Foreign Currency Liabilities, Party Systems and Exchange Rate Overvaluation

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Abstract

It is widely recognized that developing states tend to keep their real exchange rate overvalued even though overvaluation has adverse economic consequences. Recent research, however, reveals that in the set of developing countries, it is particularly developing country democracies that are more prone to adopt and maintain an overvalued exchange rate. While this is a compelling insight, a closer examination of the relevant data reveals that 55% – but not the remaining 45% – of developing democracies have opted to keep their real exchange rate overvalued. This intriguing variation raises an important question addressed in our paper: when do democratic governments in the developing world choose overvalued exchange rates? We answer this question by constructing an open-economy monetary policy model that explores how interaction between the banking industry, nonfinancial firms, an elected government and the central bank affects the prospects for exchange rate overvaluation in developing democracies. The model suggests that high levels of concentration in net foreign currency denominated liabilities held by domestic private banks provides these banks the necessary incentives and the capacity to lobby elected governments to appreciate the domestic currency. Comparative statics further reveal that policymakers from candidate-centered but not party centered developing democracies have political incentives to be responsive to such lobbying pressure which will induce them to shift to and maintain an overvalued exchange rate. Statistical results obtained from a comprehensive sample of developing country democracies provide robust support for our hypothesis.

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1 Introduction

Governments across the developing world have largely maintained overvalued exchange rates[1] throughout the post-World War II era. This practice of exchange rate overvaluation—which has been widely shown to be detrimental to economic growth, employment, and economic stability (Crystal 1994; Kaminsky et al. 1997; Easterly 2001; Frenkel 2004; Rodrik 2008)—gained significant traction in the developing world during the era of import-substitution industrialization (ISI), most notably within governments in Latin America and Africa (Crystal 1994; Bates 1981). A wide range of studies have confirmed these assertions, in noting that developing states do tend to systematically keep their real exchange rate overvalued (Edwards 1989: 78; Huizinga 1997; Frankel 2004; Rodrik 2008; Steinberg 2009) However, during the 1980s and early-1990s, numerous developing countries began to take steps (sometimes tentatively) toward a depreciated but more competitive value for their domestic currency (Frankel 2004; Calvo 2005; Eichengreen *et al* 2005). Indeed, the "new mantra" routinely propagated by international institutions like the World Bank and the IMF in especially the early 1990s was that "devalued exchange rates in developing countries is a necessary step for enhancing economic efficiency and facilitating trade liberalization" (IMF 1993: 27). This "mantra" certainly influenced some developing states to move toward and maintain devalued exchange rates (Frankel 2004; Calvo 2005).

To be sure, however, despite the "wave of exchange rate devaluation" mentioned above, a diverse set of developing countries – most notably new and consolidated developing country democracies – such as South Korea, Thailand, Peru, and Turkey consistently maintained, or in some cases further appreciated, their overvalued exchange rates in the 1990s. Moreover, developing country democracies such as Brazil, India, and the Baltic States have maintained overvaluated exchange rates well into the 2000's (Eichengreen 2007; Steinberg 2009). The fact that developing country democracies tend to favor overvalued exchange rates has not gone unnoticed among scholars. Indeed, some studies find that democracies in the developing world are on average more prone to to adopt and maintain an overvalued exchange rate compared to autocracies, which in-

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[1]That is, have adopted artificially high values of their domestic currencies with respect to the US$.

stead tend to favor undervalued exchange rates (see e.g. Eichnegreen 2007; Furlan and Gachter 2011). To explain this phenomenon, a handful of scholars suggest that democracy in particularly developing economies is positively associated with real exchange rate overvaluation as developing country democracies tend to empower interest groups that favor overvaluation (Razin and Collins 1997; Bonomo and Terra 1999; Eichengreen 2007). Others suggest that democratic governments in developing states appreciate the domestic currency to enhance the purchasing power and real incomes of voters in order to win elections (Dornubsch and Edwards 1991; Furlan and Gachter 2011).

The claim that democratic governments in the developing world choose overvalued exchange rates is not far-fetched. After all, as mentioned above, developing democracies as diverse as Brazil, the Philippines, India, Poland and the Baltic states have consistently adopted and maintain overvalued exchange rates. Yet this claim also paints the link between democracy across developing countries and the real exchange rate level (particularly exchange rate overvaluation) with a broad brush. A careful examination of the data on the real exchange rate overvaluation/devaluation across 80 developing country democracies since 1978 in fact reveals that there is significant variation in the real exchange rate level across developing country democracies (see figure 1).[2] We learn from this data that 44% of developing country democracies have actually maintained devalued exchange rates but the remaining 56% have indeed opted for and maintained overvalued exchange rates. We also learn from this data that developing country democracies such as the Philippines, Brazil and Botswana have opted for and consistently maintained overvalued exchange rates, while other developing democracies such as Argentina and South Africa have favored devalued exchange rates. These examples and the stark variation illustrated in figure 1 is intriguing given that numerous studies mentioned earlier suggest that democracy in the developing world is positively associated with real exchange rate overvaluation. It also suggests that the relationship between democracy and the real exchange rate level is far more nuanced than

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[2]We use the Rodrik's (2008) widely-used measure of real exchange rate overvaluation to plot the mean level of this measure for each of the 80 developing country democracies in figure 1. This index is described in the empirical section of this paper. Cheibub *et al*'s (2010) criterion for a democratic regime is employed to construct the pooled sample of developing country democracies from which figure 1 is derived.

suggested in existing studies. The fact that many but not all developing county democracies are associated with real exchange rate level overvaluation motivate us to address the following substantively interesting question in this paper: *when* do democratic governments in the developing world choose overvalued exchange rates?

<< Insert figure 1 about here >>

Early research on the political economy of exchange rate overvaluation in developing countries analyzed how the imperative to sustain import-substitution-industrialization policies and the growing presence of the urban poor incentivized politicians in developing states to choose overvalued exchange rates (Bates 1981; Crystal 1994). More recent studies have instead focused on not just the impact of the tradables sector but also more specifically on how the preferences and behavior of the financial sector (that is, the banking industry) is a key determinant of exchange rate overvaluation in developed democracies and "emerging markets" across the developing world (Frieden 1991; Frieden *et al* 2002; Walter 2008, 2014). Furthermore, a new strand of research has began to explore how balance-sheet "mismatches" – that results from the foreign currency denominated liabilities – of private-sector firms in developing states (including developing country democracies) leads to overvalued exchange rates (see e.g., Roubini and Setser 2004; Goldstein 2007; Walter 2008, 2014; Steinberg and Walter 2013). We build on the recent studies mentioned above to motivate and develop an open-economy monetary policy game-theoretic model that produces a theoretical story to answer the papers' central question posited earlier.[3] But we part company with this literature by examining in our theoretical story – derived from the model – how the concentration of net foreign-currency denominated liabilities of domestic private- sector banks interacts with the electoral system in which policymakers in developing democracies operate to influence exchange rate overvaluation in these states.[4] The key theoretical prediction

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[3]The open-economy monetary policy model that we construct draws from (but also substantially extends) Barro and Gordon (1983) and Obstfeld's (1995) model. Open-economy monetary policy models have also been constructed and analyzed in the IPE literature by for example Clark 2002, Hallerberg 2002, Mukherjee and Singer 2008, and Bodea 2010.

[4]In the context of especially advanced industrial democracies, a set of prominent studies published have examined how domestic political institutions (including political regimes, veto players and electoral systems) influences the choice of exchange rate regimes (but not the exchange rate level). For these studies, see Bernhard and Leblang 1999; Hallerberg 2002; Broz 2002; Bernhard, Broz and Clark 2002; Bearce 2007.

from the model is that policymakers that operate in candidate-centered – but not party-centered – electoral systems in developing country democracies will choose to keep the real exchange rate overvalued in response to demands for exchange rate overvaluation by foreign-currency liabilities concentrated private banks. Hence, we anticipate that the interactive effect of the concentration of the net foreign currency liabilities of domestic private banks and candidate-centered electoral institutions on the degree of real exchange rate overvaluation in developing democracies will be positive and substantial. The causal intuition from the model that leads to this prediction is as follows.

To begin with, the model borrows insights from existing studies to show that domestic private banks that hold substantial foreign currency liabilities have incentives to lobby the elected government to adopt and maintain an overvalued exchange rate. This is because an overvalued domestic currency significantly lowers the private banks' debt burden from foreign currency liabilities and also reduces the possibility that these banks may suffer from balance-sheet mismatches that lead to bankruptcy. Building on this, the model's first set of comparative static results show that if the concentration of net foreign currency liabilities held by domestic private banks is sufficiently high, then these banks will overcome collective action problems associated with lobbying. Higher concentration of foreign currency liabilities in this case also has another effect: it allows the concentrated private banks to "politically outmaneuver" other unorganized nonfinancial firms that are indifferent or opposed to overvaluation which enhances the banks' ability to credibly exert pressure on policymakers to appreciate the domestic currency. Yet lobbying by the foreign-liabilities concentrated private banks is at best a necessary but not sufficient condition for governments to choose exchange rate overvaluation in developing democracies.

Rather, the model shows that in contrast to party-centered systems, candidate centered electoral systems produce strong political and financial ties between policymakers in these systems and domestic private banks that seek an appreciated domestic currency. These strong ties provide political incentives to policymakers in candidate centered systems to prioritize the interests of the concentrated private banks over the distributional costs of exchange rate overvaluation. The model's second set of comparative static results reveal that the aforementioned political in-

centives will induce policymakers from candidate-centered democracies to address the demands of foreign-liabilities concentrated private banks by choosing to overvalue the exchange rate. Unlike candidate-centered democracies, we suggest that governments in party-centered democracies have electoral incentives to resist demands for domestic currency appreciation by the concentrated public banks therein negating the prospects for exchange rate overvaluation in this case. Thus, we hypothesize that higher concentration of net foreign currency denominated liabilities held by domestic private banks will have a (statistically) significant positive effect on the degree of exchange rate overvaluation in candidate-centered (but not party-centered) developing democracies. The statistical results obtained from a pooled sample of 51 developing country democracies (1988-2007) corroborate our hypothesis and remain robust when we control for alternative explanations, employ different estimation techniques, and use different measures of equity market restrictions.

This paper proceeds as follows. We begin by developing and presenting our model that generates the theoretical arguments and the main testable hypothesis stated above. We then present the data, the variables and the empirical results. We conclude by discussing the implications of our findings and provide avenues for future research.

2 The Model

We construct a simple open-economy monetary policy game-theoretic model in this section. This model builds on but also substantially extends the Barro and Gordon (1983) and Obstfeld (1995) model to analyze the political economy of exchange rate overvaluation in developing country democracies. The model begins with the standard assumption that monetary policy involves a trade-off between maintaining low inflation and expanding output to reduce unemployment. But unlike conventional monetary policy models, our model presented below also analyzes the behavior of two key groups whose economic interests are directly influenced by the level of the exchange rate. The first group is domestic private banks that hold foreign currency denominated liabilities but also provide foreign currency denominated loans to the nonfinancial firms in the

economy. The second group are the firms that borrow foreign currency denominated loans from the private banks. There are therefore four actors in the model: the government, the domestic private banks, the firms (who are also wage-setters), and the central bank and wage-setters. The model focuses on how strategic interaction between these four actors influence the exchange rate level given that the financial intermediaries (the private banks) and the firms in the economy form their expectations about future inflation rationally.

