
Observations	902	1,899	1,992	809	1,208	2,573
R^2	0.605	0.675	0.619	0.770	0.698	0.640
Within R^2	0.541	0.596	0.524	0.670	0.595	0.566

*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.*

The following non-significant variables are omitted to save space: Total Trade, Real GDP Growth, Capital Opennes, Floating Exchange Rate, Export Volatility, Stop Contagion.

B.4 Marginal Effects: Pre-1999

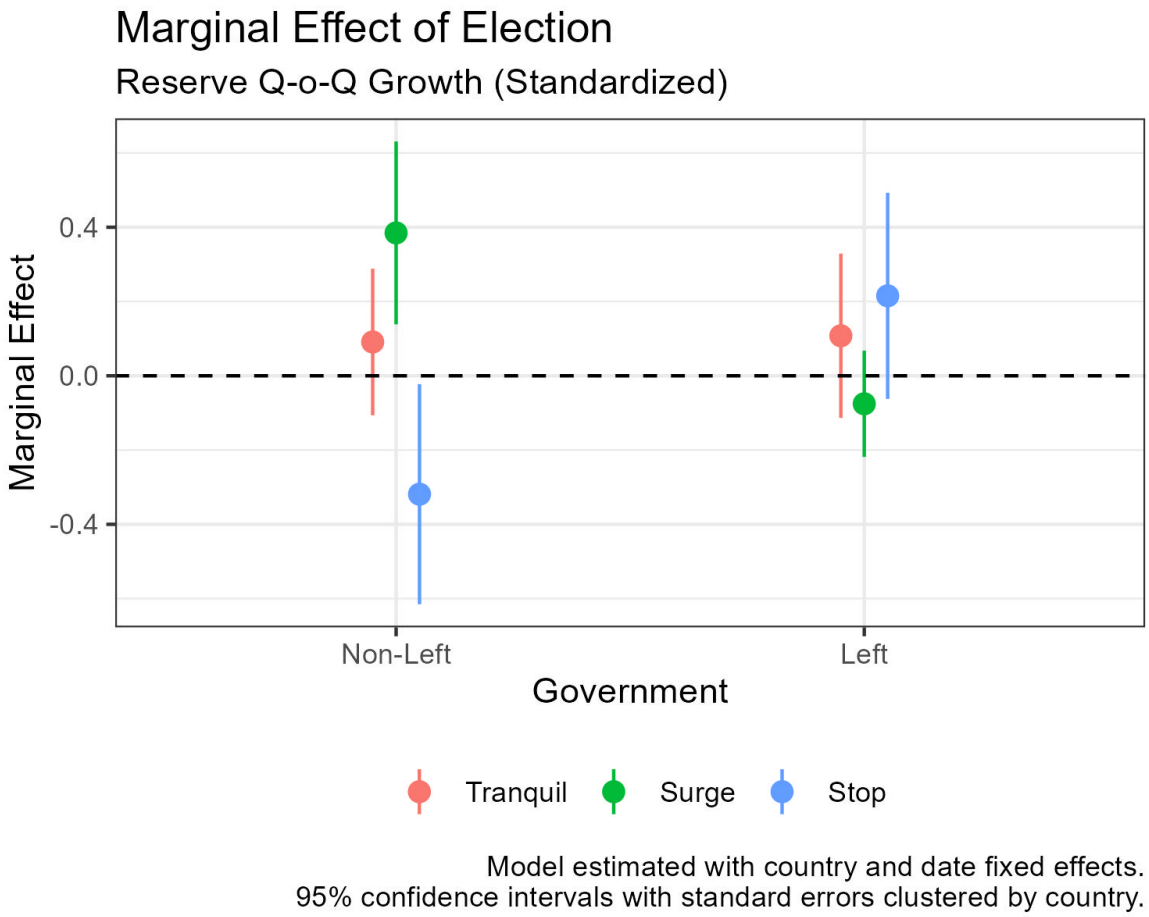

Figure B.1: *Marginal Effect of Elections: Pre-1999*

B.5 Additional First Stage Results

Table B.6: *Results from Instrumental Variable Regression - First Stage*

Dependent Variables:	Surge	Surge:Election
US Interest Rates	0.02	-0.008
	(0.02)	(0.007)
US Interest Rates × Election	0.001	0.03***
	(0.009)	(0.008)
LeftGov.	0.02	0.01*
	(0.02)	(0.008)
Election	-0.006	0.07**
	(0.03)	(0.03)
Total Trade (% of GDP)	0.0008	8.4×10^{-5}
	(0.001)	(0.0003)
Real GDP Growth	0.007	0.001
	(0.004)	(0.001)
Real GDP (log)	0.20	0.03
	(0.14)	(0.03)
Capital Openness	-0.007	-0.003
	(0.03)	(0.009)
Floating Exchange Rate	-0.06*	-0.01
	(0.03)	(0.02)
Export Volatility	-0.45	-0.11
	(0.57)	(0.16)
Current Account (% of GDP)	0.0001	-0.0004
	(0.005)	(0.001)
Lagged Dependent	0.06**	0.003
	(0.02)	(0.007)
Country Fixed-effects	Yes	Yes
Year Fixed-effects	Yes	Yes
Observations	2,454	2,454
R^2	0.169	0.216
Within R^2	0.026	0.183

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table B.7: *Results from IV Regression - First Stage, Emerging Markets*

Dependent Variables:	Surge	Surge:Election
Model:	(1)	(2)
Variables		
US Interest Rates	0.03*	0.001
	(0.02)	(0.004)
US Interest Rates × Election	-0.009	0.02*
	(0.01)	(0.01)
LeftGov.	0.03	0.02
	(0.04)	(0.02)
Election	-0.02	0.04
	(0.05)	(0.03)
Total Trade (% of GDP)	0.002	7.5×10^{-6}
	(0.002)	(0.0003)
Real GDP Growth	0.001	-0.0003
	(0.007)	(0.001)
Real GDP (log)	0.08	0.05
	(0.11)	(0.03)
Capital Openness	0.05	0.004
	(0.04)	(0.01)
Floating Exchange Rate	-0.03	0.03**
