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THE POLITICAL ECONOMY OF INTERNATIONAL CURRENCY RESERVES

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Abstract

A puzzle in international economics is the high level of foreign exchange reserves accumulated by countries around the world. Such high levels of reserves represent a conundrum since they exceed all standard benchmarks of reserve adequacy, most notably in the case of leading emerging market economies (EMEs), such as Brazil, China, India, Russia, and South Korea. Unlike past studies that examined this phenomenon from a largely economic perspective, this study adopts a comprehensive political economy approach by focusing on both economic and political factors. The paper draws on an 'audience cost' argument to identify and examine various political economy factors in explaining why EMEs accumulate currency reserves, often beyond pure economic needs. The research focuses on a large-sample of over 100 developing and transition countries for the period 1980-2015. Fixed effects model estimates demonstrate support for the political economy thesis, particularly for strategic factors such as domestic political competition, mercantilism, and global political ambitions. Support is also found for institutional characteristics, namely, political system, central bank independence, and exchange rate system. The findings of the study advance our understanding of the motivations associated with international currency reserves and the drivers of policy choices in this domain.

Keywords: *currency reserves, foreign exchange reserves, emerging market economies (EMEs), political economy, audience cost, developing and transition countries*

1. INTRODUCTION

For a variety of reasons, the accumulation of foreign currency reserves by developing and transition countries in the past few decades has drawn the attention of scholars and practitioners around the world. Even central bankers have expressed their surprise at this growing phenomenon, as articulated by Dr. Marion V. Williams, Governor of the Central Bank of Barbados, at the Central Bank of the Bahamas, Nassau, in November 2005 (Williams 2005, p. 1):

"Since the holding of reserves, which by definition is denominated in other countries' currencies, generally means that the home country is financing investment and development of other people's countries, then on the basis of pure arithmetic, countries should hold no more foreign exchange reserves than they think is necessary. However, most countries tend to do the reverse; they tend to accumulate as much foreign exchange as possible."

The puzzle surrounding the vast holdings of currency reserves by countries around the world has only grown more intriguing since 2005. Economic research has identified multiple reasons why countries hold foreign currency reserves, although two main ones dominate this decision (US Treasury 2010). First, countries hold foreign exchange reserves to meet day-to-day transactions that include debt repayments, payments to international organizations, and payments for goods and services they import. Also included in this reason is the need to hold reserves to intervene occasionally in currency markets to manage exchange rate fluctuations. The second reason why countries accumulate reserves is to serve as a defense mechanism against substantial and rapid capital outflows that could trigger a currency crisis. According to Green and Torgerson (2007), this is the most obvious reason for emerging market economies (EMEs) to stockpile foreign exchange reserves. This is particularly so after the financial crisis of the late 1990s, which highlighted the need for countries to adopt this form of self-insurance (US Treasury 2010).

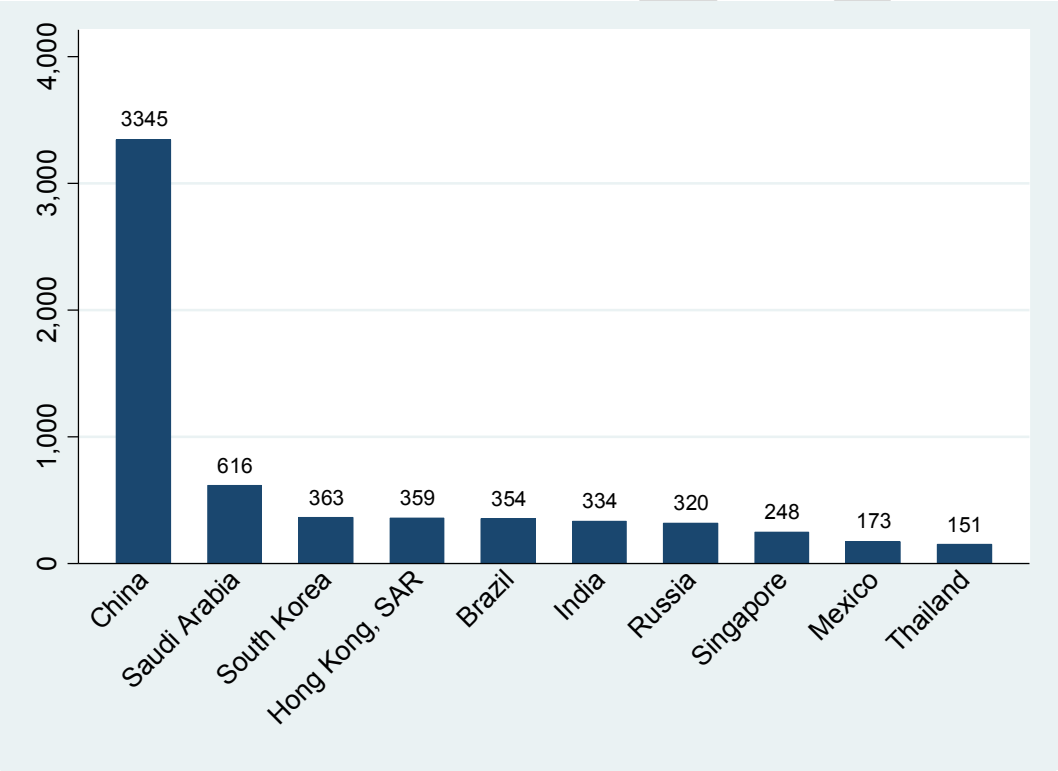
Given these motivations to hold foreign exchange reserves, there are three common benchmarks for reserve adequacy that countries usually follow (Green & Torgerson 2007; US Treasury 2010). First is the Greenspan-Guidotti rule that relates reserves to short-term external debt, that is, debt that is due in

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the next 12 months. Countries usually find it difficult to rollover their short-term debt during a financial crisis, so this benchmark has become the most preferred one to preempt and prevent currency crises. Next is the reserves to money supply benchmark that is intended to create confidence in the local currency and deter capital flight by holding foreign exchange reserves equivalent to a certain percentage of a broad measure of domestic money supply, such as M2. There is no agreement on the percentage but Wijnholds and Kapteyn (2001; as qtd. in Green & Torgerson 2007) suggest 5-20% of M2. Finally, reserves can also be benchmarked to the volume of imports, usually equivalent to 3-4 months of imports. This benchmark is particularly relevant to low-income countries that have limited access to capital markets and are vulnerable to current account shocks. Holding reserves to meet import bills for the next 3-4 months will provide a cushion to many of these countries to prevent a currency crisis.