To begin with, consider a small open economy where production is a decreasing function of the real wage. Let y, w and p denote the logarithms of output, real wage and the price (i.e. inflation) level respectively. The production function (after suppressing the notation t for time here and throughout) for this economy is

$$y_t = -\alpha(w - \pi) + u \tag{1}$$

where $\alpha > 0$ is a positive parameter, and u is a stochastic supply shock with mean 0 and variance σ_u^2. As in standard monetary policy models, the supply shock can be observed by the government and the central bank (whose loss function is defined below) but not *ex ante* by the banks, the firms and workers in the economy. Observe, however, that since the workers are rational and wish to preserve their purchasing power, they claim a nominal wage in their wage contract that covers the expected price level π^e. Because the firms know that workers wish to preserve their purchasing power, they will set wages equal to expected inflation $w = p^e = E_{t-1}(p)$.[5]

We assume that purchasing power parity holds. Therefore if e denotes the logarithm of the price of one unit of foreign currency expressed in terms of national currency and p^*measures the log of the foreign price level, the exchange rate level is $e = p - p^*$. In a small-open economy, the foreign price level is independent of national policies and domestic shocks and is thus assumed to be constant which is a standard assumption in monetary policy models (see e.g. Barro and Gordon 1983; Obstfeld 1995; **cite**).This means that given e, the production function in (1) can be rewritten as the following augmented Phillips curve where only unanticipated exchange rate

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[5]Under a fixed parity, inflation expectations will be subdued, implying that $p_t = p^e$ and the current exchange rate will simply be $e = e^e$where e^e is the expected exchange rate.

swings produce real effects:

$$y = \alpha(e - e^e) + u \tag{2}$$

where $e^e = E_{t-1}(e)$ with E_{t-1} being the expectation operator.

Following extant models of monetary policy,[6] the government's (G) – that is, the ruling party – linear quadratic loss function (defined below) comprises the standard components that affects societal welfare: deviation from desired inflation and deviation of output from the target output level. However, there exists two key modifications in the government's linear quadratic loss function in our model compared to existing monetary policy models. The first is that the government G accounts for the economic interests of the domestic private banks and the firms in the small-open economy. The second is that the government's loss function is directly influenced by the following institutional context: whether the government operates in a candidate-centered democracy (denoted as C) or a party-centered system (labeled P). Stated more formally, the government's (i.e. the ruling party's) linear quadratic loss function defined is,

$$L^G = \frac{1}{2}(p_t - p_{t-1})^2 + \frac{\beta_g}{2}(y - \overline{y})^2 + [\lambda_g u_b + (1 - \lambda)u_i] \tag{3}$$

where $(p_t - p_{t-1})^2$ captures the fact that the government accounts for inflation as inflation produces a deadweight loss and public discontent. $(y_t - \overline{y})^2$ captures deviations of output from the output target. The government is also concerned about output y_t because reduction in the output level leads to unemployment which results in public discontent as well. The parameter β_g represents the government's aversion for unemployment relative to inflation. β_g where $g \in \{C, P\}$ is influenced by whether the government operates in a candidate-centered or party-centered democracy. The additional third term in the loss function in (3), $[\lambda_g u_b + (1 - \lambda_g)u_i]$, formalizes the government's concern for the economic interests of the (i) private banks (given by their expected utility function u_b which is defined below) and (ii) nonfinancial firms which is also given by their expected utility function u_i. Specifically, λ_g is the exogenous weight that the government attaches toward accounting for the private banks' interests while $(1 - \lambda_g)$ is the

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[6]See e.g., Barro and Gordon 1983; Obstfeld 1995; Persson and Tabellini 2000.

weight that it attaches to the firms' interests. Similar to β_g, λ_g where $g \in \{C, P\}$ is influenced by whether the government operates in a candidate-centered or party-centered democracy. This has important consequences that are explored below.

Given that the government weighs the private banks' expected utility u_b and the firms expected utility u_i, we need to define u_b and u_i. In the small-open economy, the private banks as financial intermediaries hold a certain amount of foreign currency denominated liabilities (mainly foreign currency deposits) denoted as D_f as well as provide foreign currency denominated loans l_f to firms. D_f and l_f is influenced e which is the level of the exchange rate of the domestic currency per US dollar that is observed by the private banks and the firms. Now suppose that there is a continuum of firms $i \in \{1, 2, 3, ...n\}$ in the economy. As mentioned above, l_f is the amount of foreign-currency denominated loans that firm i borrows for its daily operations. Further, let θ_i be the probability with which firm i anticipates returns from investing in projects in the economy when the output level y is at the target output level $\overline{y}$ (this means that the state of the economy is "good"). $(1 - \theta_i)$ is therefore the probability of the anticipated return on investment by firm i when the output level y is lower the target output level $\overline{y}$, i.e. when $y = \underline{y}$. We assume without loss of generality that θ_i is uniformly distributed in the $[0, 1]$ interval which means that $\theta_i \tilde{} U[0, 1]$. Note that the firms ability to repay l_f to the private banks depends on θ_i and the underlying state of the economy captured by the output level y. Finally, let $c_i = w_i + a_i$ be the operational costs for firm i which is essentially the sum of their administrative expenses m_i and wages w_i given to workers. Gathering this information together, the firms expected utility (i.e. profit) function is defined as

$$u_i = E(\pi_i) = \theta_i \overline{y} + (1 - \theta_i)\underline{y} - Rl_f e - c_i \tag{4}$$

where e is the observed exchange rate level and R is the gross interest rate that the private banks charge for the foreign currency denominated loans l_f given to the firms. We turn to define the private banks' expected profit (utility) function from foreign currency lending. To this end, recall the private banks $b \in \{1, 2, 3, ...n\}$ provide foreign currency denominated loans l_f to the firms at gross interest rate R and that they hold foreign-currency denominated liabilities D_f (both l_f and

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D_f are influenced by e). Let r_d be the interest rat that the private banks pay to customers for the for the foreign currency denominated liabilities (i.e. deposits) that they hold and let $\phi \in [0, 1]$ be the market concentration of the domestic private banks in the financial sector where higher (lower) values of ϕ in the $[0, 1]$ interval implies that the level of concentration of these banks in the financial is high (low). Since $\theta_i \in [0, 1]$ influences the firms' ability to repay l_f to the banks, the domestic private banks' expected profit (utility) function is defined as

$$u_b = E(\pi_b) = \int_\theta^1 \phi e(Rl_f)h(\theta)d\theta - (1 + r_f)\phi D_f \tag{5}$$

We now describe the central bank's loss function that is drawn from existing models of monetary policy.[7] Specifically, the central bank has a standard quadratic loss function that captures its aversion for inflation and thus preference for price stability. The central bank's quadratic loss function is defined as:

$$L^{CB} = \frac{1}{2}\left[(e)^2 + \gamma(y - \bar{y})^2\right] \tag{6}$$

where $(y_t - \bar{y})^2$ captures deviations of output from the output target, and the parameter γ formalizes the central bank's aversion to unemployment relative to inflation.

The sequence of moves in the model is as follows. First, the firms and the private banks maximize their expected profit given the exchange rate level e. Next the government and the central bank observe the supply shock u. After observing u, the government optimally adjusts the exchange rate level given β_g and λ_g. The central bank also optimally adjusts the exchange rate level (given θ) after observing u. Finally, inflation and output are realized.

2.1 Results and Testable hypothesis

We begin the presentation of the theoretical results by first stating formally the equilibrium result from our model:

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[7]See e.g., Clark 2002; Cukierman 1991; and Waller and Walsh 1996.

Lemma 1: *In the subgame perfect Nash equilibrium, the*

(i) *optimal adjustment of the exchange rate level by the government is*

$$e_G^* = \frac{1}{1 + \beta_g \alpha^2}[e_{t-1} + \beta_g \alpha^2 e^e - \beta_g \alpha(u - \overline{y})] + \frac{Rl_f(1 - \lambda_g)}{(\overline{y} - \underline{y})} + \lambda_g \phi D_f(r_f + 1) \qquad (7)$$

(ii) *optimal adjustment of the exchange rate level by the central bank is* $e_{CB}^* = \alpha\gamma\frac{[\alpha e^e - u + \overline{y}]}{1 + \gamma\alpha^2}$

(iii) *domestic private banks' expected profit given the realized exchange rate level* e_G^* *and* e_{CB}^*

is $E(\pi_b^*) = \frac{\overline{y}}{4\phi} - (1 + r_f)\phi[\mu e_G^* + (1 - \mu)e_{CB}^*]D_f$. *Additionally, the nonfinancial firms will borrow*

foreign currency denominated loans from the private banks when $\theta_i \geq \frac{l_f R[\mu e_G^* + (1 - \mu)e_{CB}^*] - c_i - \underline{y}}{\overline{y} - \underline{y}}$.

Proof: See Appendix

The formal characterization of the equilibrium result in Lemma 1 is necessary as it provides the foundation to conduct our comparative static exercises. These exercises provide two main comparative static results that identify the political conditions that lead to exchange rate overvaluation in developing country democracies. The first comparative static result focuses on how the foreign-currency denominated liabilities held by domestic private banks influences their preference with respect to exchange rate overvaluation and characterizes the conditions under which they will lobby the government to appreciate the domestic currency. The second comparative result specifies the institutional condition under which the government and the central bank will respond favorably to the domestic private banks call for an appreciated domestic currency. We start by formally stating the first comparative static prediction:

Proposition 1: $\frac{\partial \widehat{\pi}_b}{\partial |D_f - l_f|} > 0$ *when* $e_j^* > 0$ $\{j \in G, CB\}$; $\frac{\partial \widehat{\pi}_b}{\partial |D_f - l_f|} < 0$ *otherwise. For* $\phi \longrightarrow 1$,

$\frac{\partial \widehat{\pi}_b}{\partial \phi} > 0$, $\lambda_g(u_b) > 0$ *and* $(1 - \lambda_g)(u_i) < 0$ *in* L_G.

Proof: See Appendix

Stated less formally, the first half of proposition 1 implies that domestic private banks will favor exchange rate overvaluation when the foreign-currency denominated *net* liabilities – the difference between their liabilities in foreign currency and assets in foreign currency – that they hold is high. Three reasons account for this result. The first is that an overvalued exchange rate

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(in other words, an appreciation of the domestic currency) substantially reduces their debt burden that results from their net foreign-currency liabilities (Walter 2008, 2014; Steinberg and Walter 2013). This not only allows them to lower the risk associated with their operations but – as shown explicitly in part (i) of the proposition – it helps them to remain financially solvent and thus obtain higher realized profits ($\frac{\partial \widehat{\pi}_b}{\partial |D_f - l_f|} > 0$ for $e_j^* > 0$). The second reason is that an overvalued exchange rate reduces the prospects that balance-sheet mismatches may occur for banks that hold substantial net foreign-currency liabilities since domestic currency appreciation reduces the debt burden stemming from their net foreign currency denominated liabilities (Calvo 2005; Walter 2008, 2014). In sharp contrast, an exchange rate devaluation substantially increases the possibility of balance sheet mismatches (Eichengreen *et al* 2005a) and thus financial insolvency for private banks especially if their net foreign currency denominated liabilities is high ($\frac{\partial \widehat{\pi}_b}{\partial |D_f - l_f|} < 0$ when $e_j^* < 0$ $\{j \in G, CB\}$).[8] Third, as noted by Frieden (1991), exchange rate overvaluation enables the domestic private banks to purchase more financial assets from abroad. Buying more financial assets from abroad curtails the difference between the foreign-currency denominated liabilities and assets of these banks which further reduces their vulnerability to balance-sheet mismatches and potentially generates more net revenue.