	(0.02)	(0.01)
Export Volatility	-0.11	-0.15
	(0.69)	(0.19)
Current Account (% of GDP)	-0.007	-0.003**
	(0.004)	(0.001)
Lagged Dependent	0.12**	0.01
	(0.04)	(0.008)
Fixed-effects		
country	Yes	Yes
Fit statistics		
Observations	809	809
R^2	0.149	0.146
Within R^2	0.120	0.138

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table B.8: *Results from IV Regression - First Stage, Volatility*

Dependent Variables:	Surge	Surge:Election
Model:	(1)	(2)
Variables		
Volatility	-0.003	-7×10^{-5}
	(0.002)	(0.0001)
Volatility × Election	-0.002	-0.005*
	(0.002)	(0.003)
LeftGov.	0.04	0.02*
	(0.03)	(0.01)
Election	0.03	0.26***
	(0.05)	(0.06)
Total Trade (% of GDP)	0.002**	0.0004
	(0.001)	(0.0003)
Real GDP Growth	0.010*	0.002
	(0.005)	(0.001)
Real GDP (log)	0.001	0.008
	(0.08)	(0.02)
Capital Openness	0.002	0.0002
	(0.03)	(0.008)
Floating Exchange Rate	-0.04	-0.006
	(0.03)	(0.02)
Export Volatility	-0.51	-0.05
	(0.35)	(0.12)
Current Account (% of GDP)	-0.004	-0.0008
	(0.006)	(0.001)
Lagged Dependent	0.06**	0.004
	(0.02)	(0.007)
Fixed-effects		
country	Yes	Yes
Fit statistics		
Observations	2,450	2,450
R^2	0.089	0.172
Within R^2	0.050	0.160

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

B.6 IV Regressions Results for Surge and Stops

Table B.9: *Capital Flow IV Regression - Second Stage*

Dependent Variable:	Reserves (Q-o-Q) Growth
Surge	-0.19
	(0.56)
Stop	-1.1**
	(0.51)
Tranquil:Election	-0.20
	(0.28)
Surge:Election	0.94*
	(0.51)
Stop:Election	0.47
	(1.3)
LeftGov.	0.04
	(0.08)
Total Trade (% of GDP)	-0.003
	(0.003)
Real GDP Growth	0.01
	(0.01)
log(rgdp_pwt)	0.06
	(0.20)
Capital Openness	-0.11**
	(0.05)
Floating Exchange Rate	-0.02
	(0.15)
Export Volatility	-0.39
	(0.77)
Current Account (% of GDP)	0.02
	(0.01)
Country Fixed-effects	Yes
F-test (1st stage), Surge	17.0
F-test (1st stage), Stop	13.7
F-test (1st stage), Tranquil:Election	18.4
F-test (1st stage), Surge:Election	36.7
F-test (1st stage), Stop:Election	5.47