Since there are enough benchmarks to assist countries in deciding on the adequate, or even the optimal, level of foreign exchange reserves, one would assume that most EMEs would not hold reserves beyond necessary levels. This is particularly so because holding excess foreign exchange reserves comes at an opportunity cost to these countries (Rodrik 2006; US treasury 2006). Surprisingly, many countries do substantially exceed the adequacy levels. Figure 1 presents the top ten countries with the highest foreign exchange reserves as of 2015. At reserves of $3,345 billion, China is very clearly an outlier. Prior research has demonstrated that at least by one of the three aforementioned measures, all of these countries held reserves far in excess of required levels (Park & Estrada 2010; US Treasury 2010).

Figure 1. Top Ten Countries with Foreign Currency Reserves (in US$ billions, minus gold; 2015)



The accumulation of currency reserves in recent decades by EME's has quite predictably drawn the attention of many scholars and practitioners. Most of the attention has been on Asian economies, particularly East and South East Asian economies, where the reserve levels have risen substantially since the 1990's Asian crisis (Aizenman & Marion 2003a; Gosselin & Parent 2005; Park & Estrada 2010; Ra 2007). The extant literature has also focused on the wisdom of accumulating such high levels of research (Green & Torgerson 2007; Rodrik 2006). Within the context of this literature, some works have adopted a normative approach to offer policy advice concerning the high reserve levels and their prudential use

(Park & Estrada 2010; Terada-Hagiwara 2005). Finally, and directly in line with the present study, substantial research effort has been expended in understanding why countries accumulate and hoard foreign currency reserves (Aizenman & Lee 2007; Aizenman & Marion 2003b; Bird & Mandilaras 2010; Wyplosz 2007).

Being a monetary phenomenon, the extant literature on the determinants of reserve holdings has evidently focused on economic reasons to explain why countries hold currency reserves. According to Vaubel (2005), there are both demand and supply side explanations for why central banks accumulate foreign exchange. Table 1 presents determinants of reserve holdings identified by relevant research in monetary economics. Following Vaubel (2005), an examination of these determinants reveals both supply and demand conditions. For example, determinants such as GDP, GDP per capita, share of exports in output, and ratio of net capital inflows constitute the supply conditions that determine the *inflow* of foreign exchange reserves. Put differently, these are the factors that supply a country with the foreign currency. Determinants such as share of imports in GDP, volatility of export receipts, ratio of broad money to GDP, short-term external debt, volatility of the exchange rate, and interest rate differentials are factors that determine the *outflow* of foreign exchange reserves. These are the variables that influence a government or central bank's demand decision regarding the level of reserves to maintain, once the inflow has occurred.

Not surprisingly, table 1 also indicates that existing research has focused on economic determinants such as economic size, current and capital account vulnerabilities, exchange rate dynamics, and opportunity cost. While this is a very helpful set of determinants, I argue that this set of possible determinants leaves out many other factors that are associated with the stockpiling of currency reserves, especially in a situation where there are tremendous costs to such an indulgence. EME's can find alternative uses for their reserves compared to the meager returns they receive from passively parking their reserves in, say, US government bonds (Park & Estrada 2010). It is, however, a fact of modern political economy that economic decision-making takes place within a political and historical context, and not just within an economic context. The present research, therefore, proceeds to locate the determinants of currency reserves in a more comprehensive set of political economy variables that reflect both strategic motives and institutional features that largely influence the demand side of foreign currency accumulation.

Table 1. Economic Determinants of Reserve Holdings

Determinant	Explanatory Variables
Economic Size	GDP, GDP per capita
Current Account Vulnerability	Share of imports or exports in output, volatility of export receipts
Capital Account Vulnerability	Financial openness: ratio of capital flows or broad money to GDP, short-term external debt, foreigners' equity position
Exchange Rate Flexibility	Volatility of the exchange rate
Opportunity Cost	Interest rate differentials

Source: Gosselin and Parent (2005)

2. THEORETICAL FRAMEWORK AND CONCEPTUAL MODEL

2.1. Theoretical Argument

'Political economy' is a term that has more than one meaning in academic literature, but I use it in the more contemporary sense that signifies a study of economic activity that incorporates political factors and dynamics instead of its other understandings, such as an erstwhile name for the academic discipline of economics or as a reference to Marxian economic analysis. Economic activity and decisionmaking "is often executed in a policy space dominated by political self-interest and incentives" (Parakkal &

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Bartz-Marvez 2013, p. 702). One mechanism to understand the political economy of currency reserves is by focusing on the motivations of political leaders as they relate to their country's currency reserves. The argument here is that the stockpiling of foreign exchange reserves is partially a political decision to satisfy certain political economy outcomes. And, to identify the relevant political economy variables, I invoke the 'audience costs' argument advanced by James Fearon (1994).

The idea of audience costs was first propounded by James Fearon (1994) in the context of international conflicts and based on assumptions of rationality. In trying to understand why international crises occur and how they unfold, Fearon (1994, p. 577) argued that "crises are public events carried out in front of domestic political audiences" and there are political costs that leaders pay for backing down from an escalated conflict. Since Fearon's introduction of the audience cost argument, it has become quite prominent in international relations literature, as evidenced by the following from Tomz (2007, p. 821-22):

"Recent models of international relations assume that leaders would suffer "domestic audience costs" if they issued threats or promises and failed to follow through. Citizens, it is claimed, would think less of leaders who backed down than of leaders who never committed in the first place. In a world with audience costs, the prospect of losing domestic support—or even office—could discourage leaders from making empty threats and promises. The concept of domestic audience costs is now central to theories about military crises, and researchers have incorporated similar ideas into models of alliances, economic sanctions, foreign trade, foreign direct investment, monetary commitments, interstate bargaining, and international cooperation more generally."

According to Fearon (1994, p. 581), relevant domestic audiences, both historically and in current times, include "kings, rival ministers, opposition politicians, Senate committees, politburos, and, since the mid-nineteenth-century, mass publics informed by mass media in many cases." Among international audiences, Fearon (1994, p. 581) included "a state's opponent in the crisis and other states not directly involved, such as allies." In the international context, Fearon (1994, p. 581) contends that "the costs of escalating and then backing down would be felt indirectly through injury to the state's reputation for threatening the use of force only when serious." But between domestic and international audience costs, Fearon (1994, p. 581, emphases in original) states that domestic audience costs are primary because "Backing down after making a show of force is often most immediately costly for a leader because it gives domestic political opponents an opportunity to deplore the international loss of credibility, face, or honor. Because governments are far more likely to be deposed or to lose authority due to internal political developments than due to foreign conquest and because opposition groups frequently condition their activities on the international successes and failures of the leaders in power, domestic audiences may provide the strongest incentives for leaders to guard their states' "international" reputations. Audience costs thus figure in a domestic system of incentives that encourages leaders to have a realist concern with their state's "honor" and reputation before international audiences."