Because private-sector banks with high net foreign currency-denominated liabilities will favor an appreciation of the domestic currency, they have incentives to lobby the government to adopt and maintain an overvalued exchange rate. Yet incentives alone are not sufficient to ensure that they will successfully coordinate and collectively lobby the government. After all, lobbying by financial intermediaries is susceptible to collective action problems since it is subject to the problem of free-riding. This possibility leads to the following question: when are private banks more likely to successfully coordinate their lobbying effort in order to pressure elected governments to adopt an overvalued exchange rate? The latter half of proposition 1 suggests that privately-owned banks in developing democracies will overcome their collective action problems and successfully exert sufficient lobbying pressure on the government to appreciate the domestic currency when the concentration of the *net* foreign currency denominated liabilities held by these

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[8]We briefly prove this result in the appendix.

banks is high. This is because of two reasons.

First, higher concentration of net foreign currency liabilities in the context described above implies an oligopolistic market structure where the net foreign currency denominated liabilities of a small number of private-sector banks constitute a relatively large share of the total net foreign currency liabilities in the country's economy. Since the gains are larger and monitoring costs lower for the smaller number of banks, the concentrated banks in this case will find it easier to overcome collective action problems and lobbying by these privately-owned banks will be less susceptible to free-riding. Second, when the net foreign currency liabilities is concentrated among a small number of domestic private banks, it is likely that these intermediaries will have substantial discretionary powers in the financial sector and more generally, the economy. This is because a higher share of net foreign currency liabilities held by few domestic private banks in the small-open economy implies that these banks essentially hold and manage the foreign currency deposits of large number of consumers (i.e. voters) in the economy (Hausmann and Panizza 2003; Calvo *et al* 2008). It also implies that a substantial number of other public and private-sector nonfinancial firms will in all likelihood rely on these concentrated private banks to obtain much needed foreign-currency denominated capital for expansion and investment (Eichengreen *et al* 2005a, 2007; Hausmann and Panizza 2010).

Such discretionary power translates to more bargaining leverage for the small number of foreign currency-liability concentrated private banks compared to the other large number of non-financial firms that are not concentrated. Indeed, unlike the net foreign-liabilities concentrated domestic private banks, severe collective action problems between the other larger number of firms will make it almost impossible for these firms to coordinate and collectively lobby the government to implement exchange rate policies that suit their interests. Hence, as suggested by the result in part (ii) of Proposition 1, the concentration of net foreign currency liabilities of few private banks allows these banks to (i) "politically outmaneuver" the larger number of non-concentrated firms in the economy and (ii) *credibly* exert lobbying pressure on the government to shift toward and maintain an overvalued exchange rate. This will drive the government to more heavily weigh the concentrated private banks interests relative to the larger set of unorganized

nonfinancial firms ($\lambda_g(u_b) > 0$ and $(1 - \lambda_g)(u_i) < 0$ in L_G when $\phi \longrightarrow 1$ and $|D_f - l_f| > 0$).

Some examples support the claims posited in the preceding paragraphs. For instance, the Hirschman-Herfindahl index of the concentration of net foreign currency liabilities held by domestic private banks (a commonly used measure of industrial concentration) in Thailand from 1992 to 1997– the years in which Thailand is observed as a democracy –was 0.67; this is fairly high considering that this index ranges from a minimum of 0 to a maximum value of 1. This high concentration facilitated coordination between the domestic private banks in Thailand and gave them sufficient "political leverage" to put pressure on Chuan Leekpai, Thailand's Prime Minister from 1992-1996, to adopt an appreciated value for the Thai baht in international forex markets (Lee 2003; Hall 2005). Likewise, the Hirschman-Herfindahl index of concentration of foreign currency net liabilities held by private banks in South Africa's new democracy during the mid to the late 1990s was as high as 0.62. High foreign currency liability concentration of domestic private banks in South Africa made it easier for these banks to collectively pressure the ANC-led government to maintain an overvalued exchange rate (Clark 1998; Bhinda *et al* 1999). Domestic private banks – characterized by high levels of concentration of net foreign liabilities – in developing democracies like South Korea, Peru and Turkey have consistently lobbied incumbents in their respective country to implement and sustain an overvalued exchange rate.

While private banks that exhibit a sufficiently high level of net foreign liabilities concentration are more likely to lobby elected governments to adopt an overvalued exchange rate, it is worth noting that not all governments respond favorably to this lobbying pressure. Lobbying by the foreign-liabilities concentrated private banks in Thailand mentioned earlier certainly influenced Prime Minister Chuan Leekpai and Thailand's central bank to adopt an overvalued exchange rate during the mid-1990s (Lee 2003; Hall 2005). In contrast, successive governments in South Africa in the previous two decades did not take take steps to appreciate the South Arcian Rand even though the foreign-liabilities concentrated private banks consistently put pressure on them to do so (Clark 1998; Bhinda *et al* 1999). Our data from 51 developing democracies described below also reveals that higher concentration of net foreign currency denominated liabilities held by domestic private banks is positively associated with exchange rate overvaluation in 53% of

these 51 democracies, but not in the remaining 47% of the countries in the sample.

What accounts for the variation mentioned above? In other words, when will concentrated domestic private banks successfully lobby elected governments in developing democracies to adopt and maintain an overvalued exchange rate? The second set of comparative static results derived from our model provide an answer to this question. Specifically, these results suggest that governments in developing country democracies that operate in candidate-centered – but not party-centered – electoral systems will have political incentives to favorably respond to the private banks' "request" for exchange rate overvaluation when the concentration of net foreign currency denominated liabilities held by these banks is sufficiently high. In contrast to party-centered systems, these incentives will encourage the government and monetary authorities in candidate-centered democracies to shift to and maintain an overvalued exchange rate. This result is stated more formally as:

Proposition 2: $Define\ |D_f - l_f| = k.\ \frac{\partial e_G^*}{\partial \phi \partial k} = \frac{\partial e_G^*}{\partial k \partial \phi} > 0\ for\ \lambda_g = \lambda_C. \frac{\partial L_G^*}{\partial \phi \partial k} < 0\ for\ \lambda_g = \lambda_C.$

Proof: See Appendix

To understand the rationale that leads to the prediction in Proposition 2, we first list below and briefly discuss the main candidate-centered and party-centered electoral systems. Doing so helps us explain why the government in candidate-centered systems have incentives to be responsive to the foreign-liabilities concentrated private banks' demand for exchange rate overvaluation, while leaders in party-centered systems will resist it.

To begin with, extant studies on party systems define candidate-centered systems as electoral systems that encourage intra-party competition between political candidates by (i) giving each voter "the option of casting one or more votes directly for candidates" (Samuels 1999, 490), (ii) allowing members from the same party to campaign against each other and (iii) awarding seats to politicians on the basis of their individual vote totals (Carey and Shugart 1995; Hicken 2006). Electoral systems that exhibit the main political features listed above and are thus candidate-centered include the following systems: open-list proportional representation (open-list PR), single nontransferable vote (SNTV), single transferable vote (STV), block-vote (BV),

and single- member district (SMD) plurality systems that use primary elections or which allow multiple candidates from the same party to run in a district (Carey and Shugart 1995; Hicken 2006). These candidate-centered systems are distinct from party-centered (that is, non-candidate centered) systems which – as described below – produce inter-party (as opposed to intraparty) competition and highly centralized parties (Hicken 2006). These party-centered systems include, for example, the following electoral systems: closed-list PR and the SMD plurality with party ballot control (Hicken 2006; Hankla 2006).

Our model suggests that in equilibrium, the institutional features of candidate-centered electoral systems described above generates political incentives for policymakers in the government in these systems to be responsive to the concentrated private banks call for exchange rate overvaluation. To see why, first note that in candidate-centered democracies, the institutional parameter $\lambda_g = \lambda_C$ in the government's loss function. When $\lambda_g = \lambda_C$, intraparty competition emerges as a central feature of the political system and this feature induces policymakers to "cultivate their personal vote" (Hicken 2006: 51) rather than making partisan appeals to broad national constituencies (Samuels 1999; Chang 2005; Hicken 2006). This in turn has the following two political effects in the model which, as discussed below, has direct ramifications for the exchange rate level as well.

First, cultivation of their personal vote drives policymakers in the candidate-centered system to solicit the political and financial support of narrow interest groups[9] such as the small number of concentrated private banks. This is because the policymakers in this case focus on winning and staying in office by providing financial transfers to narrow constituents or by using money to buy votes (see e.g., Chang 2005). To this end, they will therefore seek the resource-rich private banks' financial support to fund financial transfers to certain constituencies. Second, our model reveals that in equilibrium, policymakers in the candidate-centered system will weigh the economic interests of the concentrated private banks more than the interests of the large number of unorganized nonfinancial firms given that they solicit the concentrated private banks' support. This claim which is derived from the model is stated as

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[9]For this claim, also see Chang (2005) and Hankla (2006).

Claim 1: *When $\lambda_g = \lambda_C$, $\lambda_C > 0$ for $\phi|D_f - l_f| > 0$ while $(1 - \lambda_C) < 0$ for $\phi|D_f - l_f| > 0$ in equilibrium.*

The proof for claim 1 is provided in the appendix. A key implication of this claim is that the government in this case will be more susceptible to the lobbying pressure exerted by the foreign liabilities-concentrated private banks who favor an overvalued exchange rate. Such susceptibility will in equilibrium both incentivize and drive the policymakers in the candidate-centered democracy to respond favorably to the private banks' demands for appreciation of the domestic currency. The policymakers' political strategy of being responsive to the concentrated private banks preference for an overvalued exchange rate in candidate-centered democracies is taken into account by the central bank and moreover, it has two consequences for the exchange rate level in these states. The first consequence is that policymakers in this case will be less sensitive to the distributional costs that results from an overvalued exchange rate. Instead our model formally demonstrates that policymakers in the candidate-centered democracy will politically seek to implement exchange rate policies – specifically overvaluation of the exchange rate – that are targeted to satisfy the policy preferences of the foreign liabilities-concentrated private banks. Interestingly, our model further suggests that this particular desire to appreciate the domestic currency will be compatible with the inflation-averse central bank's monetary policy preference $(e_G^* \rightarrow e_{CB}^*$ for $\lambda_g = \lambda_C$ and $\phi|D_f - l_f| > 0)$.[10] One reason for this is because an overvalued exchange rate reduces inflationary pressures and promotes price stability (even though it may dampen growth).

Because the central bank is by construction inflation-averse, it will favorably view the policymakers political goal of appreciating the domestic currency given that currency appreciation helps the central bank to dampen inflationary pressures in the economy. Compatibility with the central bank's monetary policy preference will thus make it easier for policymakers in a candidate-centered system to adopt an overvalued exchange rate when the concentration of foreign currency denominated liabilities held by private banks is sufficiently high. The second consequence of the policy maker's strategy (in candidate-centered systems) of being more re-

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[10]We briefly prove this result in the appendix as well.

sponsive to the concentrated private banks' interests it that they will be less concerned about the longer term adverse consequences of overvaluation such as trade and current account deficits. Rather in terms of their intertemporal trade-off, policymakers in candidate-centered systems will develop a strong short-term bias toward reaping the political windfall and rent-seeking benefits of exchange rate overvaluation. This will further incentivize them to move to and maintain an overvalued exchange rate.

