THE IMPACT OF EXTERNAL VULNERABILITIES ON EXCHANGE RATE PASS-THROUGH: RECENT LONGITUDINAL EVIDENCE FROM EMERGING MARKETS

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ABSTRACT

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This thesis investigates the effects of structural vulnerabilities on the nexus between exchange rate and inflation in Emerging Markets for the recent time period. It is observed that there is a considerable heterogeneity among Emerging Markets regarding selected vulnerability sources. In the study, firstly EM countries are classified into two subgroups as "highly vulnerable" and "low vulnerable" according to median levels for each vulnerability categorization. Then, the possible differences between high and low country groups in terms of exchange rate pass-through (ERPT) to inflation is examined. Results show that more resillient EM countries are experiencing lower ERPT levels. For instance, countries with higher level of dollarization shows higher ERPT compared to lower dollarization group. Moreover, countries with higher current account deficit or external financing need shows higher ERPT levels. Additionally, higher level of inflation, higher country risk premium and higher foreign currency debt debt can be associated with increasing ERPT. On the other hand, countries with higher reserve adequacy or higher foreign direct investment shows lower ERPT compared to lower EM groups.

Keywords: Exchange Rate Passthrough, Structural Vulnerability, Emerging Markets

ÖZ

YAPISAL KIRILGANLIKLARIN KUR GEÇİŞKENLİĞİ ÜZERİNE ETKİSİ: GELİŞMEKTE OLAN ÜLKELERDE YAKIN DÖNEM ANALİZİ

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Bu tez, gelişmekte olan ülkelerde (GOÜ) yakın dönemde yapısal kırılganlık faktörlerinin döviz kuru ile enflasyon arasındaki ilişki üzerindeki etkisini incelemektedir. Seçilen kırılganlık göstergeleri bakımından GOÜ'ler arasında belirgin bir heterojenlik olduğu görülmektedir. Çalışmada, öncelikle gelişmekte olan ülkeler her bir kategorizasyon için ortanca seviyelerine göre "yüksek hassasisetli" ve "düşük hassasiyetli" olarak iki alt gruba ayrılmaktadır. Ardından, yüksek ve düşük gruplar arasındaki olası kur geçişkenliği farklılıkları incelenmiştir. Sonuçlar, görece daha dirençli ülkelerin daha düşük kur geçişkenliğine sahip olduğunu göstermektedir. Örneğin, yüksek dolarizasyon seviyesine sahip ülkeler, düşük dolarizasyon ülke grubuna kıyasla daha yüksek kur geçişkenliği göstermektedir. Ayrıca, cari açığı veya dış finansman ihtiyacı yüksek olan ülke grupları daha yüksek geçişkenliğe sahip olmaktadır. Ek olarak, yüksek enflasyon seviyesi, yüksek ülke risk primi ve yüksek reel sektör yabancı para borçluluğu da artan geçişkenlik seviyesi ile ilişkilendirilebilmektedir. Öte yandan, yüksek rezerv yeterliliği seviyesine sahip veya Doğrudan Yabancı Yatırım paylarında daha yüksek olan ülkeler düşük ülke grubuna kıyasla daha düşük kur geçişkenliği göstermektedir.

Anahtar Kelimeler: Kur Geçişkenliği, Yapısal Kırılganlık, Gelişmekte Olan Ülkeler

To My Family

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LIST OF ABBREVIATIONS

EM	Emerging Market
ERPT	Exchange Rate Pass Through
IT	Inflation-Targeting
IPVAR	IPVAR: Interacted Panel VAR
VAR	Vector Auto Regression
IMF	International Monetary Fund
IMF IFS	International Monetary Fund International Financial Statistics
FX	Foreign Exchange
CAD	Current Account Deficit
CAB	Current Account Balance
FDI	Foreign Direct Investment
IIF	Institute of International Finance
GFC	Global Financial Crisis
AE	Advanced Economies
NFC	Non-Financial Corporates
GDP	Gross Domestic Product
CDS	Credit Default Swap
EMBIG	Emerging Markets Bond Global Index
OECD	Organisation for Economic Co-operation and Development
HP Filter	Hodrick-Prescott filter
IPI	Industrial Production Index
IRFs	Impulse Response Functions
FEVD	Forecast Error Variance Decomposition
OLS	Ordinary Least Square