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Table B.10: *Capital Flow IV Regression - First Stage*

Dependent Variables:	Surge	Stop	Tranquil:Election	Surge:Election	Stop:Election
log(VXO)	-0.09*	0.13***	-0.0006	0.003	-0.002
	(0.05)	(0.04)	(0.005)	(0.003)	(0.005)
US Interest Rates	0.03***	0.02*	-0.004	0.0004	0.003*
	(0.008)	(0.008)	(0.002)	(0.002)	(0.002)
log(VXO) × Election	-0.03	-0.06	0.03	-0.12*	0.09
	(0.05)	(0.07)	(0.09)	(0.06)	(0.07)
US Interest Rates × Election	0.007	-0.004	-0.03***	0.03***	-0.002
	(0.009)	(0.007)	(0.009)	(0.008)	(0.007)
LeftGov.	0.03	0.009	-0.02*	0.02*	0.004
	(0.03)	(0.02)	(0.01)	(0.009)	(0.009)
Election	0.06	0.20	0.70**	0.40**	-0.10
	(0.16)	(0.20)	(0.27)	(0.19)	(0.19)
Total Trade (% of GDP)	0.001	-0.003***	0.0004	0.0002	-0.0006
	(0.001)	(0.001)	(0.0005)	(0.0003)	(0.0004)
Real GDP Growth	0.008*	-0.01***	-0.0008	0.001	-0.0005
	(0.004)	(0.005)	(0.001)	(0.001)	(0.001)
log(rgdp_pwt)	0.18*	0.15*	-0.11***	0.04*	0.07***
	(0.09)	(0.08)	(0.03)	(0.02)	(0.02)
Capital Openness	-0.001	-0.01	0.005	-0.001	-0.004
	(0.03)	(0.02)	(0.007)	(0.008)	(0.005)
Floating Exchange Rate	-0.05*	0.04	0.01	-0.01	-0.003
	(0.03)	(0.05)	(0.03)	(0.02)	(0.02)
Export Volatility	-0.40	-0.45	0.17	-0.06	-0.11
	(0.33)	(0.35)	(0.18)	(0.12)	(0.13)
Current Account (% of GDP)	-0.0004	-0.004	0.002	-0.0005	-0.002
	(0.006)	(0.003)	(0.002)	(0.001)	(0.002)
Country Fixed-effects	Yes	Yes	Yes	Yes	Yes
Observations	2,450	2,450	2,450	2,450	2,450
R^2	0.097	0.100	0.668	0.211	0.159
Within R^2	0.058	0.076	0.661	0.199	0.145

Clustered (country) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Appendix C

Appendix to Chapter 3

C.1 Proof of Proposition 1

The objective function of entrepreneurs can be simply transformed to $\mathbb{E}[C_{m1}] - \frac{\gamma}{2}\mathbb{V}[C_{m1}]$. We can state an entrepreneur's problem as

$$\max_{\{\alpha_i,\beta_i\}} \left\{ \left[\sum_{n\in X_i} \alpha_{i,n}\left(\pi_i + \pi_n\right) - \sum_{n\in X_i} \beta_{i,n}(1+r_n) \right] - \frac{\gamma}{2}[\alpha_i', \beta_i']\Omega_0 \begin{bmatrix} \alpha_i \\ \beta_i \end{bmatrix} \right\} - \sum_{n\in X_i\setminus\{1\}} \tau_i f_n$$

where $\alpha_i = [\alpha_{i,1}, ...\alpha_{i,N}]$ and $\beta_i = [\beta_{i,2}, ...\beta_{i,n}]$. The budget constraints are

$$\sum_{i\in X_k} q_i\alpha_{k,i} = e_m + \sum_{i\in X_k} \beta_{k,i} \tag{C.1}$$

$$\alpha_{k,i} \geq 0, \beta_{k,i} \geq 0 \text{ for all } i \tag{C.2}$$

so we can write $\beta_{k,1} = \sum_{i\in X_m} q_i\alpha_{k,i} - e_m - \sum_{i\in X_m\setminus\{1\}} \beta_{k,i}$. The objective function can then be written as

$$\sum_{i\in X_k} \alpha_{k,i}q_i\left(\frac{\pi_i+\pi_k}{q_i} - r_1\right) - \sum_{i\in X_k\setminus\{1\}} \beta_{k,i}(r_i - r_1) + r_1 e_m$$
$$- \frac{\gamma}{2}[\alpha_k', \beta_k']\Omega \begin{bmatrix} \alpha_k \\ \beta_k \end{bmatrix} - \sum_{i\in X_m\setminus\{1\}} \tau_i f_i$$