A brief examination of some examples broadly corroborates the claims posited above. For instance, consider a candidate-centered democracy like the Philippines where politicians have incentives to cultivate a personal vote and cater to the demands of "special interests" that includes interests groups organized by domestic private-sector banks (Hicken 2007; Hicken and Simmons 2008). In addition to the incentives faced by politicians in the Philippines, it is worth emphasizing here that the moving average of the Hirschman-Herfindahl index of net foreign-currency liabilities concentration of domestic private banks in the country from 1991 to 1997 was as high as .62. This high concentration in turn help domestic privately-owned commercial banks in the Philippines to "collectively lobby" and exert pressure on President Ramos' government to appreciate the Philippine peso. Since politicians in Philippines' candidate-centered democracy cater to "special interests" like the concentrated private banks mentioned, it is not surprising that the Ramos-led government acquiesced to the pressure exerted by domestic private banks and subsequently took concrete steps to appreciate the Philippine peso (Lee 2003; Hall 2005).A second example that supports the model's predications posited above is Sri Lanka which is also candidate-centered as it employs the open-list PR electoral rule for electing candidates to the country's national assembly (Coomaraswamy 2003). After the concentration of the net foreign liabilities held by domestic private banks in Sri Lanka increased significantly in the mid-to-late 1990s,[11] these banks were able to undertake the necessary collective action required to first lobby President Premadasa and then President Chandrika Bandaranaike Kumaratunga to appreciate

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[11]The Herfindahl index of the concentration of net foreign currency denominated liabilities held by domestic private banks in Sri Lanka from 1994 to 1998 is approximately 0.62 which is high. The Herfindahl index of concentration in this case has been calculated based on data drawn from Central Bank of Sri Lanka *Review of the Economy* (1998); Seelanatha 2007; and the Bankscope Database.

the Sri Lankan Rupee.[12] Since policymakers in Sri Lanka's candidate-centered democracy rely on intermediaries like domestic private banks for funding their electoral campaigns, they responded to the private banks' demands by taking concrete steps to appreciate the Sri Lankan rupee in forex markets. Hence put together, these examples and the comparative static results that were discussed above lead to the following testable hypothesis:

Hypothesis 1: *Higher concentration of the net foreign-currency denominated liabilities held by domestic private banks will lead to exchange rate overvaluation in developing country democracies that are candidate-centered.*

Similar to their counterparts in candidate-centered systems, foreign-currency net liabilities concentrated private banks in party-centered democracies will also have economic incentives to lobby their government to appreciate the domestic currency. Yet, *unlike* policymakers in candidate-centered systems, we claim that two key features of party-centered electoral systems (e.g. closed-list PR system) will encourage leaders from these systems to resist such lobbying pressure from the private banks. The first feature is that party leaders in party-centered systems "control nominations or access to the party label" (Hicken 2006: 51). This produces strong, centralized parties where party leaders exert substantial control over individual party members who "toe the party line and adopt a party-centered strategy" (Hicken 2006: 51). Second, scholars find that high party centralization and control of party members by party leaders work together to bind the fates of politicians and parties in party-centered systems to that of the national electorate rather than to narrow interests (Nielsen 2003; Hankla 2006). Parties and politicians in party-centered democracies are thus disproportionately accountable to the national electorate as a whole rather than to narrow interest groups.Our model suggests that the two aforementioned features of party-centered systems leads to an outcome where the government in a party-centered democracy will *not* adjust (i.e. will not overvalue) the exchange rate level even when the foreign liabilities concentrated private banks raise their demand for domestic currency appreciation. This result is stated more formally as:

Claim 2: *Recall that $|D_f - l_f| = k$. For $\lambda_g = \lambda_P$, $e_G \cong e_G^*$ when $\phi \to 1$ and $k > 0$.*

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[12]For this see Baudel 2010; Seelanatha 2007.

The reasons that explain why the main institutional features of party-centered systems described earlier drive policymakers in these systems to resist demands from the concentrated private banks for appreciating the domestic currency are as follows. Specifically, since party-centric dynamics make politicians in party-centered systems accountable to a national electorate, the electoral benefits of aiding narrow interest groups such as the foreign-liabilities concentrated public sector banks are low for politicians and parties in these systems (Hankla 2006). In equilibrium, policymakers in party-centered systems will thus lack the overriding political incentives to cater to the private banks' demands for shifting to and sustaining an overvalued exchange rate. Hence, unlike policymakers in candidate-centered systems, the government in party-centered democracies will place more weight toward preventing the broader distributional costs of overvaluation over and above the interests of the private banks that are characterized by a high concentration of net foreign-currency denominated liabilities. This weaken the private banks' ability to influence the real exchange rate level.

Furthermore, since politicians in party-centered democracies adopt a party-centered strategy, they focus on winning elections by making broad partisan appeals to the national electorate rather than soliciting the support of narrow constituencies (Hicken 2006; Hankla 2006). Seeking to win elections by appealing to a national electorate drives the government in the model – in the context of a party-centered system – to ensure that the output level y converges to the target level $\overline{y}$ in order to increase growth and employment opportunities for workers (voters) in the small-open economy. Hence when $y \longrightarrow \overline{y}$, it is likely that the government in the party-centered system will reap electoral dividends. Note, however, that to ensure that $y \longrightarrow \overline{y}$, policymakers in a party-centered system will be compelled to *not* overvalue the exchange rate as an overvalued exchange rate depresses the output level and thus leads to a deviation of output y *below* the target level of $\overline{y}$. If $y < \overline{y}$, then the government in the party-centered system will be more susceptible to broad-based electoral punishment that will jeopardize its survival in office. This provides an added *incentive* for the government to *not* appreciate the domestic currency in spite of demands to do so from the concentrated private banks. Thus, as a corollary to hypothesis 1, we anticipate form the preceding discussion that policymakers in party-centered democracies

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will be less inclined to overvalue the exchange rate even if the concentrated private banks put pressure on them to do so.

3   Sample, Dependent Variable, Statistical Methodology

We compile a time-series cross-sectional (TSCS) sample of 51 developing countries that are observed as democracies during the 1988 to 2007 period – listed in table 1 – to test hypothesis 1 since this hypothesis focuses on democracies in the developing world. The size and temporal range of our sample is determined by the availability of data to particularly operationalize the independent variables (described below) of interest. Note that the democracies in our sample satisfy Cheibub *et al*'s (2010) criteria for a democracy which are: (i) the chief executive and legislature must be directly elected; (ii) there must be more than one party in the legislature and (iii) incumbents must allow a lawful alternation of office if defeated in elections. The results reported below remain robust if countries are coded as democracies when their Polity score is greater than or equal to +4, +5 and +6 in the -10 (full autocracy) to +10 (full democracy) Policy scale. To conserve space, we focus on reporting the results that we obtain from our country-year sample of developing democracies that satisfy Cheibub *et al's* (2010) criteria for a democracy.

<<Insert Table 1 about here>>

We need to construct a measure of the level of the real exchange rate for each country-year to operationalize the dependent variable – that is real exchange rate (RER) overvaluation – in hypothesis 1. We use two alternative measures that are widely used in extant studies to operationalize real exchange rate over/undervaluation (for these studies see e.g., Dollar 1992; Easterly 2001; Rodrik 2003). The first is a measure of RER overvaluation – which we label as *overvaluation* – developed by Rodrik (2003). Specifically, to develop his measure of RER overvaluation, Rodrik (1993) used data from Penn World to construct an index of the real exchange rate which is defined as RER = ln(exchange rate/PPP), where exchange rate refers to the nominal exchange rate, and PPP is a purchasing power parity conversion factor, also

known as a GDP deflator, which measures inflation by dividing nominal GDP by real GDP. When constructing a measure of real exchange rate overvaluation, researchers need to adjust the RER index measure defined above to account for the possibility that equilibrium real exchange rate tends to be more appreciated in countries with higher per capita income (Calvo et al 1993; Easterly 2001; Rodrik 2003). To account for this possibility, Rodrik estimates the following model via OLS:

$$RER_{i,t} = \alpha + \beta(GDPpercapita)_{i,t} + T_t + \varepsilon_{i,t} \tag{8}$$

where GDP per capita$_{i,t}$ is real GDP per capita per country-year, T_t is a year fixed effect, and $\varepsilon_{i,t}$ is the error term. *Overvaluation* is defined as the difference between the actual real exchange rate and the predicted value, which proxies for the equilibrium real exchange rate. As shown by Rodrik (2003), the measure of *overvaluation* described above is particularly useful for comparing the real exchange rate level across countries and over time.

The alternative measure of the dependent variable that we employ was developed by Dollar (1992) and has been used extensively by economists including Easterly (2001) and Acemoglu *et al* (2003). This variable (labeled here as *RER overvaluation*) is the logged difference between the RER—defined as the nominal exchange rate multiplied by the ratio of U.S. and home-country consumer price indices—and its fitted value, which is obtained by regressing the RER on per capita income, per capita income squared, and regional dummies as explanatory variables.[13] *RER overvaluation* is also characterized by substantial cross-sectional and temporal variation which provides us with sufficient leverage to test our main hypothesis.

We evaluate hypothesis 1 by employing a variety of statistical models to ensure that our results are econometrically robust. Since we use a TSCS sample in which the dependent variable (equity restriction) is continuous, we first test hypothesis 1 in a TSCS regression model that is estimated with the lag of the dependent variable, country and time (i.e year) fixed effects and panel corrected standard errors (PCSEs) which are adjusted to correct for heteroskedasticity and contemporaneous correlation (denoted as xtpcse model). Second, we also test hypothesis 1 by

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[13]This specification accounts for the possibility that countries with higher GDP per capita tend to have a more appreciated equilibrium RER.

using Pesaran *et al's* (1999) Pooled Mean Group (PMG) estimator that allows the short-term parameters to differ between groups while imposing equality of the long-term coefficients mac between countries. One advantage of the PMG is that it can allow the short-run dynamic specification to differ from country to country while making the long-run coefficients constrained to be the same. Furthermore, unlike the dynamic fixed effects model, the PMG estimator highlights the adjustment dynamic between the short-run and the long-run. The reasons for assuming that the short-run dynamics and error variances should be the same is less compelling. Not imposing equality of short-run slope coefficients allows the dynamic specification to differ across countries. Therefore, the long-run relationship between real exchange rate overvaluation and for example log GDP is expected to be identical from country to country but the short-run coefficients are expected to be country-specific.