CHAPTER 1

INTRODUCTION

Inflation is the term referring to the ongoing increases in the general price level of a pre-determined consumption basket including goods as well as services. High inflation rates are generally considered to be harmful to an economy in many aspects given its macroeconomic outcomes. First of all, high inflation increases the uncertainty in the economy which disturbs investors' appetite for risk-taking and desire for investment. Hence, inflationary pressures can distort the well-being of economic agents through the lack of adequate capital accumulation resulted from the risk-averse behavior of firms and individuals, as widely emphasized in endogenous growth literature (Nelson, 1976; Gultekin, 1983; Boyd et al., 1996). Their argument is associated with the dependence of growth on the rate of return which is, in fact, decreased with rising inflation. While the empirical evidence has been vague on this front, starting from the 1970s, during which there exists upward movement in inflation rate coincided with the depression in the economic growth of advance economies, literature documents positively linear and non-linear association (Fischer, 1993; Barro, 1996). Additionally, from the saving side, decreasing purchasing power of money forces agents to consume more today instead of saving for the future. Apart from these, decreased competition, distorted income equality and fall in real wages are generally associated with high inflation levels.

For example, if a country experiences a relatively higher rate of inflation than its trading partners for a period of time, this will decrease the competitiveness level of that country. Therefore, this might lead to a decrease in export orders, depressed profits and fewer employment opportunities (Khan and Moessner, 2005). On the other hand, increased competitiveness may force firms to adjust their markups and

they cannot reflect incurred costs to prices easily due to market share concerns (Przybyla and Roma, 2005).

Moreover, households with different income groups are exposed to different inflation levels due to differences in their consumption habits. Studies in the literature show that lower income groups are affected by higher inflation levels to a large extent due to their inelastic demand (mainly food and shelter) (Akçelik, 2016). Moreover, studies show that an increase in inflation deteriorates income inequality further through such exposure channel (Monnin, 2014).

Shortly, it can be argued that low and especially stabilized inflation has positive implications for countries in terms of better growth projections and financial stability concerns (Friedman, 1977; Fischer, 1983).

When inflation trajectory is examined in recent decades, it is evident that, in both developed and developing countries, there appears to be a disinflationary process. As it is clearly showed by Ha et al. (2019), global inflation rate declined from 15% to 3% between the years 1970-2017. Although the decline in advanced countries began earlier, the fall in inflation is largely observed across different indicators and across countries (Figure 1 and 2).