For the purposes of this research, I modify the prevailing audience cost argument to theoretically motivate the identification of possible political economy factors that explain the hoarding of currency reserves. The audience cost argument applies in this context primarily for two reasons: the signaling properties that underpin its logic and the political costs involved in not averting a balance of payments crisis. I begin with a discussion of the latter. A balance of payments crisis is a situation when countries run out of foreign exchange to pay for its imports and other external liabilities. This crisis occurs "when the inward flow of capital needed to finance a current account deficit (or to offset gross capital outflows) abruptly halts" (Cecchetti & Schoenholtz 2018). As a form of financial crisis, a balance of payments crisis generates not just negative economic outcomes but also adverse social consequences (Ramesh 2009). The combination of damaging economic and social consequences undoubtedly puts political pressures on the country's leaders. Therefore, not preventing a balance of payments crisis has a domestic audience cost attached to it and leaders could incur domestic political costs if they fail to fulfil the expectations of the general public on this particular issue.

The first reason concerning the signaling properties of audience costs are clearly associated with foreign currency reserves: these reserves signal an insurance mechanism in the form of a "liquidity war chest" (Yeyati 2010) that can prevent possible payments crises. As found in international relations literature

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on audience costs, the argument here too is that the domestic audience costs vary depending on the domestic attributes of a country. For example, these costs are argued to be higher in countries that are democratic versus countries that are not (Trachtenberg 2012). The nature of the domestic political economy plays a strong role in channeling, or not, the signal to the strong domestic audience and dictates its level of importance. These theoretical and practical considerations influence my choice of the possible political economy determinants of the levels of foreign currency reserves, as further presented and discussed in the next section.

2.2. Conceptual Model: Variables and Hypotheses

Existing literature on foreign currency reserves has failed to provide a *comprehensive* understanding of the drivers of the levels of these reserves. The literature is devoid of a political economic conceptualization of the dynamics that underpin the accumulation and holding of currency reserves. Figure 2 presents a conceptual model of the variables that influence the level of currency reserves in a country. As depicted in the figure, the political economy—as informed by audience costs—generates two sets of explanatory factors, *strategic* and *institutional*. Strategic variables are so-called since they provide a goal-oriented reason for holding currency reserves. The institutional factors are structural variables of a political economy nature that are theorized to be associated with currency reserve levels.

2.2.1 Political Competition

Competition is "the struggle between two or more agents to capture scarce, limited, and valued resources within a defined system or context," with political competition being a struggle for political power (Altman 2011, p. 359). In the present context, the argument is that the higher the struggle between political agents in a country, the greater the incentive for the incumbent agents in power to hold sufficient, or even excessive, currency reserves to demonstrate to the citizens that it is 'taking care of business.' The need for this sort of signaling is arguably higher in a democratic political system but all types of political systems experience pressure for positive signaling about the economy to prevent social unrest and political instability. This discussion leads to the following testable hypothesis.

H_1: *Countries experiencing high domestic political competition hold higher levels of currency reserves*.

2.2.2 Mercantilism

In international political economy literature, mercantilism is understood as an economic strategy where the government, as the political entity, intervenes in international trade and business to increase the nation's exports and restrict its imports (Cohn 2010). Prior literature has noted how a country that is driven by the mercantilist motive would typically hold high levels of currency reserves (Dooley, Folkerts-Landau & Garber 2004; Aizenman & Lee 2007). This is often the result of foreign currency purchases aimed at keeping the domestic currency undervalued so the nation's exports would be more internationally competitive. I, therefore, obtain the following hypothesis.

H_2: *Countries following a strategic policy of mercantilism hold higher levels of currency reserves*.

2.2.3 Global Political Ambitions

It can be theorized that a major reason why countries hoard foreign exchange reserves is to be taken seriously as important players in the global political arena. China is an excellent example to support this proposition as there is no denying the fact that China's vast amounts of foreign exchange reserves has given it much global political clout (Williams 2005). Other major emerging powers, such as India, Russia, and Brazil, also see reserve stockpiles not only as insurance against currency risks but as a matter of nationalistic pride that they can project globally. In the case of India, which experienced an extreme balance-of-payments crisis in 1990-91, the comfortable situation now contrasts starkly with the "threat of national humiliation" that "touched on personal pride" (Reddy 2002, p. 1906). Within the framework of the audience cost argument, this discussion leads to an understanding that there is an audience cost involved for governments of countries that harbor global political ambitions. There is a political price to pay, both internationally and domestically, for not carrying high levels of reserves that signal the country's prowess to the world. Apparently, the economic cost that they bear in keeping high reserves is seen as a justifiable price to pay for a worthy cause. I, therefore, test the following hypothesis.

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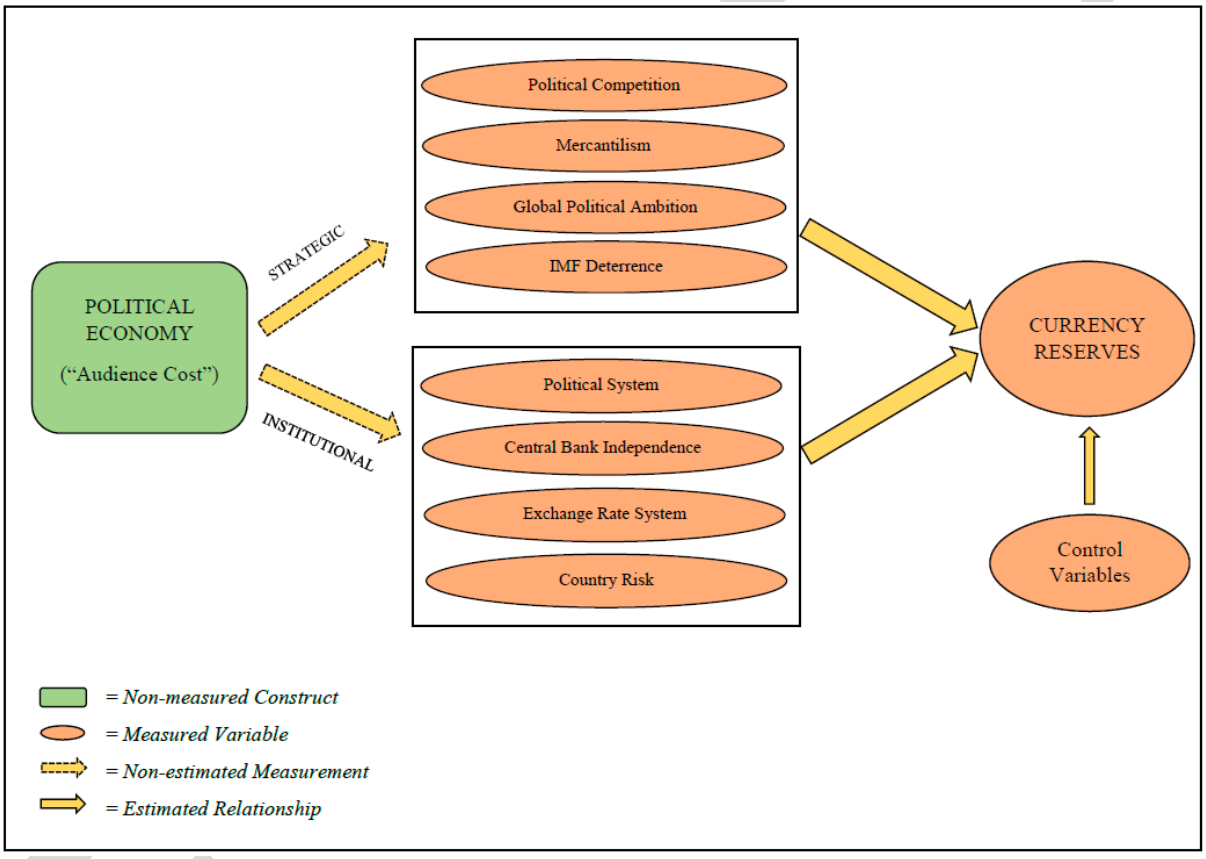
H_3: *Countries with global political ambitions hold higher levels of currency reserves*.