The PMG estimator is defined and constructed as a combination of two models: the Autoregressive distributed lag, ARDL (p, q) model and an error correction specification. The autoregressive distributive lag (ARDL) dynamic panel specification is given by,

$$y_{i,t} = \sum_{j=1}^{p} \beta_{ij} y_{i,t-j} + \sum_{j=1}^{p} \delta'_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \tag{9}$$

where $i = 1, 2, 3...n$ are the countries, $t = 1, 2, ...T$ is time (years), X_{it} is a vector of explanatory variables with δ as the corresponding vector coefficients, β_{ij} are the scalars and μ_i is the group-specific effect. Time trends and other xed regressors are also included. If the variables in the ARDL specification are, for example, $I(1)$ and cointegrated, then the error term is an $I(0)$ process for all i.Thus it is common to reparametrize the ARDL model into the error-correction equation,

$$\Delta y_{it} = \phi_i(y_{i,t-1} - \theta' X_{it}) + \sum_{j=1}^{p-1} \beta_{ij}^* \Delta y_{i,t-1} + \sum_{j=1}^{q-1} \delta_{ij}'^* \Delta X_{i,t-j} + \mu_i + \varepsilon_{it} \tag{10}$$

where $\phi_i = -(1- \sum_{j=1}^{p} \beta_{ij}), \theta_i = \sum_{j=0}^{q} \delta_{ij}/(1 - \sum_k \beta_{ik}), \beta_{ij}^* = - \sum_{m=j+1}^{p} \beta_{im}$, and $\delta_{ij}'^* = - \sum_{m=j+1}^{q} \delta_{im}$.The choice of the lag length is based on the literature on the relationship between real exchange rate overvaluation and the variables of interest are confirmed by the Akaike Information

Criterion (AIC) and Schwarz Bayesian Criterion (SBC) and based on this criteria, we use a maximum of one lag for all the variables.Third, we further assess the econometric robustness of our results by estimating the following additional model to test hypothesis 1: the dynamic panel model estimated via the "system-GMM" approach that corrects for potential endogeneity problems between the dependent and independent variables of interest.

3.1 Independent and control variables

We need to interact the following two independent variables to test the interactive effect posited in hypothesis 1: the concentration of foreign-currency denominated liabilities held by domestic private banks for each country-year and a dummy variable for countries in our sample that are candidate-centered systems. We first describe the operationalization of the latter independent variable which is labeled as *candidate-centered*. Following research on electoral systems, we suggested in the paper's theoretical section that democracies that employ any of the following four electoral rules are by definition candidate-centered: open-list PR, SNTV system, STV system, SMD plurality system with primary elections, and SMD plurality systems that allow multiple candidates from the same party to run in a district. We thus code the binary variable *candidate-centered* as 1 for country-years that employ any of the four electoral rules listed above. Countries that do not use any of these four electoral rules (i.e. countries that are not candidate-centered) but rather employ party-centered electoral rules (e.g. the closed-list PR system) are therefore the reference category.[14]

We operationalize the concentration of net foreign currency denominated liabilities (in short, net foreign liabilities) held by domestic private banks by computing the 0-1 Hirschman-Herfindahl index of concentration of liabilities of private-sector banks for each country-year. This measure is widely used by scholars of finance to operationalize the concentration of foreign currency denominated net liabilities of domestic private banks in developing countries . Following the lead of these scholars, the Hirschman-Herfindahl index of net foreign currency denominated

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[14]These party-centered democracies in our sample do not use the candidate-centered electoral systems listed above but rather employ the following party-centered electoral rules: the closed-list PR system, ordered-list PR system and SMD plurality with party ballot control (Carey and Shugart 1995; Hicken 2006).

liabilities of domestic private-sector banks – which we label as *foreign liability concentration* – is operationalized (after dropping the parameter t for notational convenience) as $\sum_{i=1}^{n} f_i^2$ where f_i is the share of each privately-owned bank's net foreign currency denominated liabilities in the total net foreign currency denominated liabilities in the economy for each country-year. Note that the net foreign currency denominated liabilities of the domestic private banks is given by the difference between their foreign plus domestic liabilities denominated in foreign-currency [15] and foreign plus domestic assets denominated in foreign-currency[16]; that is, their net foreign currency denominated liabilities is = foreign currency foreign liabilities + foreign currency domestic liabilities - foreign currency foreign assets - foreign currency domestic assets. The Hirschman-Herfindahl index is thus the sum of the squared share of the net foreign currency denominated liabilities . The *foreign liability concentration* variable ranges from a minimum value of 0 to a maximum value of 1. To test the interactive effect posited in hypothesis 1, we interact *foreign liability concentration* with *candidate-centered*. We then introduce *foreign liability concentration* x *candidate-centered* in the statistical model to test hypothesis 1 and control for the individual components of this interaction term.

For robustness tests, we use an alternative measure for the concentration of net foreign liabilities of private-sector banks (labeled as *foreign liability index*) that is also drawn from the finance literature. This alternative measure is operationalized for each country-year as,

$$foreign\ liability\ index\ = f_1 + \sum_{i=1}^{n} f_i^2 (1 + (1 - f_i)) \tag{11}$$

This expression is equal to the sum of the share of net foreign currency liabilities held by the largest private-sector bank (f_1) in the economy plus the sum of the squared shares of net foreign currency liabilities of domestic private banks (f_i^2), weighted by a multiplier reflecting the propor-

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[15]The sum of foreign currency foreign and domestic liabilities include the following components: all foreign currency claims of nonresidents towards the domestic private banks, foreign currency deposits of nonresidents, foreign currency domestic liabilities include all foreign currency claims of residents towards the domestic private banks (such as foreign currency deposits of residents), and foreign currency lending to households and non-financial firms.

[16]Foreign currency foreign and domestic assets include the following components: all foreign currency claims of domestic private banks towards nonresidents, such as deposits, or loans in foreign currencies, and all foreign currency claims of these banks towards residents, such as foreign currency loans.

tional size of foreign currency denominated liabilities in the rest of the banking industry. To test hypothesis 1 by using this alternative measure, we interact *bank liability index* with *candidate-centered*. We then introduce *foreign liability index* x *candidate centered* in the specification to test the hypothesis and control for the individual components of this interaction term. We anticipate from hypothesis 1 that *foreign liability concentration* x *candidate-centered* as well as *foreign liability index* x *candidate centered* will have a statistically positive effect on *overvaluation*. Data to operationalize concentration and bank index has been drawn from several primary and secondary sources including the *Bankscope* database, the *Compustat Global* database, Haver Analytics, Bertay *et al* (2012), annual reports on the volume of assets and liabilities (including foreign assets and liabilities) in financial sector published by Central Banks of various countries, and Ranciere *et al* (2010).

We include several control variables in the specification. With respect to economic controls, we first control for *log GDP per capita* and *log GDP* studies suggest and find that that these economic variables may influence the degree of real exchange rate appreciation (see e.g. ; Edwards 1989; Calvo *et al* 1993; Obstfeld 2008; Steinberg 2012). Our models also include *terms of trade*, *log* (foreign exchange) *reserves* and *trade openness*[17] as numerous economists find that each of these three variables influences the real exchange rate level in particularly developing countries (e.g. Hinkle and Montiel 1999; Obstfeld 2008; Rodrik 2008). Chinn and Ito's *capital account openness* index is included in the specification as capital account controls makes it more feasible for governments to maintain misaligned exchange rates (El Badawi and Soto 2008; Rodrik 2008; Steinberg 2012). We include foreign currency denominated debt of public-sector and private sector firms (this excludes domestic private commercial banks) as a percent of GDP (labeled *currency debt*) in the specification. This is because researchers suggest that higher aggregate levels of foreign currency denominated debt held by firms in developing countries may also lead to real exchange rate overvaluation (Walter 2008, 2014; Steinberg and Walter 2014).

We control for the size of the manufacturing sector as a percent of GDP (labeled *manufacturing sector*) as previous studies suggest that this variable influences exchange rate policy in

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[17]Operationalized as the sum of exports and imports as a share of GDP.

developing countries (e.g. Frieden *et al* 2010; Singer 2010). The size of the service sector as a percent of GDP (*service sector*) is included as Frieden (1991) predicts that the service sector (the main nontradable sector) is likely to be associated with appreciated exchange rates.[18] A dummy variable for countries with a de facto fixed exchange rate regime (labeled as *fixed exchange rate*) is added as a fixed exchange rate regime tends to be positively associated with an overvalued exchange rate. We employ Reinhart and Rogoff's (2004) coarse 5-point scale of de facto exchange rate regimes, which has been updated till 2007 by Reinhart and Rogoff, to operationalize the fixed exchange rate dummy.[19] Lastly, *veto players* is added to the specification as recent research suggests that this variable may be positively associated with exchange rate overvaluation (Steinberg 2012). A linear time trend is included as scholars claim that there has been a trend in favor of removal of equity market controls by developing states in the previous three decades (Calvo *et al* 1993; El Badawi and Soto 2008).

4 Results

Model 1 presents the results from the specification estimated with the lag of the dependent variable, country fixed effects and PCSEs. The results from the Pesaran *et al* (1999) Pooled Mean Group (PMG) estimator – this includes the estimated long-run and short-run coefficients – are reported in model (country fixed effects are included in this model). These two models include all the control variables discussed above. The estimated effect of *foreign liability concentration* x *candidate-centered* on *overvaluation* is positive and significant at the 1% level in models 1 and 2. We also find (but do not report to save space) that the statistical effect of the aforementioned interaction term on overvaluation is positive and highly significant in a model estimated with the lagged dependence variable, PCSEs and random effects. These results statistically corroborate hypothesis 1. With respect to the individual components of *foreign liability concentration* x

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[18]The data to operationalize *log GDP per capita, log GDP, terms of trade, trade openness, service sector, manufacturing sector*, and *log reserves* is drawn from the World Bank (2012) and the IMF (2012).

[19]From this 5-point scale, we discard observations that are classified as "freely falling" and those for which parallel market data are missing. We then classify the remaining observations as "fixed" (pegs and limited flexibility) or "floating" (managed float and free floating); the dummy variable fixed exchange rate is coded as 1 for observations that are classified as "fixed".

candidate-centered, we find that the estimate of the individual *foreign liability concentration* measure and the *candidate-centered* dummy variable are each statistically insignificant in models 1 and 2. Thus it is indeed the interaction of the two independent variables—rather than each variable individually—that has a statistically significant positive effect on *overvaluation*.

<<Insert Table 2 about here>>

We conduct two empirical exercises to derive and analyze the substantive effect of the statistical results presented above. For the first exercise, we use the estimates from model 1 to compute with 95% confidence intervals the marginal effect of *foreign liability concentration* on *overvaluation* for candidate-centered developing democracies across the entire range of the *foreign liability concentration* measure in the sample. The result from this exercise, which is illustrated in figure 2, demonstrates that when the *candidate-centered* dummy is set equal to 1 (indicating a candidate centered democracy in our sample) and all other variables in the specification are held at their sample mean, *foreign liability concentration* has a sizable positive effect on the degree of *overvaluation*. In particular, this figure indicates that a one standard deviation increase in *foreign liability concentration* from its mean in the sample yields approximately a 12% increase in the degree of *overvaluation* for candidate-centered democracies. This substantive effect is statistically significant at the 95% confidence level which indicates that there exists strong statistical and substantive support for our hypothesis.

For the second exercise, we compute and illustrate in figure 3 the marginal effect of foreign debt concentration on overvaluation concentration for party-centered democracies across the entire range of *foreign liability concentration* with 95% confidence intervals. Figure 4 shows that for party-centered democracies in the sample, an increase in the level of *foreign liability concentration* from its minimum to its maximum level not only has a statistically insignificant but also a substantively negligible (almost zero) impact on overvaluation. These two figures confirm our claim that greater concentration of foreign-currency denominated liabilities held by domestic private commercial banks significantly (in the statistical sense) increases the degree of exchange rate overvaluation in candidate-centered but not in party-centered developing democracies.