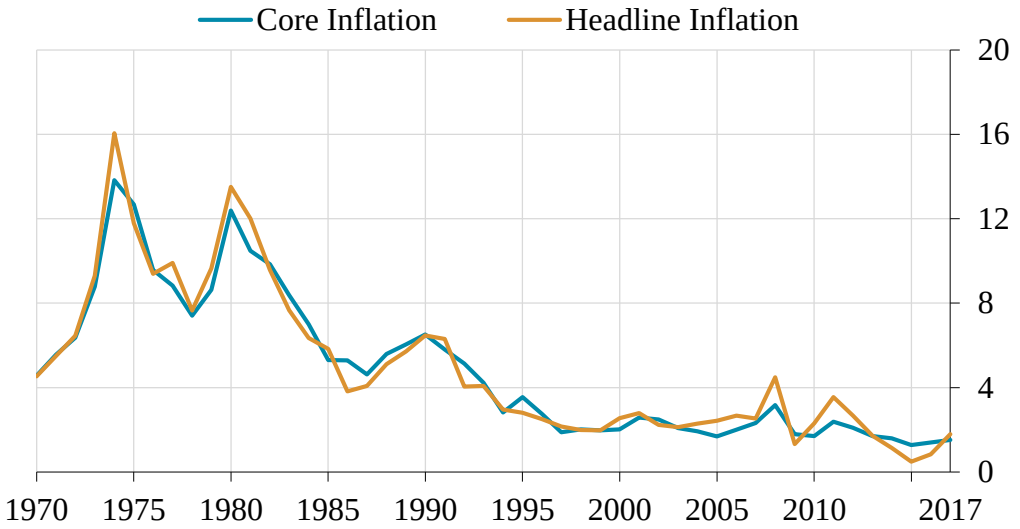


Figure 1. Global Inflation Trajectory Across Different Indicators

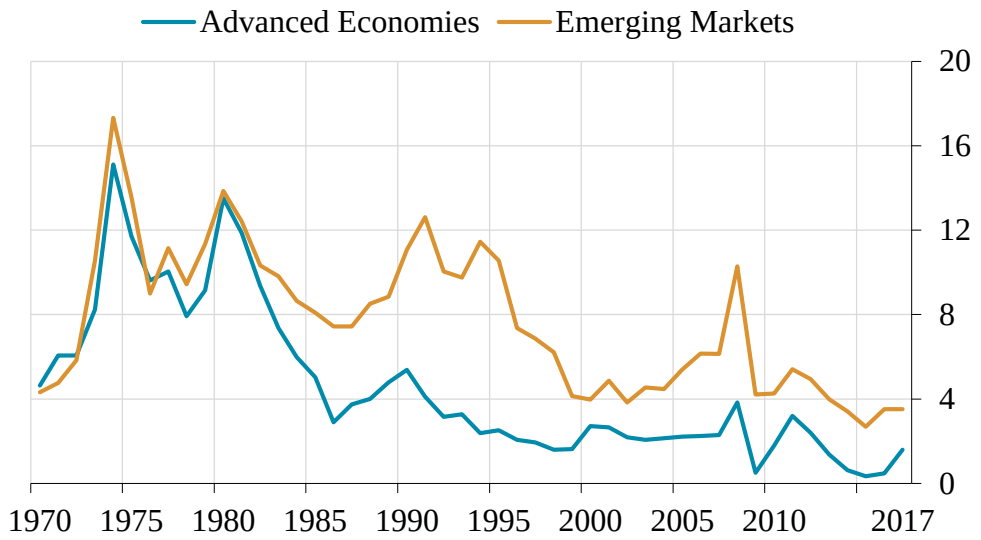


Figure 2. Global Inflation Trajectory Across Country Groups

Although the long term declining trend of inflation is somewhat similar in advanced countries and emerging markets, the main driving factors behind inflationary movements differ. In other words, in advanced countries, demand-side factors seem to be the main drivers of price developments, whereas supply-side factors become more prominent in determining inflation developments of emerging counterparties (Benlialper et al., 2017). Among these supply-side factors, energy commodity price shocks and exchange rate outlook are of critical importance for EMs.

Exchange rate movements and channels through which they influence macroeconomic and financial environment are closely followed by policymakers in emerging markets considering the small and open economy nature. Thus, the information exchange rate changes carry become very crucial in pricing decisions as well. In this regard, for small open economies exchange rate emerges as one of the main determinants of inflation realizations. Therefore, understanding the impact of exchange rate movements on prices is critically important for central bankers in terms of macroeconomic dynamics and policy decisions.

This phenomenon is conceptualized as the exchange rate pass-through (ERPT) which is defined as the degree to which exchange rate changes are transmitted into domestic prices (Campa and Goldberg, 2005; Gagnon and Ihrig, 2004; Marazzi et al., 2005). Given that currencies of emerging markets are more volatile and exposed to large and frequent depreciations, its influence on price changes is examined theoretically and empirically (by academics, policymakers and practitioners) in a detailed manner to be able to find optimal policy strategies. Moreover, it should also be noted that not only the magnitude of ERPT but also the momentum of it should be considered while establishing a well-structured policy.

Theoretically, the ERPT discussion stems from the deficiencies of Law of One Price Theory given the fact that when local currency fluctuate, domestic prices cannot adjust immediately and at a full amount (Menon, 1995; Goldberg and Knetter, 1997). It means that in the face of currency shocks, prices in the domestic economy are expected to react to this shock with some lag and also with some sacrifice ratio. Based on this, the notion of incomplete pass-through emerge. In this regard, depending on the content of price indices, considered ERPT can be categorized into two sub-groups. "First stage ERPT" attributes to the sensitivity of import prices with respect to changes in the exchange rate, while the "second stage ERPT" refers to the related sensitivities of consumer prices. In general, complete transmission from exchange rate changes to domestic prices does not take place. This implies that there might be factors affecting the magnitude of the friction leading to incomplete ERPT and mechanism through which such friction or possibly over-transmission happens. Starting from this point, there are many studies in the literature examining the determinants of ERPT from both theoretical and empirical aspects (Taylor, 2000; Campa and Goldberg, 2005; Gopinath, 2015).

In this framework, the main contributions of this study to ERPT literature can be listed under four headings. First of all, the focus of this study is on a relatively recent time period covering mostly post-crisis era. Hence, it aims to shed light on the contemporary dynamics of inflation developments and the role of currency movements. Secondly, we employ a unique methodology in a cross-country setting embodying the application of Interacted Panel Vector Autoregression (IPVAR) model, which is introduced by Towbin and Weber (2013)[1] , to examine the country characteristics affecting the response of domestic prices to exchange rate shocks.

[1] Special thanks are presented to Pascal Towbin and Sebastian Weber for sharing IPVAR Matlab codes.