2.2.4 IMF Deterrence

For residents of countries that have gone through a balance of payments crisis, the memories of those difficult periods are extremely painful. Added to that is the 'national humiliation' of being placed on the rescue programs of the International Monetary Fund (IMF). There is a strong argument to be made that one of the greatest motivations for countries to hold high levels of currency reserves is to deter a recurrence of those dark periods and to serve as an 'IMF repellant.' While this might still sound as an economic argument, there is an even greater political incentive here that is associated with the audience cost argument: "voters value the national honor and will wish to punish national leaders who sully that national honor…" (Schultz 2001, p. 33). While this statement assumes a democratic polity, this sense of national pride and the need to keep the IMF at bay is a collective national motivation, regardless of the nature of the political system. This preceding discussion leads to the following hypothesis.

H_4: *Countries with a history of being on IMF programs hold higher levels of currency reserves*.

Figure 2. Conceptual Model of Currency Reserves Level



2.2.5 Political System

The nature of the political system is a key institutional factor that is hypothesized to influence currency reserve levels because of the vulnerability that it creates for the incumbent government. The chief reason parties in government feel vulnerable is that elections provide an opportunity for citizens to vote a governing party and its executives out of office. The idea that elections and the period immediately leading up to it represent political vulnerability exists in current literature (Leeds & Davis 1997). The more the political system of a country provides avenues for vulnerability, the more the government of that country decides to hold high levels of foreign currency reserves. If vulnerability is understood as

sensitiveness to electoral outcomes, then the avenues that create vulnerability would be the media, civil society, citizens' freedom of expression, etc. And, these are elements commonly found in a democratic political system and less so in an autocratic one. Given the publicity that high levels of foreign exchange reserves receive in the media and among citizens, holding high levels of reserves would be a tactic to provide a 'feel good' effect to the voters in a democratic country and mitigate the extent of vulnerability.

H_5: *Countries that are more democratic hold higher levels of currency reserves*.

2.2.6 Central Bank Independence

Central banks, in general, have become more autonomous over the years (Crowe & Meade 2008). They have also tried to become more accountable and transparent in their functions and operations (Crowe & Meade 2008). Central bank independence is, therefore, important in this context because "the degree of independence of the central bank from other parts of government affects the rates of expansion of money and credit and, through them, important macroeconomic variables…" (Cukierman, Webb & Neyapti 1992, p. 353-54). It is, however, ambiguous in what exact direction central bank independence affects currency reserve levels. In countries where the central bank is not fully independent of the government and faces restrictions on freely conducting monetary policy with regard to purely economic and monetary considerations, the audience cost argument of political exigencies and motivations would be stronger. By that logic, greater levels of central bank independence would typically not result in excessive levels of currency reserves. However, the audience cost argument could still be in operation with a relatively free central bank and lead to higher levels of reserves if the central bank itself uses the high reserve levels to signal its successful operation as an independent economic institution. In this context, a relevant observation is the idea that central banks also accumulate reserves for political reasons (Glavan 2006). This view emanates from public choice theory that argues that central bankers are not immune to the power and prestige that result from foreign assets in the form of currency reserves (Vaubel 2005). The power and prestige argument is an indirect reference to the signaling process that underpins the audience cost thesis of the present study. Given the ambiguity surrounding the *a priori* relationship between *central bank independence* and currency reserves, I offer the following main and alternate hypotheses.

H_6: *Countries with a more independent central bank hold higher levels of currency reserves*.

H_{6A}: *Countries with a more independent central bank hold lower levels of currency reserves*.

2.2.7 Exchange Rate System

Existing economics literature on currency reserves argues for the influence of a country's exchange rate system on its reserve levels. Classifications of most exchange rate systems range from fixed to floating. The reasoning here is that the more floating a currency is, there is less need to keep high levels of reserves. The situation with fixed exchange rates is, however, the opposite as there is greater need of reserves to manage the pegged exchange rate. Gosselin and Parent (2005, p. 3) support this with the finding that "reserves increased significantly in economies with limited exchange rate flexibility and those with managed floating exchange rates." I include this variable to test the following hypothesis on a much wider sample than the eight emerging Asian economies that Gosselin and Parent (2005) analyzed.

H_7: *Countries with a more fixed exchange rate system hold higher levels of currency reserves*.

2.2.8 Country Risk

In the international business literature, country risk is typically associated with the risks of foreign investment that are associated with political instability and violence, corruption, and regulatory uncertainty (Luo 2009). I argue that countries that are perceived to be of higher risk—for investment, trade, and business activities—have a greater motivation to hold large levels of currency reserves as these reserve levels transmit a positive signal about the country's economy and act as a potentially countervailing effect on the negative risk perceptions. Although country risk has non-political sources (Johnson & Tellis 2008), I focus here only on the political risks and offer the following hypothesis.

H_8: *Countries with a higher risk perception hold higher levels of currency reserves*.

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3. RESEARCH DESIGN: DATA, MEASURES, AND SAMPLE

3.1. Data and Operationalization of Variables

This study has a total of thirteen variables: the dependent variable, *currency reserves*, eight explanatory variables, and four control variables that were identified from existing relevant literature. *Currency reserves* is foreign currency reserves, minus gold, and was sourced from International Financial Statistics (IFS) database of the International Monetary Fund (IMF). In the empirical analysis that follows, *currency reserves* was deflated by the US GDP price deflator (2009 = 100), as done in Aizenman and Marion (2003b). The price deflator data was sourced from the Federal Reserve Bank of St. Louis website.