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As an initial test of robustness, we checked whether the results reported above hold when we replace *foreign liability concentration* x *candidate-centered* with *foreign liability index* x *candidate-centered* in the specification and control for the individual components of the latter interaction term. The estimated effect of *foreign liability index* x *candidate-centered* on *overvaluation* is positive and highly significant (see model 3). We find mixed results for the control variables in the specification. For instance, *log GDP*, *capital account openness* and the *fixed exchange rate* are each consistently insignificant in the specifications in table 2. The estimate of *log reserves* and *terms of trade* have the anticipated positive sign and are each significant. *Service sector* is positive and significant which is consistent with Frieden's (1991) claim that this nontradable sector will be associated with an overvalued exchange. *Manufacturing sector* has the predicted positive sign but is insignificant in most of the specifications. The coefficient of *currency debt* has the predicted positive but is insignificant in the specifications. The estimate of *veto players* is positive and significant at the 10% level in the models in table 2. Finally, the lag of the dependent variable is positive and significant in the empirical models.

For the first robustness test, we checked and found that the effect of *foreign liability concentration* x *candidate-centered* on *RER overvaluation* – the alternative measure of the dependent variable – is positive and significant (see model 4, table 3). For the second robustness test, we include the following control variables which, according to extant research, influences the exchange rate level in developing economies: *urbanization*, the dummy variable *IMF program* for countries observed under an IMF program, and *government consumption* (as percent of GDP). The estimated impact of *foreign liability concentration* x *candidate-centered* on *overvaluation* remains positive and significant in the statistical specification that include the additional controls listed above (see model 5). *IMF program* and *government consumption* are each statistically insignificant, while *urbanization* is weakly significant in model 7.

We estimated more specifications after adding the following variables which, according to extant research, influences the degree of exchange rate misalignments in developing countries:

income inequality, *foreign aid* from OECD countries, and the level of *agricultural exports* (as percent of GDP).[20] We do not report the results obtained after including these additional controls to save space, but our main results were unchanged. Diagnostic tests conducted for the empirical models reveal that none of the models suffers from severe multicollinearity, serial correlation, and that the residuals are normally distributed.[21] Additionally, F-statistics from Hurlin and Venet's (2003) granger causality test for the presence of endogeneity in panel data indicates that there is no endogeneity problem between *overvaluation* and each of the two independent variables: *candidate-centered* and *foreign liability concentration*.

Yet we further checked whether the results are robust to potential endogeneity problems by testing hypothesis 1 via a "system-GMM" model that combines a regression in first-differences and a regression in levels; estimating the two equations (levels and differences) in a single system leads to consistent and efficient estimates (Blundell and Bond 1998). The system-GMM model corrects for potential endogeneity by using moment conditions to derive a set of valid instruments for the potentially endogenous explanatory variables. It also corrects for serial correlation, controls for country fixed effects and accounts for heteroskedasticity via White's heteroskedasticity robust standard errors. *Foreign debt concentration* x *candidate-centered* remains positive and highly significant in the system-GMM model (see model 6, table 3). The disturbances from the system-GMM model show no sign of serial correlation, and the Sargan test result obtained from this model fails to reject the null hypothesis of the validity of the instruments.

5   Conclusion

Why do many democratic developing countries overvalue their exchange rates while others do not? Our paper develops an open-economy monetary policy game-theoretic model to explain this variation. The model suggests that high levels of concentration in net foreign currency de-

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[20]See e.g., Steinberg 2012; El badawi and Soto 2008.

[21]Diagnostic tests reveal that none of the models suffer from severe multicollinearity or serial correlation, and that the residuals are normally distributed. For instance, VIF values indicate that multicollinearity is not a problem. The Breusch-Godfrey LM test fails to reject the null of no serial correlation, the Jarque-Bera test shows that the residuals are distributed normally.

nominated liabilities held by domestic private banks in developing democracies leads to exchange rate overvaluation in candidate-centered (but not party-centered) democracies. We test this hypothesis on a TSCS sample of 51 developing democracies (1988-2007) by assessing the interactive effects of (i) candidate-centered systems and (ii) the concentration of foreign-currency denominated liabilities held by domestic private banks on real exchange rate overvaluation. Across a wide variety of variable operationalizations and model specifications, the statistical results provide robust support for our main hypothesis.

Our findings contribute to the literature in several respects. Firstly, scholars often focus on the influences of rent-seeking interest groups as an explanation for the preponderance of overvalued exchange rates in the developing world (e.g., Bates 1981; Frieden 1991; Steinberg 2008). A central theoretical contribution of the current paper is that it examines how candidate-centered (as opposed to party-centered) electoral systems in which policymakers in developing democracies operate are a critical factor that influences policymakers' incentives to be responsive to the preferences of these groups—and to domestic private banks in particular—that favor overvalued exchange rates. Focusing on how electoral institutions shape the responsiveness of policymakers to pressure from private banks provides us with more theoretical leverage to understand when politicians in developing democracies will maintain overvalued exchange rates. It also improves our understanding of *when* the preferences of private banks to keep exchange rates overvalued will translate into a policy outcome that they favor.

Secondly, while we build on extant research into the relationship(s) between financial intermediaries and monetary policy (e.g., Frieden 1991; Calvo 2005; Adrian and Shin 2010), we emphasize here that two key factors matter for the preferences and behavior of these financial intermediaries in the issue area of exchange rate overvaluation specifically: whether the financial intermediaries in question are domestic private banks and the concentration in net foreign currency denominated liabilities held by these banks. These points of emphasis are substantively important as they help us to understand which domestic financial intermediaries have the capacity to successfully exert pressure on elected politicians to implement developmentally disadvantageous monetary policies such as exchange rate overvaluation. We also further develop

detailed and nuanced measures of the concentration in net foreign currency liabilities held by domestic private banks to carefully test our main theoretical claims. These measures may be useful for future research on the politics of financial market and exchange rate policies as well as outcome in forex markets.

Two key policy lessons emerge from this study. First, it is plausible that policymakers in developing democracies may find it challenging to reduce high levels of net foreign currency liabilities among private banks, as our research suggests that when net foreign currency liabilities are concentrated among a small number of domestic private banks, these intermediaries will possess substantial political and economic leverage. We believe, however, that policymakers in developing democracies—and lending agencies such as the IMF—should nevertheless seek to reduce this from of net liability concentration. Doing so will help to improve the competitiveness of the domestic private banking sector while curtailing the potential deadweight losses that occur when small groups of influential private banks focus on rent-seeking. Second, our results also suggest that it might be politically rational for elected policymakers in the developing world to provide compensation ex ante to domestic groups such as private banks that "lose" from exchange rate undervaluation. This will provide democratic governments with more agency to implement policy instruments that allow them to maintain undervalued exchange rates which, in turn, will better foster long-term economic development (Rodrik 2008).

This paper also gives rise to several potential avenues for future research. For example, it might be interesting to analyze whether, and under what institutional settings, the interaction between politicians and domestic banks affects more indirect forms of currency intervention such as sector or industry specific capital controls. Valuable theoretical insights may also be gained by analyzing how attempts to maintain overvalued exchange rates by private banks in developing democracies may affect the likelihood of currency crises in these states. We hope that our study will facilitate future research in these and related issue-areas.

6 Appendix

Proofs

Proof of Lemma 1: From equation (4), firm i will borrow l_f from the private banks if $\theta_i \overline{y} + (1 - \theta_i)\underline{y} - Rl_f e - c_i \geq 0$ which leads to $\theta_i \geq \frac{l_f Re - c_i - \underline{y}}{\overline{y} - \underline{y}}$ and thus $\widehat{\theta} = \frac{l_f Re - c_i - \underline{y}}{\overline{y} - \underline{y}}$ where $\widehat{\theta}$ is the critical value of θ for which firm i borrows l_f. The private banks will choose R to maximize their expected profit function in equation (5). The optimal solution for R from (5) is $R^* = \frac{\overline{y}}{2\phi l_f e}$. Substituting R^* and $\widehat{\theta}$ into (5) leads to the private banks expected profit, $E(\widehat{\pi}_b) = \frac{\overline{y}}{4\phi} - (1 + r_f)\phi e D_f$. When the government seeks to adjust the exchange rate level, G will set the exchange rate level such that it minimizes its loss function in equation (3) and while minimizing its loss function, G will also account for $E(\widehat{\pi}_b)$ (weighted by λ_g) and $\widehat{\theta}$ (weighted by $(1 - \lambda_g)$). Substituting the Phillips curve in equation (2) in the government's loss function in (3), substituting $E(\widehat{\pi}_b)$ (weighed by λ_g) and $\widehat{\theta}$ (weighed by $(1 - \lambda_g)$) in (3), and then minimizing the government's loss function for a given level of expectation yields the optimal adjustment of the exchange rate level by G in equilibrium:

$$e_G^* = \frac{1}{1 + \beta_g \alpha^2}[e_{t-1} + \beta_g \alpha^2 e^e - \beta_g \alpha(u - \overline{y})] + \frac{Rl_f(1 - \lambda_g)}{(\overline{y} - \underline{y})} + \lambda_g \phi D_f(r_f + 1) \qquad (12)$$

Substituting the Phillips curve in equation (2) in the central bank's loss function in (6) and then minimizing the loss function in (6) yields $\frac{\partial L_{CB}}{\partial e} = e + \alpha\gamma[\alpha(e - e^e) + u - \overline{y}]^2$; from this expression we obtain the optimal adjustment of the exchange rate level by the central bank in equilibrium $e_{CB}^* = \alpha\frac{[\alpha e^e - u + \overline{y}\gamma]}{1 + \gamma\alpha^2}$. The interaction between the nonfinancial firms, the private, G and the central bank is a sequential move game of complete and perfect information. Hence using backward induction and substituting e_G^* and e_{CB}^* into $E(\widehat{\pi}_b)$ – and assuming that the private banks weigh e_G^* with $\mu \in [0, 1]$ and weigh e_{CB}^* with $(1 - \mu)$– leads to the private banks' subgame-perfect equilibrium level of expected profit: $E(\pi_b^*) = \frac{\overline{y}}{4\phi} - (1 + r_f)\phi[\mu e_G^* + (1 - \mu)e_{CB}^*]D_f$. Likewise, using backward induction, the subgame-perfect equilibrium critical value of θ at which the firms borrow l_f from the private banks (and given that the firms also incorporated the weighted average of e_G^* and e_{CB}^* is $\widehat{\theta} = \frac{l_f R[\mu e_G^* + (1 - \mu)e_{CB}^*] - c_i - \underline{y}}{\overline{y} - \underline{y}}$.