Additionally, some of the specification/characteristics called as “vulnerability sources” are tested in this study as potential explanatory variables of ERPT differences across EMs. The role of these factors are underwhelmingly covered in the existing literature. Lastly, considering the findings of the study related to ERPT determinants, some specific policy measures for EM countries regarding determined vulnerabilities are provided.

In fact, the vulnerability indicators have important implications on exchange rate-inflation nexus through various channels. Highly vulnerable countries are exposed to more frequent and large external shocks which decrease resilience of the country and threatens macroeconomic and financial stability. Under such circumstances, due to the increase in uncertainty as well, pricing behavior of agents are distorted. Therefore, the analysis regarding exchange rate-inflation link with specific emphasis on structural vulnerabilities have important implications for policymakers and practitioners.

The rest of the thesis is organized as follows. Chapter 2 reviews the related literature for determinants of ERPT. Chapter 3 provides a brief overview regarding structural vulnerabilities arising from dollarization, current account deficit and its financing sources, net FX debt of corporates and the others. Chapter 4 and Chapter 5 describes the data and methodology employed in this study. Chapter 6 provides empirical findings and finally Chapter 7 concludes the study.

CHAPTER 2

LITERATURE REVIEW

In the literature, there are many theoretical and empirical studies related to ERPT in both advanced and developing countries. Apart from the studies purely focusing on the size/magnitude of the ERPT, there are also some works concentrated on the determinants of the ERPT differences in cross-country setting as well.

Regarding the magnitude, the previous studies in the literature have shown that ERPT to consumer prices vary considerably depending on the country characteristics. ERPT in advanced countries turn out to be lower than those of emerging countries. In addition to this, it is also shown that ERPT is not a static issue and, even for the same country, ERPT might change over time. In other words, the degree of ERPT is time-varying and declining substantially over the last decades (Campa and Goldberg, 2005; Campa and Goldberg, 2010; Marazzi et al., 2005; Bouakez & Rebei, 2008).

Motivated by such heterogeneity, some of the previous studies in the literature focus on the factors which might be behind these differences both across countries and over time. At this point, there are two main strands as the one concentrating on the structural factors and the one focusing on the deriving shock factors. For the former approach, monetary policy credibility (Lopez-Villavicencio and Mignon, 2016; Taylor, 2000; Gagnon and Ihrig, 2004; Choudri and Hakura, 2006; Caselli and Roitman, 2016; Carriere-Swallow et al., 2016), exchange rate volatility (Kohlscheen, 2010; Campa and Goldberg, 2005), the level of inflation/inflationary environment (Taylor, 2000; Gagnon and Ihrig, 2004; Choudhri and Hakura, 2006), trade openness (Campa and Goldberg, 2005) and composition of imports (Campa and Goldberg, 2002) are all considered as main influential factors for the size of ERPT.

In addition to these, the magnitude and direction of exchange rate changes and dollarization tendencies (Reinhart et al., 2014; Carranza et. al., 2009; Sadeghi et. al., 2015) came to the forefront in the previous works. Moreover, price change frequency (Devereux and Yetman, 2003; Corsetti et. al., 2008), competition in the market (Amiti et. al., 2016), the share of foreign currency invoicing (Casas et al., 2017), and the use of hedging products (Amiti et. al., 2014) are also considered as prominent factors on ERPT dynamics in the literature.

As stated by Taylor (2000) and Lopez-Villavicencio and Mignon (2016), firms increase their prices if they perceive exchange rate changes permanent. Otherwise, if their expectation is aligned with the fact that the shock is temporary, then they would not adjust their prices immediately. Thus, when the level of inflation is high, persistency of the shocks increases. In such cases, firms tend to reflect increasing costs on their prices easily. Therefore, ERPT is expected to be prominent in a highly inflationary environment. Jasova et al. (2016) analyze evolvement of ERPT in both developed and developing countries. They particularly argue that declining ERPT in EMs is closely associated with the declining inflation level. In addition to this, Mihaljek and Klau (2008) show that declining trends in both level and variability of inflation paved the way for lower ERPT in EMs.

Secondly, another part of the literature regarding ERPT determinants argues that the adoption of inflation targeting regime decreases exchange rate pass-through to inflation especially for emerging markets (Edwards, 2006; Coulibaly and Kempf, 2010). After 1990s, most of the emerging markets altered their monetary policy strategies toward explicit inflation targeting and studies examining that period find that significant decrease in ERPT happened thanks to improvements in the credibility of central banking practices (Eichengreen, 2002; Mishkin, 2000; Mishkin and Savastano, 2000).