Political competition is the first of the four strategic variables and is measured using the 'Frac' variable from the Database of Political Institutions 2015 (Cruz, Keefer & Scartascini 2016). 'Frac' is the probability that two deputies picked at random from the legislature will be of different parties and is a type of 'Herfindahl' index for measuring the extent of political competition in a country. The higher this probability the greater is the level of political competition in a country as the higher probability signifies the opportunities available for political parties to compete in the electoral arena. As such, it is appropriate for use as a measure of the political competition variable. Since the mercantilist motive is to increase one's exports, I measure *mercantilism*—in line with existing research—as the exports of goods and services as a percentage of the gross domestic product (GDP). This data comes from the World Development Indicators database of the World Bank. *Global political ambitions* is the extent to which a country wishes to project its political salience to the global community. This would imply a country that is politically engaged in international affairs in an active manner. I, therefore, use the Index of Political Globalization from the KOF Index of Globalization database (Dreher 2006a). The Index of Political Globalization measures the extent to which a country is active in the international community through international treaties, membership in international organizations, embassies in other countries, and participation in United Nations Security Council missions. This serves as an effective proxy for a country's intended and realized roles in international affairs. The final strategic variable is *IMF deterrence*, which measures the history of a country's placement on IMF programs. This variable measures the extent to which a country wishes to deter future IMF involvement and prevent a recurrence of being placed on IMF programs. I focus on two main programs, IMF Standby Arrangement 5 (SBA 5) and IMF Extended Fund Facility Arrangement 5 (EFF 5). These are programs that have been in place in a particular country for at least 5 months. Both are included as separate dummy variables and coded as 1 for every year following the year the country was first placed on the IMF program during the data period under analysis, and 0 otherwise. Data for the IMF programs was taken from Dreher (2006b).

The institutional set of variables begins with *political system*, which measures the nature of a country's polity from autocratic to democratic. To operationalize this variable I used the POLITY2 measure from the Polity IV Project. This is one of the most widely used data in social scientific research to measure political systems and does this measurement on a 21-point scale from -10 (autocratic) to +10 (democratic). The data is available at http://www.systemicpeace.org/inscrdata.html. *Central bank independence* is measured using a new dataset developed by Garriga (2016) and is the most comprehensive dataset on *de jure* central bank independence (CBI) currently available. According to Garriga (2016, p. 854), this data set is the result of a meticulous search and coding of documents, including in multiple languages, and where "each piece of legislation was coded on 16 dimensions related to four components of CBI, on a country-year basis: CEO's characteristics…policy formulation attributions…the central bank's objectives; and the central bank's limitations on lending to the public sector." The dataset is a weighted index on an increasing scale of independence from 0 to 1. Data for *exchange rate system* is taken from Ilzetzki, Reinhart & Rogoff (2017). I used the fine de facto exchange rate arrangement classification from their dataset and collapsed the 15-category classification into four categories using the classification methodology in Tavlas, Dellas and Stockman (2008). I coded the variable on an increasing four-point scale from fixed to floating exchange rate systems as follows: 1 = hard peg, 2 = soft peg, 3 = managed floating, and 4 = free floating or falling. Since *exchange rate system* is measured on an increasing scale from fixed to floating, the expected coefficient sign is negative. The *country risk* variable uses data from Political Risk Services that includes a Political Risk Index, which

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has 12 components that measure different dimensions that affect the political and business environment for firms in a country. The index focuses on attributes such as voice and accountability, political stability, violence, government effectiveness, regulatory quality, rule of law, and control of corruption. The data was sourced from the World Governance Indicators website of the World Bank (http://info.worldbank.org/governance/wgi/pdf/PRS.xlsx). The political risk measure is scored on a decreasing scale of riskiness from 0 to 1 and we, therefore, expect a negative coefficient for this variable.

Population is the first of the four control variables used in this study that were identified from existing economic literature on the determinants of foreign currency reserves holding. This variable was measured by data on total population of each country. *Economic size* is measured by GDP per capita in constant 2010 US dollars. *Current account vulnerability* is the dependence of a country on imports and is measured by imports of goods and services as a percentage of GDP. Finally, *capital account vulnerability* signifies a country's dependence on capital inflows and is measured by total capital inflows as a percentage of GDP. Here, total capital inflows is a sum of net foreign direct investment and portfolio investment. Data for all of the control variables were sourced from the World Development Indicators database of the World Bank and have an expected positive association with levels of foreign currency reserves.

3.2. Sample

The sample consists of 162 countries that were not part of the economically advanced group of countries included in the Organization of Economic Cooperation and Development (OECD) as of 1980, which is the start of the data period in this study. However, for some variables, there is missing data for some of the country-year observations, leading to some countries dropping out of the dataset in the final analyses. The total data period is from 1980 to 2015, thereby providing 36 years of rich information.

4. EMPIRICAL ANALYZES: EXPLAINING THE POLITICAL ECONOMY OF CURRENCY RESERVES

Following Aizenman and Marion (2003b), I adopted the following model, although various combinations of the right-hand side variables were used in the analyses. In the equation below, FER is *currency reserves* and DEF is the U.S. GDP deflator; the dependent variable is, therefore, the log of the real, and not nominal, currency reserves.

$$\ln\left(\frac{FER_{it}}{DEF_{it}}\right) = \beta_0 + (\beta_1 X_{1,it} + \ldots + \beta_j X_{j,it}) + (\gamma_1 Z_{1,it} + \ldots + \gamma_k Z_{k,it}) + u_{it}$$

where,

$i = 1 \ldots 162$ (countries in the sample)

$t = 1980 \ldots 2015$ (data period)

$X_{j,it}, Z_{k,it}$ = explanatory and control variables, respectively

β_j, γ_k = coefficients for the explanatory and control variables, respectively

Variables measured using time series data—*mercantilism* and the four control variables—were converted into logs to ensure stationarity of the data, which is a problem that often plagues time series analyses. To check for stationarity of the logged data, Fisher-type unit-root tests for the entire panel based on augmented Dickey-Fuller tests were run. The results showed that all of the logged data were stationary.

The empirical analyses were conducted using panel data. The use of panel data is excellent for estimation since they allow the exploitation of the longitudinal and cross-sectional information contained in the data. I employed a new econometric technique that was suitable for use with unbalanced panel data, as is the case with the current data. Specifically, I ran fixed effects models with an adjusted Driscoll-Kraay

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estimator and standard errors that are robust to heteroskedasticity, autocorrelation, and cross-sectional (spatial) and temporal dependence (Hoechle 2007). Before I present and discuss the results, I am motivated by Aizenman and Lee (2007) to clarify that the empirical exercise here is not to identify strict causality between the explanatory variables and reserves accumulation. Even though the identification of the right-hand side variables and the associated hypotheses were driven by extant literature and careful arguments, the objective is to unearth "relatively robust correlations" that allow us to empirically inform our conceptual understanding of the possible motivations of currency reserves accumulation (Aizenman & Lee 2007, p. 198).