Proof of Proposition 1: Let $\mu e_G^* + (1 - \mu)e_{CB}^*$ in $E(\pi_b^*)$ and $\widehat{\theta}$ be defined as e^* (for notational convenience). Recall from Lemma 1 that for $\theta_i \in [0, 1]$, the nonfinancial firms will borrow l_f from the private banks when $\widehat{\theta} \geq \frac{l_f R[\mu e_G^* + (1 - \mu)e_{CB}^*] - c_i - \underline{y}}{\overline{y} - \underline{y}}$ which (in this case) can be rewritten as $\widehat{\theta} \geq \frac{l_f Re^* - c_i - \underline{y}}{\overline{y} - \underline{y}}$. This $\Longrightarrow$ the nonfinancial firms will *not* borrow l_f from the private banks when $\widehat{\theta} \leq \frac{l_f Re^* - c_i - \underline{y}}{\overline{y} - \underline{y}}$. Let $[\overline{\theta}, \widehat{\theta})$ be the set of nonfinancial firms in the $\theta_i \in [0, 1]$ continuum for whom $\overline{\theta} \leq \frac{l_f Re^* - c_i - \underline{y}}{\overline{y} - \underline{y}}$ and will therefore not borrow l_f from the private banks. Hence $(\widehat{\theta}, 1]$ is the set of nonfinancial firms in $\theta_i \in [0, 1]$ for whom $\widehat{\theta} \geq \frac{l_f Re^* - c_i - \underline{y}}{\overline{y} - \underline{y}}$ and will therefore borrow l_f. Given $[\overline{\theta}, \widehat{\theta})$ and $(\widehat{\theta}, 1]$, the realized profit of the private banks from foreign currency lending is from equation

(x) therefore

$$\widehat{\pi}_b = \int_{\underline{\theta}}^{\widehat{\theta}} (\theta\overline{y})h(\theta)d\theta + \int_{\widehat{\theta}}^{1} \phi l_f Re^* h(\theta)d\theta - (1+r_f)\phi e^* D_f \tag{13}$$

where $\widehat{\theta} \geq \frac{l_f Re^* - c_i - y}{\overline{y} - \underline{y}}$ and $\overline{\theta} \leq \frac{l_f Re^* - c_i - \underline{y}}{\overline{y} - \underline{y}}$. Given that $\theta_i \tilde{} U[0,1]$, we obtain from the above expression

$$\widehat{\pi}_b = \frac{\overline{y}}{2}(\widehat{\theta}^2 - \overline{\theta}^2) - (1 - \widehat{\theta}^2)\phi l_f Re^* h(\theta)d\theta - (1+r_f)\phi e^* D_f \tag{14}$$

Substituting $\widehat{\theta} \geq \frac{l_f Re^* - c_i - y}{\overline{y} - \underline{y}}$, $\overline{\theta} \leq \frac{l_f Re^* - c_i - \underline{y}}{\overline{y} - \underline{y}}$ and $R^* = \frac{\overline{y}}{2\phi l_f e^*}$ into this equation, we get

$$\widehat{\pi}_b = \frac{\overline{y}}{2}\left[\left(\frac{e^*}{e^*}\right) - \frac{1}{2}\left(\frac{e^*}{e^*}\right)^2\right] + \left[1 - \frac{e^*}{2e^*}\right]\left(\frac{\overline{y}}{2e^*\phi}\right)e^*\phi l_f - \left(\frac{e^*}{e^*}\right)(1+r_f)\phi e^* D_f \tag{15}$$

which after some simplification is equivalent to $\widehat{\pi}_b = \frac{1}{2}\left(\frac{\overline{y}}{2}\right)l_f - (1+r_f)\phi e^* D_f$. Rewriting $\frac{1}{2}\left(\frac{\overline{y}}{2}\right)l_f - (1+r_f)\phi e^* D_f$ as a function of the private bank's net foreign currency denominated liabilities – that is $|D_f - l_f|$ – leads after some algebra to $\widehat{\pi}_b = \frac{4\phi(1+r_f)e^*}{\overline{y}|D_f - l_f|} \cdot \frac{\partial\widehat{\pi}_b}{\partial|D_f - l_f|} > 0$ iff $e^* > 0$, in other words if e_G^* and e_{CB}^* strictly increases. Conversely $\frac{\partial\widehat{\pi}_b}{\partial|D_f - l_f|} < 0$ when e_G^* and e_{CB}^* decreases. To prove that higher concentration of the net foreign currency denominated liabilities (ϕ) held by the domestic private banks allow them to exert more lobbying pressure on the government, we need to show that G weighs the private banks' interest more strongly in its loss function (that is $\lambda_g > 0$) when the concentration of net foreign-liabilities of these banks is high. To this end, recall that $\widehat{\pi}_b = \frac{4\phi(1+r_f)e^*}{\overline{y}|D_f - l_f|}$. Observe that $\frac{\partial\widehat{\pi}_b}{\partial\phi} = \frac{4(1+r_f)e^*}{\overline{y}|D_f - l_f|} > 0$ since $4(1+r_f)e^* > 0$ and $\overline{y}|D_f - l_f| > 0$. Substituting $\frac{\partial\widehat{\pi}_b}{\partial\phi}$ into the government's loss function in (3) leads to

$$L^G = \frac{1}{2}(p_t - p_{t-1})^2 + \frac{\beta_g}{2}(y - \overline{y})^2 + [\lambda_g(\partial\widehat{\pi}_b/\partial\phi) + (1 - \lambda)u_i] \tag{16}$$

Because $\partial\widehat{\pi}_b/\partial\phi > 0$, it follows that $\lambda_g > 0$ as claimed.

Proof of $\frac{\partial\widehat{\pi}_b}{\partial|D_f - l_f|} < 0$ *when* $e_j^* < 0$: Let $e_j^* = e^*$. From $\widehat{\pi}_b = \frac{4\phi(1+r_f)e^*}{\overline{y}|D_f - l_f|}$ it follows that $\frac{\partial\widehat{\pi}_b}{\partial|D_f - l_f|} = \frac{\overline{y}[4(1+r_f)e^*]}{\overline{y}|D_f - l_f|}$. For $\lim e^* \to 0$, $\frac{\partial\widehat{\pi}_b}{\partial|D_f - l_f|} \to 0$ which $\implies \frac{\partial\widehat{\pi}_b}{\partial|D_f - l_f|} < 0$ when $e^* < 0$.

Proof of Proposition 2: In a candidate-centered democracy $\lambda_g = \lambda_C$ and by construction $\lambda_C = 1$. For $\lambda_g = \lambda_C = 1$, it follows that e_G^* in (x) is equal to

$$e_G^* = \frac{1}{1 + \beta_g\alpha^2}[e_{t-1} + \beta_g\alpha^2 e^e - \beta_g\alpha(u - \overline{y})] + \phi D_f(r_f + 1) \tag{17}$$

This equation indicates that in a candidate-centered democracy, the policymakers in equilibrium will focus on ϕD_f (while accounting for $k = |D_f - l_f|$) when adjusting the real exchange rate level. $\frac{\partial e_G^*}{\partial k\partial\phi} = (r_f + 1) > 0$, $\frac{\partial e_G^*}{\partial\phi\partial k} = (r_f + 1) > 0$ and $\frac{\partial e_G^*}{\partial k} = (r_f + 1) > 0$ when $\phi \to 1$ for $\lambda_g = \lambda_C$ as claimed. We next show that L_G strictly decreases in $\phi|D_f - l_f|$ for $\phi \to 1$ when $\lambda_g = \lambda_C = 1$. Plugging e_G^* in (x) in the Phillips curve, we obtain the discretionary level of output in equilibrium after taking

expectations as given $y^* = \frac{1}{1+\beta_g\alpha^2}[\alpha(e-e^e)+\beta_g\alpha^2\overline{y}+u]-\lambda_g\phi D_f(1+r_f)-(1+r_f)\phi l_f$. After collecting terms this expression is given by $y^* = \frac{1}{1+\beta_g\alpha^2}[\alpha(e-e^e)+\beta_g\alpha^2\overline{y}+u]-\lambda_g\phi(1+r_f)(|D_f-l_f|)$. From e_G^* in (x), y^* and the loss function in (3), we find that the government's loss function in equilibrium is equivalent to

$$L_G^* = \frac{1}{1+\beta_g\alpha^2}\left(\frac{\beta_g}{2}\right)[\alpha(e-e^e)+\beta_g\alpha^2\overline{y}-u]^2 - \lambda_g\phi(1+r_f)(|D_f-l_f|) \qquad (18)$$

Let $|D_f-l_f| = k$. The parameter $k > 0$ since $|D_f-l_f| > 0$. In a candidate centered system $\lambda_g = \lambda_C = 1$. Let $\lambda_g = \lambda_C = 1$ and $|D_f-l_f| = k > 0$. Note that $\frac{\partial L_G^*}{\partial\phi\partial k} = -(1+r_f) < 0$ and $\frac{\partial L_G^*}{\partial\phi\partial k} = -(1+r_f) < 0$ as claimed.

Proof of $e_G^* \to e_{CB}^*$ **for** $\lambda_g = \lambda_C$ **and** $\phi|D_f-l_f| > 0$: Because the central bank is by construction inflation-averse, $\gamma \to 0$ in L_{CB} and hence $e_{CB}^* = \alpha\frac{[\alpha e^e-u+\overline{y}\gamma]}{1+\gamma\alpha^2}$. For $\lim\gamma \to 0$, $e_{CB}^* > 0$ which is consistent with $e_G^* > 0$ for $\lambda_g = \lambda_C$ and $\phi|D_f-l_f| > 0$.

Proof of Claim 1: From the proof of Propositions 1 and 2, $\frac{\partial\widehat{\pi}_b}{\partial\phi} > 0$, $\frac{\partial\widehat{\pi}_b}{\partial|D_f-l_f|} > 0$ and $(\frac{\partial\widehat{\pi}_b}{\partial\phi|D_f-l_f|}) > 0$. Substituting $(\frac{\partial\widehat{\pi}_b}{\partial\phi|D_f-l_f|})$ for u_b in L_G for $\lambda_g = \lambda_C$ leads to $L^G = \frac{1}{2}(p_t-p_{t-1})^2 + \frac{\beta_g}{2}(y-\overline{y})^2 + [\lambda_C(\frac{\partial\widehat{\pi}_b}{\partial\phi|D_f-l_f|})+(1-\lambda_C)u_i]$. Given that $(\frac{\partial\widehat{\pi}_b}{\partial\phi|D_f-l_f|}) > 0, \lambda_C > 0$ and when $\lambda_C > 0$, then $(1-\lambda_C) < 0$.

Proof of Claim 2: From Lemma 1, $e_G^* = \frac{1}{1+\beta_g\alpha^2}[e_{t-1}+\beta_g\alpha^2 e^e-\beta_g\alpha(u-\overline{y})]+\frac{Rl_f(1-\lambda_g)}{(\overline{y}-\underline{y})}+\lambda_g\phi D_f(r_f+1)$. When $\lambda_g = \lambda_P$, it follows that $e_G^* = \frac{1}{1+\beta_g\alpha^2}[e_{t-1}+\beta_g\alpha^2 e^e-\beta_g\alpha(u-\overline{y})]+\frac{Rl_f(1-\lambda_P)}{(\overline{y}-\underline{y})}+\lambda_P\phi D_f(r_f+1)$. In a party-centered democracy, $\lambda_P \not\geq 0$ and thus $\lambda_P \not\to 1$ but that $\lambda_P \in [0,1]$. Hence in a party-centered democracy $e_G = \frac{1}{1+\beta_g\alpha^2}[e_{t-1}+\beta_g\alpha^2 e^e-\beta_g\alpha(u-\overline{y})]+\frac{Rl_f(1-\lambda_P)}{(\overline{y}-\underline{y})}+\lambda_P\phi D_f(r_f+1)$ which $\implies e_G \cong e_G^*$.