Given credible monetary policy actions, inflation expectations can be anchored to the targeted levels and become less prone to external shocks. Therefore, sound monetary policy formulation is thought to contain inflation volatility and eventually restricts the scope of ERPT (Gagnon and Ihrig, 2004). Furthermore, as stated in Carriere-Swallow et al. (2016), inflation dynamics and ERPT are closely relevant to the monetary policy credibility.

Thirdly, the exchange rate regime and volatility of exchange rates are also found to be influential on the degree of ERPT. Inflation-targeting (IT) regime refers to the monetary policy framework in which central banks set official inflation targets and communicate possible deviations from that target with the public to sustain credibility. It was firstly introduced in New Zealand in 1990. After that, most advanced economies switched to IT regime on the purpose of lowering inflation level and decrease volatility. Then, during the past two decades, many emerging market economies have also adopted IT framework. Considering the fact that almost all of the inflation targeting emerging economies also have floating exchange rate regime (Agenor and Pereira da Silva, 2019), it is expected that this policy mix might signal more stable monetary policy and hence results in lower ERPT degree. Campa and Goldberg (2002) and McCarthy (2000) provide supporting evidence that less volatility in exchange rates are associated with lower ERPT.

Contrary to this, Krugman (1986), and Taylor (2000) contend that exporters may perceive volatility in exchange rates as temporary and prefer not to adjust their prices quickly to be able to avoid possible market share losses in an increasingly competitive market environment. In such a case, higher volatility of exchange rates might lead to lower ERPT. Therefore, the impact of the volatility could be either positive or negative.

The degree of trade openness is another structural determinant of ERPT, but its effect on ERPT is found to be controversial in the literature. Some studies argue that exchange rate movements can be easily reflected to domestic prices in more open economies which means higher exchange rate pass-through (Campa and Goldberg, 2005 and Ghosh, 2013). However, more liberal trade policies and opening up the boundaries will force companies to a more competitive environment and hence declining ERPT.

The dollarization tendencies in the economy migh affect the degree of ERPT as well. The previous works have shown that in highly dollarized economies the pass-through from exchange rate to domestic prices is significant compared countries with less dollarization tendencies through various channels such as cost and indexation channels (Leiderman et al., 2006; Reinhart et al., 2014 and Sadeghi et. al., 2015). On the other hand, Janaya (2000) argues higher dollarization might increase the speed of pass-through although the magnitude is not changed.

The composition of imports stands as another major factor influencing the pace and degree of ERPT. In the work of Campa and Goldberg (2002), it is found that ERPT can vary a lot depending on the substitutability between imported goods and domestically-produced goods. If the degree of substitutability is low, then the price-setting ability of importing firms will be higher and they are less concerned in the face of market share losses. However, if there exist closely resembling substitutes, then the competitiveness and concerns related to market share will be higher, so they cannot boost their prices as much as the level implied by the whole depreciation in the exchange rate.

As mentioned above, the sensitivity of prices to an exchange rate fluctuations may also be attributed to shock-deriving factors (Comunale and Kunovac, 2017; Forbes, Hjortsoe, and Nenova, 2017). It means that different sources of shocks leading to movements in exchange rates have different implications for price formation. Therefore, it is argued that when examining the ERPT, not only the magnitude of exchange rate movements but also triggering shocks should be taken into account in a separate manner. Exchange rate movements that stem from domestic monetary policy shocks lead to higher ERPT levels than domestic demand shocks in EMs. Therefore, it is highlighted once again that the sources of shocks fluctuating exchange rates should be considered when designing monetary policy framework.

Table 1.

Literature Review

Authors	**Sample Countries**	**Sample Period**	**Methodology**
McCarthy (1999)	9 Industrialized Economies (USA, Japan, Germany, France, UK, Belgium, the Netherlands, Sweden, and Switzerland	(1976:1Q-1998:4Q)	Vector Autoregression (VAR)
Leigh and Rossi (2002)	Turkey	(1994:1M-2002:4M)	Vector Autoregression (VAR)
Alper (2003)	Turkey	(1987:1M-2003:5M)	Single Equation Error Correction Model
Arbatlı (2003)	Turkey	(1994:1M-2004:5M)	Threshold Vector Autoregression (TVAR)
Kara and Öğünç (2005)	Turkey	(1995:2M-2004:9M)	Vector Autoregression (VAR)
Damar (2010)	Turkey	(1995:1M-2009:12M)	Vector Error Correction Model (VECM)
Yüncüler (2011)	Turkey	(1997:1M-2010:9M)	Vector Autoregression (VAR)
Kara and Öğünç (2012)	Turkey	(2002:3M-2011:6M)	Vector Autoregression (VAR)
Korkmaz and Bayır (2015)	Turkey	(2008:1M-2014:M12)	VAR Granger Causality
Özdamar (2015)	Turkey	(2006:1M-2015:10M)	ARDL