Table 2. Fixed Effects Models of Foreign Exchange Reserves (Strategic Variables)

Variable	**1**	**2**	**3**	**4**	**5**
Political Competition	.21**				
	(.05)				
Mercantilism		.08#			
		(.04)			
Global Political Ambitions			.006***		
			(.001)		
IMF Deterrence					
SBA5				.09*	
				(.04)	
EFF5					.12*
					(.05)
Population	.99***	.89***	.71***	.84***	.87***
	(.10)	(.11)	(.14)	(.11)	(.12)
Eco. Size	.68***	.68***	.64***	.70***	.70***
	(.06)	(.05)	(.06)	(.05)	(.05)
Curr. Acc. Vul.	.22**	.17*	.20***	.22***	.21***
	(.06)	(.06)	(.04)	(.05)	(.05)
Cap. Acc. Vul.	.03**	.03***	.03***	.03**	.03**
	(.009)	(.008)	(.007)	(.009)	(.009)
Countries	139	151	149	151	151
Observations	2633	3248	3211	3248	3248
F-stat	92.69***	123.81***	204.16***	136.94***	117.82***
R-squared	.53	.52	.52	.52	.52

*Note: #p< 0.1, *p< 0.05, **p< 0.01, ***p< 0.001; Driscoll-Kraay standard errors in parentheses*

The results of the analyses are presented in tables 2, 3, and 4. Table 2 presents the results for the strategic variables while table 3 does this for the institutional variables. In table 4, I present the results for the full models with all the strategic and institutional variables included. Each of the five models in table 2

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includes one strategic variable and the four control variables. The variable, *IMF deterrence*, is analyzed using two measures—SBA5 and EFF5. In table 2, the estimation results from running the five models indicate that all of the strategic variables are statistically significant and with the expected positive signs. Increased *political competition* within a country is a motivation to hold higher levels of currency reserves, as these noticeable reserves serve to figuratively fend off challenges to the incumbent government's political standing. *Mercantilism* is significant only at the lower .1 alpha level but still provides support for the mercantilist concern of higher exports motivating the accumulation of foreign currency reserves.

Global political ambitions returned the highest level of significance among the strategic variables, which is evidence of the importance countries attach to their reserve position in relation to their effective international participation, especially in non-trivial international settings. For *IMF deterrence*, both the dummy variables, SBA5 and EFF5, had identical significance at the .05 alpha level. This result signifies a strong intention on the part of countries to prevent a recurrence of the past involvement with IMF programs, by way of accumulated reserves. Besides the strategic variables, the control variables included in all the five models are also significant, as expected from prior studies. For the models as a whole, the F-stats for each of them are also highly significant, thereby indicating significance of the models and joint significance of the coefficients.

In table 3, we find similar results for the institutional variables—with one exception, the coefficients of interest take the hypothesized signs and are individually significant, as are the control variables (except for *capital account vulnerability* in model 9) and the four models based on their significant F-stats. The nature of the *political system* is a strong determinant of the motivation to hold high levels of currency reserves, with democracies holding higher levels of currency reserves as a visible and positive signal to the electorate of the economic health of the country. China is, however, a noticeable outlier in this respect, with the non-democratic country holding the highest level of currency reserves in the world. But with regard to democracies, in general, the argument holds that they are associated with higher levels of international reserves. The significant and positive coefficient for *central bank independence* demonstrates that higher levels of central bank independence does, in fact, lead to higher reserve levels. This, therefore, confirms the main hypothesis associated with this variable. There are multiple ways to interpret this result. First, an independent central bank can be argued to be more cognizant of the economic realities facing the country and therefore, hold higher reserves to meet the economic demands. Second, a more independent central bank might be influenced by the audience cost argument and would itself be motivated to hold higher levels of reserves to signal its successful operation as an important economic institution in the country.

As expected, the *exchange rate system* coefficient is negative and signifies the fact that a more floating currency system is not compelled to hoard foreign currency reserves. This is seen in global practice as well, with so-called hard currency countries holding lower levels of international reserves. The positive *country risk* coefficient is the exception to the findings and provides support to the reverse of our argument that countries that are higher on this risk factor hold higher levels of reserves to mitigate the negative risk perceptions. However, unreported results using data lagged for three and five years for this particular model (model 9) returned expected negative coefficients that were also statistically significant, thus lending support to the original hypothesis for this variable. Since currency reserves, especially out-sized reserve levels, are an often reported statistic in domestic and international newspapers, it serves as an easy medium by which to signal a more positive image of the country's economy to potential investors.

Models 1 through 9 were reduced models that each contained only one variable of interest and the four control variables. To obtain a *consolidated* understanding of the political economy of currency reserves, I ran four full models that included six of the eight variables of interest, as presented in table 4. *Central bank independence* and *country risk* were dropped from this analysis due to fewer observations relative to the other variables. Models 10 and 12 exclude *political system* and use SBA5 as the measure for *IMF deterrence* while models 11 and 13 exclude *political competition* and use EFF5 as the measure for *IMF deterrence*. For understandable reasons of being close political variables, *political competition* and *political system* reported a high correlation between them and their joint inclusion in the full models had

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the risk of collinearity, thereby leading to incorrect coefficient results. I, therefore, used them in isolation from each other. The switching between SBA5 and EFF5 as measures for *IMF deterrence* was to provide representation for both of these two measures in the full models, as their joint inclusion to measure the same variable was conceptually incorrect. Models 10 and 11 use data as originally available, that is, as used in models 1 through 9 and without normalizing the data. In models 12 and 13, I used normalized data to identify the *relative effects* of the explanatory variables on currency reserve levels.

Table 3. Fixed Effects Models of Foreign Exchange Reserves (Institutional Variables)

Variable	**6**	**7**	**8**	**9**
Political System	.01**			
	(.003)			
Central Bank Ind.		.38**		
		(.11)		
Ex. Rate System			-.09***	
			(.01)	
Country Risk				.74**
				(.24)
Population	.82***	.93***	.90***	1.40***
	(.13)	(.13)	(.10)	(.11)
Eco. Size	.70***	.67***	.67***	.91***
	(.06)	(.06)	(.05)	(.02)
Current Acc. Vul.	.21**	.16**	.21***	.23**
	(.05)	(.05)	(.04)	(.06)
Capital Acc. Vul.	.03***	.02**	.03**	.01
	(.009)	(.007)	(.008)	(.01)
Countries	129	144	149	106
Observations	2790	2818	3238	1351
F-stat	90.73***	65.65***	126.54***	2134.67****
R-squared	.52	.53	.53	.49

*Note: **p< 0.01, ***p< 0.001; Driscoll-Kraay standard errors in parentheses*

The results from models 10 and 11 in table 4 indicate that, except for *IMF deterrence*, all of the variables of interest have significant coefficients and take the hypothesized signs. Based on the F-stats, the models are also significant. *Political competition*, *mercantilism*, *global political ambitions*, *political system*, and *exchange rate system* are all jointly significant and impact the level of currency reserves. The R-squared values indicates that 55% (54%) of the variation in currency reserve holdings by EMEs is explained by model 10 (11).