From the first-order conditions, we can write the solutions as

$$\begin{bmatrix} \alpha_{k,1} q_1 \\ \dots \\ \beta_k \end{bmatrix} = \frac{\Omega^{-1}}{\gamma} \begin{bmatrix} s_{k,1}\sigma_1 - r_1 \\ \dots \\ r_1 - r_I \end{bmatrix}$$

$$\beta_{k,1} = \sum_{i \in X_k} q_i \alpha_{k,i} - e_m - \sum_{i \in X_k \setminus \{1\}} \beta_{k,i}$$

where $s_{i,n} = \frac{\pi_i + \pi_n}{\sigma_n q_n}$. X_k is chosen such that the objective function is maximized. Next, turning to the spread, notice that for firm i we have

$$Roa_i = \frac{\sum_{n \in X_i} \pi_n \alpha_{i,n}}{\sum_{n \in X_i} q_n \alpha_{i,n}}, \quad \text{and} \quad Int_i = \frac{\sum_{n \in X_i} r_n \beta_{i,n}}{\sum_{n \in X_i} \beta_{i,n}}$$

We can then write

$$\begin{aligned} \mathbb{E}[\mathcal{S}_i] &= \frac{\sum_{n \in X_i} \pi_n \alpha_{i,n}}{\sum_{n \in X_i} q_n \alpha_{i,n}} - \frac{\sum_{n \in X_i} r_n \beta_{i,n}}{\sum_{n \in X_i} \beta_{i,n}} \\ &= \sum_{n \in X_i} \frac{\pi_n \omega_{\alpha,n}}{q_n} - \sum_{n \in X_i} r_n \omega_{\beta,n} \\ &= \sum_{n \in X_i} s_{i,n} \sigma_n \omega_{\alpha,n} - \sum_{n \in X_i} r_n \omega_{\beta,n} \end{aligned}$$

where $s_n = \frac{\pi_n}{q_n \sigma_n}$. Turning to the gap between $\mathbb{E}[\mathcal{S}_m]$ and $\mathbb{E}[\mathcal{S}_d]$, note that $\omega_{\alpha,1} = 1$ and $\omega_{\beta,1} = 1$ for domestic firms. Thus, we can write

$$\begin{aligned} \mathbb{E}[\mathcal{S}_m] - \mathbb{E}[\mathcal{S}_d] &= \sum_{n \in X_m} s_n \sigma_n \omega_{\alpha,n} - \sum_{n \in X_m} r_n \omega_{\beta,n} - s_1\sigma_1 + r_1 \\ &= \Big\{ \sum_{n \in X_m} s_n \sigma_n \omega_{\alpha,n} - s_1 \bar{\sigma}_m \Big\} - \Big\{ \sum_{n \in X_m} r_n \omega_{\beta,i} - r_1 \Big\} + \{ s_1 \bar{\sigma}_m - s_1 \sigma_1 \} \end{aligned}$$

where $\bar{\sigma}_m \equiv \sqrt{[\alpha'_m, \beta'_m] \Omega [\alpha'_m, \beta'_m]'}$ is the average volatility faced by firm m.

C.2 Proof of Proposition 2

The only difference from the baseline case is the followings:

$$\begin{aligned}\mathbb{E}[\mathcal{S}_i] &= \frac{\sum_{n\in X_i}(\pi_i+\pi_n)\alpha_{i,n}}{\sum_{n\in X_i} q_n\alpha_{i,n}} - \frac{\sum_{n\in X_i} r_n\beta_{i,n}}{\sum_{n\in X_i}\beta_{i,n}} \\ &= \sum_{n\in X_i}\frac{(\pi_n+\pi_i)\omega_{\alpha,n}}{q_n} - \sum_{n\in X_i} r_n\omega_{\beta,n}\end{aligned}$$

which leads to

$$\begin{aligned}\mathbb{E}_0[\mathcal{S}_m] - \mathbb{E}_0[\mathcal{S}_d] = &\sum_{n\in X_m}\pi_m\omega_{\alpha,n}/q_m + \Big\{\sum_{n\in X_m} s_n\sigma_n\omega_{\alpha,n} - s_1\bar{\sigma}_m\Big\} \\ &- \Big\{\sum_{n\in X_m} r_i\omega_{\beta,n} - r_1\Big\} + \{s_1\bar{\sigma}_m - s_1\sigma_1\}\end{aligned}$$

The first term is added, which we interpret as excess profits from intangible assets.