Table 1. (continued)

Villavicencio and Mignon (2016)	15 Emerging Markets (Brazil, Colombia, Czech Republic, Hungary, Indonesia, South Korea, Mexico, Peru, Philippines, Poland, Romania, Slovak Republic, South Africa, Thailand and Turkey)	(1994:1M-2015:7M)	Smooth Transition Regression (STR)
Liu and Chen (2017)	China	(2003-2012)	VECM
Ozkan and Erden (2015)	88 countries (including developing and developed)	(1980-2013)	DCC-GARCH
Campa & Goldberg (2006)	18 countries	(1975:1Q-2004:4Q)	Single Equation Model
Ito &Sato (2008)	East Asian Countries	(1993-2005)	Vector Autoregression (VAR)
Kolhscheen (2010)	8 EM Countries: Brazil, South Korea, Mexico, Indonesia, South Africa, Thailand, Czech Rep, Philippines	(1994-2008)	Vector Autoregression (VAR)
Ponomarev et al. (2016)	Russia	(2002-2012)	Vector Autoregression (VAR)
Hajnal et al. (2015)	Hungary	(2001:3Q-2014:2Q)	VAR Single Equation
Winkelried (2014)	Peru	(2005:4M-2011:4M)	Vector Auto-regression (VAR)
Gagnon ad Ihrig (2004)	20 Industrial countries	(1971:1Q-2003:4Q)	VAR Single Equation
Choudhri and Hakura (2006)	71 countries	(1979:1Q – 2000:4Q)	Single Equation

Table 1. (continued)

Carriere-Swallow et al. (2016)	31 advanced and 31 emerging market economies	(2000:1M-2015:12M)	Single Equation Panel Fixed Effect
Caselli and Roitman (2016)	A panel of 28 emerging countries	(1980-2014)	Local projection method
Jasova et al. (2016)	22 emerging and 11 advanced economies	(1994:1Q – 2015:4Q)	Dynamic Panel Method
Ghosh (2013)	Latin American Countries: Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador, Mexico, Peru and Uruguay	(1970:1Q – 2010:1Q)	Seemingly Unrelated Regression (SUR)
Amiti et. al. (2016)	Belgium	1995-2017 (Annual)	Single Equation (OLS & IV) Model
Sadeghi et. al. (2015)	Selected Middle Eastern and North African Countries	1994-2012 (Annual)	Dynamic Panel GMM approach
Reinhart et al. (2014)	Non-industrial economies	1996-2001 (Annual)	Panel Regression
Gopinath and Itskhoki (2010)	USA	(1994:1M - 2005:12M)	Single Equation
Edwards (2006)	Selected IT Countries: Australia, Brazil, Canada Chile, Israel, Korea, Mexico	1986:1Q-2005:1Q	Seemingly Unrelated Regression (SUR)
Coulibaly and Kempf (2010)	27 Emerging countries	(1989:1Q - 2009:1Q)	Panel VAR
Nalban (2015)	4 Central and Eastern Europe Countries (Romania, Hungary, Czechia, Poland	(2001:1M-2014:6M)	Panel Bayesian VAR
Faryna (2016)	Ukraine and Russia	(2000:1M 2015:11M)	Bilateral panel VAR (BPVAR)

Table 2.