The analyses and results until this point did not permit us to perform an examination of the *relative* impact of each variable on currency reserve levels, which is of particular interest to this research. This is because the data for the different variables were on different ranges. The original data for all the variables was, therefore, normalized by scaling them to a [0,1] range using the following formula:

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$$z_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$$

where, z_i is the normalized data and $x = (x_1 \dots x_n)$

Table 4. Fixed Effects Models of Foreign Exchange Reserves (Full Models)

Variable	Original Data		Normalized Data	
	10	**11**	**12**	**13**
Political Competition	.16*		.02*	
	(.06)		(.008)	
Mercantilism	.13**	.11*	.18**	.16*
	(.04)	(.04)	(.06)	(.06)
Global Political Ambition	.004**	.005**	.04**	.06**
	(.001)	(.001)	(.01)	(.01)
IMF Deterrence				
SBA5	.03		.004	
	(.03)		(.004)	
EFF5		.06		.008
		(.04)		(.005)
Political System		.008#		.02#
		(.004)		(.01)
Ex. Rate System	-.08***	-.09***	-.03***	-.03***
	(.01)	(.01)	(.005)	(.006)
Population	.81***	.63***	1.17***	.92***
	(.11)	(.14)	(.16)	(.20)
Eco. Size	.58***	.58***	.52***	.53***
	(.07)	(.06)	(.06)	(.05)
Current Acc. Vul.	.12	.12#	.17	.16#
	(.07)	(.06)	(.10)	(.08)
Capital Acc. Vul.	.02**	.02**	.06**	.05**
	(.008)	(.008)	(.02)	(.01)
Countries	138	128	138	128
Observations	2608	2769	2608	2769
F-stat	332.55***	342.69***	332.55***	342.69***
R-squared	.55	.54	.55	.54

*Note: #p< 0.1, *p< 0.05, **p< 0.01, ***p< 0.001; Driscoll-Kraay standard errors in parentheses*

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The normalized data was used to run models 12 and 13. The results from these two full models are similar to those from models 10 and 11—except for *IMF deterrence*, the coefficients are significant and take the hypothesized signs. The models are also significant, based on their F-stats. In terms of relative strength of their impact on reserve levels, we find that *mercantilism* has the greatest impact, followed by *global political ambitions*, *exchange rate system*, *political competition*, and *political system*. Among the control variables, *population* and *economic size* also display considerable relative impact on the dependent variable. Based on the R-square value of model 12 (13), these ten variables account for 55% (54%) of the variation in the level of currency reserves.

The results presented in tables 2, 3, and 4 used contemporaneous data. However, to avoid the possibility of contemporaneous endogeneity that might arise with using contemporaneous data, I also ran all the 13 models using data for the right-hand side variables that had one, two, and three year lags. Except for model 9 involving country risk, the results for the other models were very similar, with the coefficients retaining their signs and statistical significance. Very importantly, for the two full models 12 and 13 that used normalized data, the coefficient values were also very similar between the lagged and contemporaneous models. The results from using the lagged data for the two full models 12 and 13 are given in table 5 in the appendix.

5. DISCUSSION: AN INTEGRATED UNDERSTANDING OF THE DRIVERS OF CURRENCY RESERVES

The idea that political considerations influence a country's currency reserve levels has been around for some time. More than a decade ago, Marion V. Williams, the Governor of the Central Bank of Barbados, argued in a speech that "The political correctness of an economy influences what it considers to be an adequate level of foreign exchange reserves. … Such countries see themselves as needing to avoid placing themselves in a position where they are forced to change their regimes" (Williams 2006, p. 3). While Williams was talking about "political correctness" as a matter of political legitimacy, the broader implication of her argument was that politics has a decisive role to play in the level of currency reserves countries decide to hold. Although the idea of a connection between political economy and currency reserves was present at least a decade ago, if not more, systematic analyses to empirically verify the claim was conspicuously absent in the relevant literature. This research has filled that gap.

The finding from the present study is that reserve levels are positively associated with the strategic motivations to stave off domestic *political competition*, encourage export competitiveness through a policy of *mercantilism*, and promote international prestige as part of a country's *global political ambitions*. In the context of international prestige, Williams (2006, p. 3) adds that "There is evidence from the case of China that substantially high levels of foreign exchange reserves add political clout. … its economic dynamism and vast foreign reserves meant that its views needed to be listened to more respectfully than had been the case in the past. … China's reserve accumulation has not only secured insurance against shocks but also the world's respectful attention." This is true not just of China but of most EMEs that harbor regional and global strategic goals. The large reserves either signal power to allies and enemies alike or may be used as a 'war chest,' or, both. Regardless, an impressive holding of currency reserves has noticeable political uses and motivations of a strategic nature.

The institutional factors that comprise the political economy argument of the present study also appear to display the hypothesized associations with reserve levels. Their statistical significance, however, is not as robust as for the strategic variables when included in the full models in table 4. *Political system* returns lower significance results while *country risk* and *central bank independence* had to be excluded from the full models due to sample size concerns, although *central bank independence* held its sign and significance in alternative specifications of full models that are not reported in table 4. *Exchange rate system* consistently retains its sign and statistical significance across the full models. Between the strategic and institutional variables, therefore, the finding is that the strategic set of factors has an economically and statistically stronger and robust association with currency reserve levels.

Comparing the variables of interest in the present study with the control variables that were identified from prior economic studies, we do not find any clear evidence that the economic variables are

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unequivocally and consistently of a higher magnitude of strength and significance than the political economy variables. From models 12 and 13 in table 4, the finding is that *economic size* and to a lesser extent, *capital account vulnerability*, are the only two economic variables that are consistently significant and returning non-trivial coefficient values. As for the main variables of interest in models 12 and 13, besides *IMF deterrence*, the other variables are significant and report non-trivial coefficient values. In fact, these variables display consistent significance across all the 13 models that are part of this study.