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Table 1: List of countries

Country	Period	Country	Period	Country	Period
Argentina	1988-2007	Guatemala	1988-2007	Pakistan	1988-1998
Bahamas	1988-2007	Guyana	1992-2007	Paraguay	1992-2007
Bangladesh	1991-2007	Haiti	1994-1999	Peru	1988-1989; 2001-2007
Barbados	1988-2007	Honduras	1988-2007	Philippines	1988-2007
Bolivia	1988-2007	Hungary	1989-2007	Poland	1989-2007
Botswana	1995-2007	India	1988-2007	Romania	1990-2007
Brazil	1988-2007	Indonesia	1999-2007	Russian Federation	1992-2007
Bulgaria	1990-2007	Jamaica	1988-2007	Senegal	2000-2007
Chile	1989-2007	Kenya	2002-2007	Slovak Republic	1993-2007
Colombia	1988-2007	Korea, South	1988-2007	South Africa	1990-2007
Costa Rica	1988-2007	Latvia	1991-2007	Sri Lanka	1988-2007
Cyprus	1988-2007	Lithuania	1991-2007	Thailand	1988-1990; 1992-2005
Czech Republic	1993-2007	Madagascar	1992-2007	Trinidad & Tobago	1988-2007
Dominican Rep.	1988-2007	Mexico	1997-2007	Turkey	1988-2007
Ecuador	1988-2007	Nepal	1990-2001; 2006-2007	Ukraine	1991-2007
El Salvador	1988-2007	Nicaragua	1990-2007	Uruguay	1988-2007
Estonia	1991-2007	Nigeria	1999-2007	Zambia	1991-1995; 2001-2007
Georgia	1991-2007				
Ghana	2001-2007				

Notes: The time period in the columns indicate the years in which each country is observed as a democracy according to the Cheibub *et al* (2010) criteria for a democratic regime.

	overvaluation	*overvaluation*		*overvaluation*	RER *overvaluation*
	xtpcse fixed effects	**PMG**		xtpcse fixed effects	xtpcse fixed effects
		Short-run	Long-run		
	Model 1	**Model 2**		**Model 3**	**Model 4**
lag dependent variable	.712***	0.582***	0.263**	.644***	.681***
	(.119)	(0.104)	(.121)	(.131)	(.120)
log GDP	.031	.023	-.012	.025	.042
	(.036)	(.059)	(.040)	(.091)	(.067)
manufacturing (%GDP)	.019	.010**	-.012	.024	.029
	(.031)	(.005)	(.019)	(.023)	(.086)
log reserves	.022**	.043*	.040	.038**	.032**
	(.010)	(.021)	(.029)	(.018)	(.011)
log GDP per capita	.010**	.009***	.019***	.006**	.007*
	(.004)	(.003)	(.006)	(.003)	(.004)
service (%GDP)	.017*	.017*	.010	.017*	.009*
	(.010)	(.010)	(.026)	(.008)	(.005)
capital account openness	-.027	-.020	.015	-.016	-.019
	(.041)	(.032)	(.038)	(.030)	(.035)
terms of trade	.037***	.055***	.022**	.035**	.032***
	(.012)	(.018)	(.010)	(.017)	(.010)
foreign liability concentration	.067	.050	.043		.011
	(.099)	(.103)	(.195)		(.078)
foreign liability concentration x candidate-centered	.138***	.134***	.078***		.102***
	(.037)	(.036)	(.043)		(.035)
candidate-centered	.032				.018
	(.085)				(.078)
Foreign liability index				.016	
				(.033)	
Foreign liability index x candidate-centered				.119***	
				(.043)	
trade openness	-.124*	-.145*	-.092	-.109*	-.114*
	(.077)	(.077)	(.118)	(.063)	(.065)
currency debt	.029	.041	.034	.038	.045
	(.093)	(.082)	(.095)	(.089)	(.077)
fixed exchange rate	.054	.077	.015	.065	.084
	(.141)	(.120)	(.143)	(.102)	(.156)
veto players	.028*	.032**	.019	.031**	.019*
	(.015)	(.016)	(.027)	(.016)	(.011)
time trend	.061**	.045**		.026**	.021**
	(.029)	(.022)		(.013)	(.010)
Constant	2.40***	1.90***		1.68***	2.16**
	(1.03)	(0.78)		(0.55)	(.095)
N	739	739		739	737
Adjusted R^2	0.21			0.15	0.22

**Notes:** ***, **, *: 1%, 5% and 10% levels of significance. Models 1-4 are estimated with country fixed effects (not reported to save space). Models 1,3 and 4 ar estimateed PCSEs (reported in the parentheses) that are corrected for heteroscedasticity and contemporaneous correlation. Bootstrapped standard errors in model 2.

Table 3: Robustness tests

|	xtpcse with fixed effects	xtpcse with fixed effects	System-GMM
	overvaluation	*overvaluation*	*Overvaluation*
	Model 4	**Model 5**	**Model 6**
lag overvaluation	.356***	.273***	.449***
	(.084)	(.089)	(.106)
log GDP	.010	.008	.005
	(.011)	(.012)	(.011)
manufacturing (%GDP)	-.025	-.008	-.061
	(.079)	(.059)	(.098)
log reserves	-.022**	-.017**	-.036**
	(.010)	(.08)	(.018)
log GDP per capita	.018	.009	.011
	(.035)	(.033)	(.028)
service (%GDP)	.009*	.007	.008*
	(.005)	(.004)	(.005)
capital account openness	.020**	.014**	.017**
	(.009)	(.008)	(.008)
terms of trade	.075**	.025*	.039**
	(.037)	(.014)	(.019)
foreign liability concentration	.359	.184	.296
	(.377)	(.640)	(.353)
Foreign liability concentration x candidate-centered	.140***	.104***	.130***
	(.041)	(.023)	(.040)
Candidate-centered	.031	.022	.054
	(.062)	(.067)	(.128)
IMF program	-.028	-.054	-.039
	(.051)	(.102)	(.046)
trade openness	-.040	-.058	-.170*
	(.039)	(.062)	(.088)
fixed exchange rate	.065	.036	.044
	(.087)	(.090)	(.087)
government consumption	.012	.019	.010
	(.043)	(.012)	(.026)
currency debt	.019	.021	.025
	(.023)	(.045)	(.067)
veto players	.021*	.020*	.055
	(.013)	(.012)	(.050)
Urbanization	.025	.019	.017
	(.056)	(.021)	(.023)
time trend	.077**	.082**	.053**
	(.040)	(.041)	(.025)
Constant	1.33***	2.90***	1.59***
	(.219)	(.721)	(.425)
N	694	694	685
AR(1)			-3.034**
AR(2)			-1.612
Hansen-J test			0.155
(p-value)			(0.662)

Notes: ***, **, *: 1%, 5% and 10% levels of significance. Models 4 and 5 are estimated with (i) country fixed effects (not reported to save space) and (ii) PCSEs (reported in the parentheses) that are corrected for heteroscedasticity and contemporaneous correlation. To conserve space, we report in model 6 the estimates from the levels equation in the system-GMM model. A negative and statistically significant AR1 term plus a statistically insignificant AR2 term in model 6 indicates no serial correlation.

Figure 1: Real Exchange Rate Overvaluation in Developing Country Democracies
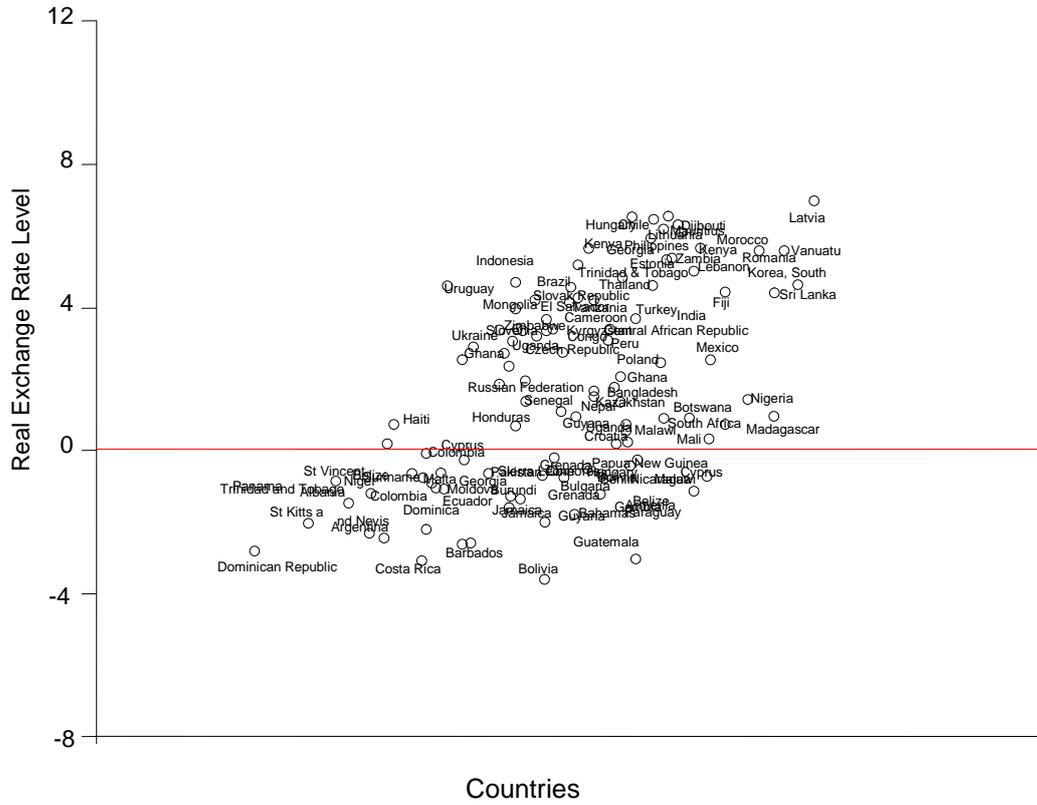
Notes: Each point in the figure represents the mean of the real exchange rate level – calculated by using Rodrik's (2008) procedure to operationalize real exchange overvaluation/devaluation – for the relevant developing country during the years in which it is observed as a democracy. A positive (negative) number indicates that the RER level is appreciated/overvalued(devalued) relative to equilibrium.

Figure 2: Effect of *foreign liability concentration* on *overvaluation* for candidate-centered democracies
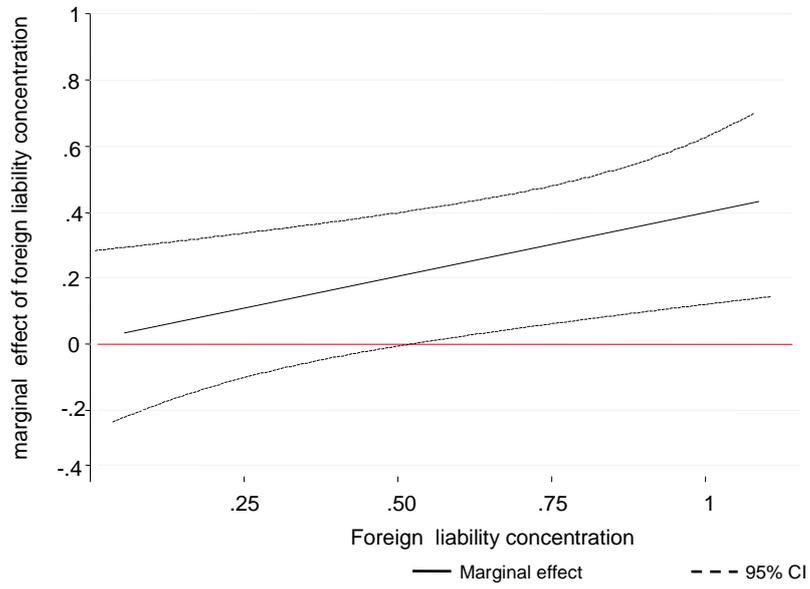
Figure 3: Effect of *foreign liability concentration* on *overvaluation* for party-centered democracies