Determinants of Exchange Rate Pass-through in the Literature

Factor	Reference Studies
Inflation Level	Taylor (2000), Gagnon ad Ihrig (2004), Corsetti et. al. (2008), Choudhri and Hakura (2006), Carriere-Swallow et al. (2016), Lopez-Villavicencio and Mignon (2016), Caselli and Roitman (2016), Jasova et al. (2016)
Trade Openness	Campa and Goldberg (2005), Goldfajn and Werlang (2000), Barhoumi (2006), and Ghosh (2013)
Foreign Currency Invoicing	Gopinath et. al. (2010), Gopinath (2015), Devereux et. al. (2015), Casas et al. 2017
Competition	Devereux et. al. (2015), Amiti et. al. (2016)
Dollarization Level	Reinhart et al. (2014), Carranza et. al. (2009), and Sadeghi et. al. (2015)
Frequency of Price Adjustment	Gopinath and Itskhoki (2010); Devereux and Yetman (2003); Corsetti et. al. (2008)
Dispersion of Price Changes	Berger and Vavra (2015)
Nominal Rigidities	Devereux and Yetman (2003); Corsetti et. al. (2008)
Inflation Volatility	Taylor (2000), Lopez-Villavicencio and Mignon (2016), Jasova et al. (2016), Mihaljek and Klau (2008)
Exchange Rate Volatility	Kohlscheen (2010); Campa and Goldberg (2005) McCarthy (2000)
Inflation Targeting Policy & Central Bank Credibility	Edwards (2006), Coulibaly and Kempf (2010), Eichengreen (2002); Mishkin (2000); Mishkin & Savastano (2000), Gagnon ad Ihrig (2004), Carriere-Swallow et al. (2016)

CHAPTER 3

A BRIEF OVERVIEW OF ECONOMIC OUTLOOK and STRUCTURAL VULNERABILITIES in EMs

Before proceeding to the empirical analysis, it would be informative to provide a brief discussion of general economic outlook of selected EMs and the possible implications of EMs' structural vulnerabilities on pricing tendencies.

In this study, the selected sample of EMs comprises 14 peer countries which are classified as emerging country by major worldwide economic institutions including IMF, OECD and World Bank. Those countries are considered to be peer countries according to many international investment institutions in terms of portfolio approach as well. Selected countries are evaluated to reflect different geographical, market-based and macroeconomic outlook characteristics. Moreover, all of the selected EMs in this study are inflation targeting countries whose one of the main policy interests is inflation and its determinants. Therefore, examining the exchange rate inflation nexus for those selected countries while considering the reliable and frequent data availability issue seems more appropriate.

As it is mentioned before, there seems to be no previous profound and comprehensive study in the empirical literature investigating the effects of considered structural fragilities on ERPT. Here, possible linkages between such vulnerabilities and price stability (as well as financial stability) will be briefly discussed. Additionally, the current outlook and recent trends in such indicators in EMs can also be tracked via graphical analysis.

3.1 Selected Emerging Economies General Economic Outlook

3.1.1 Brazil

When we look at the general economic outlook in Brazil (a natural resource-rich EM country) its economy experienced a short recovery period in terms of GDP growth after GFC. Following that, with geopolitical concerns and fluctuations in global risk appetite, Brazil experienced a considerable slowdown. During that period, inflation levels initially increased to two-digit levels; afterwards price pressures have been subdued. Compared to EM countries, unemployment levels are elevated owing to deceleration in economic activity. In line with such developments, the local currency has undergone a significant depreciation trend.

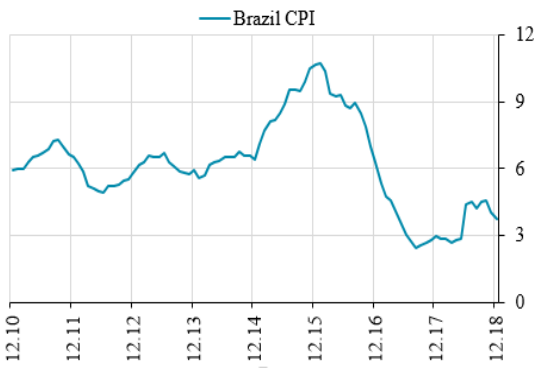


Figure 3. Brazil CPI (YoY, %)

Figure 4. Brazil GDP Growth (%)

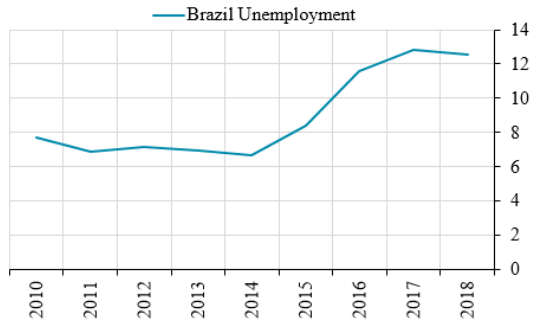


Figure 5. Brazil Unemployment (%)