In terms of its placement within the relevant literature, the present study is located very much in the center of a small but important debate over the precautionary versus mercantilist motives of accumulating large currency reserves. The precautionary motive views reserves as self-insurance to prevent currency crises while the mercantilist motive understands large reserve holdings as being driven by considerations of export promotion. These are not necessarily competing goals and might even be complementary to each other (Carvalho & Fry-McKibbin 2014). However, that has not prevented the brewing of a scholarly discussion in the literature over these two motives of reserves accumulation. The mercantilist motive harks back to an era when countries used currency market interventions as a means to increase their export competitiveness. In the relevant literature, works by Dooley, Folkerts-Landau & Garber (2004, 2005 & 2009) and Carvalho and Fry-McKibbin (2014) argue for the mercantilist motive while Aizenman and Marion (2003a) support the financial crises motive and Han (2007) finds no statistical significance for the mercantilist variable. There is, however, support for both the precautionary and mercantilist arguments in Aizenman and Lee (2007), although the self-insurance motive is of relatively more economic importance than the mercantilist one.

In the present study, we do find statistical significance for both the mercantilist motive—denoted by *mercantilism*—and the precautionary motive, as represented by *exchange rate system*, *current account vulnerability*, and *capital account vulnerability*. In contrast, however, to Aizenman and Lee (2007), the results from models 12 and 13 in the current study lend more economic strength to the mercantilist motive than the precautionary motive. The coefficient values in models 12 and 13 for *mercantilism* are markedly higher than those for the three precautionary variables. A separate but unreported regression using the contemporaneous, normalized data for only *mercantilism*, *exchange rate system*, and the four control variables does, however, show *current account vulnerability* to be of higher economic significance than *mercantilism*, although the other two precautionary variables still trail the coefficient for *mercantilism*. All the variables and the model for this separate regression were statistically significant and with the expected coefficient signs. This finding, nonetheless, does not hold when the normalized data is lagged for 1, 2, and 3 years, with mercantilism returning higher and significant coefficient values than the three precautionary variables. On this particular debate, therefore, we can conclude from the results of the present study that both the precautionary and mercantilist motives are at play in the accumulation of currency reserves. However, in a more comprehensive, integrated, and realistic political economy context, the mercantilist motive trumps the precautionary motive in terms of relative importance.

Although I did not test for it specifically, there is some support from the positive results of the *central bank independence* variable for Mrs. Machlup's 'Wardrobe Theory of International Reserves,' as it pertains to the actions of central bankers of EMEs. According to this theory, propounded by Machlup (1966), reserve accumulation by central banks is similar to how Machlup observed his wife acquiring clothes: although Mrs. Machlup's wardrobe was full, she continued to amass more clothes and beyond what she needed. In other words, there was a demonstrated difference between demand and need. Vaubel (2005, p. 78) rationalises this by claiming that "central bankers simply enjoy the beauty of having and increasing their international reserves," thereby alluding to signaling behavior on the part of central bankers and empirical support for the audience cost argument advanced in this study.

There is considerable evidence from the results reported in tables 2, 3, and 4 that including political economy variables in the analyses provides for a conceptually complete approach to examining currency reserve holdings by EMEs. It is also prudent to identify the specific political economy variables that have significant associations with currency reserve levels. The effects of "audience costs" on reserve levels are captured through the associations we unearthed from the detailed analyses. Being a monetary

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phenomenon, currency reserves are expectedly associated with economic variables, as reported by prior studies. But based on the careful empirical analysis that was motivated by the conceptual political economy model in figure 2, we find that political economy variables—both strategic and institutional—are also significantly associated with currency reserve levels. In particular, the results from using normalized data in models 12 and 13 provide us with an integrated understanding of the political economy nature of currency reserves. This understanding has implications for correctly gauging countries' motivations for holding large currency reserves, which evidently extend beyond economic considerations alone.

6. CONCLUSION

The political expediency of having a large currency reserve is a factor that was missing in existing analyses of currency reserve holdings. The extant literature had included some political variables, such as political corruption (Aizenman and Marion 2003b), but had not accorded an explicit theoretical or analytical space for plausible political economy variables as determinants of currency reserves. The present study has filled that gap through a careful identification of relevant political economy variables and a systematic empirical analysis of said variables as they relate to reserve levels. The main conclusion we can draw is that political economy variables matter for currency reserve levels. Any effort to understand why countries sometimes hold seemingly excessive levels of reserves needs to go beyond the commonly understood economic benchmarks and examine the extent of political and strategic signaling these countries attempt to do with these very conspicuous levels of currency holdings. The excessive reserves may be socially and economically costly in a way but many countries believe it is worth the cost if the currency stockpile can help them deter domestic political competition, promote export competitiveness, or establish international clout, among other motivations. This is particularly so for EMEs than for advanced economies as a large stash of currency reserves is a loud and emphatic statement to their domestic constituents and international audience of their country's growing economic and political salience.

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Appendix

Table 5. Fixed Effects Full Models of Foreign Currency Reserves (Normalized Data)

Variable	Lagged 1 Year		Lagged 2 Years		Lagged 3 Years	
	12	13	12	13	12	13
Political Competition	.02*		.02**		.02*	
	(.009)		(.01)		(.009)	
Mercantilism	.24***	.23***	.27***	.26***	.30***	.27***
	(.04)	(.04)	(.04)	(.05)	(.05)	(.05)
Global Political Ambition	.03**	.05**	.03**	.05***	.03***	.05**
	(.01)	(.01)	(.009)	(.01)	(.007)	(.01)
IMF Deterrence						
SBA5	.005		.005		.003	
	(.004)		(.005)		(.006)	
EFF5		.01		.01		.01
		(.007)		(.009)		(.009)
Political System		.02*		.02*		.01#
		(.01)		(.01)		(.009)
Ex. Rate System	-.02***	-.02***	-.01**	-.01**	-.01*	-.01*
	(.004)	(.004)	(.005)	(.004)	(.006)	(.004)
Population	1.35***	1.08***	1.57***	1.31***	1.73***	1.46***
	(.12)	(.17)	(.09)	(.13)	(.09)	(.12)
Eco. Size	.49***	.48***	.48***	.46***	.47***	.44***
	(.06)	(.05)	(.06)	(.06)	(.06)	(.06)
Current Acc. Vul.	.13	.11	.06	.05	-.01	.006
	(.10)	(.07)	(.10)	(.07)	(.10)	(.07)
Capital Acc. Vul.	.07**	.07**	.07**	.07**	.07**	.07*
	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)
Countries	136	128	135	128	132	127
Observations	2498	2669	2380	2558	2261	2443
F-stat	287.05***	244.78***	152.45***	124.00***	210.68***	52.00***
R-squared	.54	.53	.56	.55	.55	.53

*Note: #p< 0.1, *p< 0.05, **p< 0.01, ***p< 0.001; Driscoll-Kraay standard errors in parentheses*

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