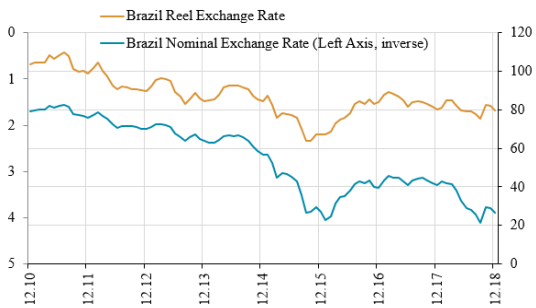


Figure 6. Brazil Exchange Rate

3.1.2 Chile

Among EMs, Chile has a relatively higher ranking in terms of per capita GDPand economic welfare. Its economy is mainly based on mining sector, especially, copper and related industries. Chile's economic performance after GFC has been compatible with other EM countries as the economy exerted recovy in earlier times, while it has decelerated as time elapsed until the end of 2016. More recently, the economic performance of Chile is rather promising. In addition to this, the inflation level in Chile is relatively lower and stabilized around 3% level as suggested by recent data. In terms of labor market, 7% unemployment rate happens to be relatively higher compared to other EMs. On the other hand, the local currency of Chile has followed a depreciation trend similar to general tendencies in EM universe.

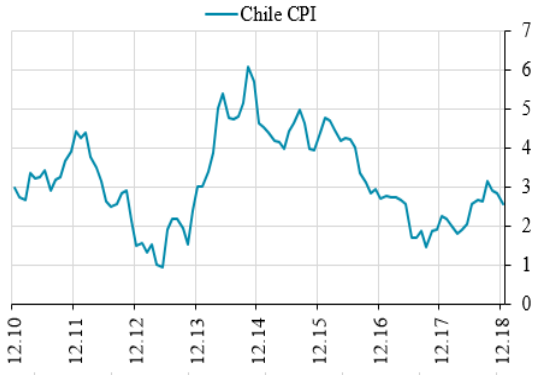


Figure 7. Chile CPI (YoY, %)

Figure 8. Chile GDP Growth (%)

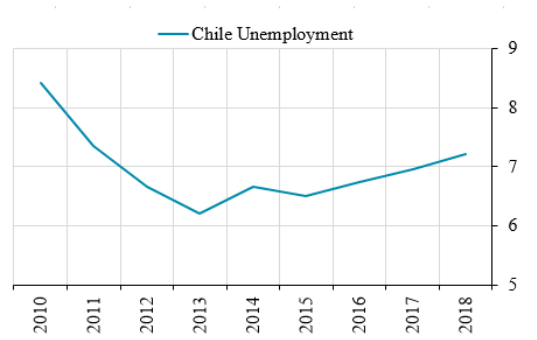


Figure 9. Chile Unemployment (%)

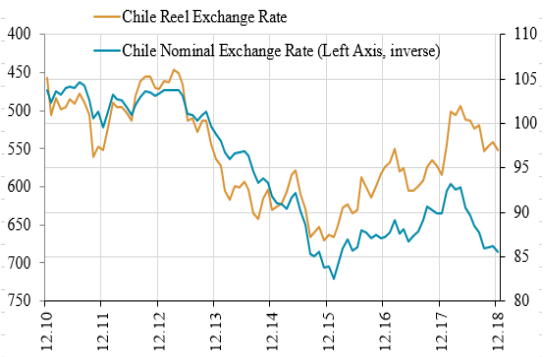


Figure 10. Chile Exchange Rate

3.1.3 Colombia

From an endowment-based perspective, Colombia has very reach coal and petroleum reserves. Even in the GFC period, the economy has not contracted deeply, wheras somewhat deterioration occurred in GDP growth. After GFC, economic growth recovered and reached above 8% levels in 2011. Thereafter, economic activity entered a declining trend and stabilized around 2% levels. Apart from the observed peak in the 2015-2016 period, the inflation level hovered around 2-4% range. Focusing on other macroeconomic aggregates, the unemployment level remained above EM average during that period. Colombian local currency has followed a depreciation trend similar to many EM countries against the US dollar.

Figure 11. Colombia CPI (YoY, %)

Figure 12. Colombia GDP Growth (%)

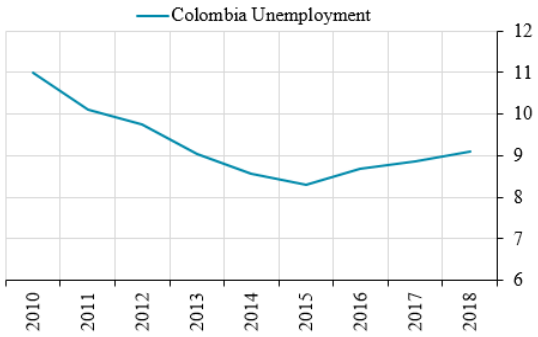


Figure 13. Colombia Unemployment (%)

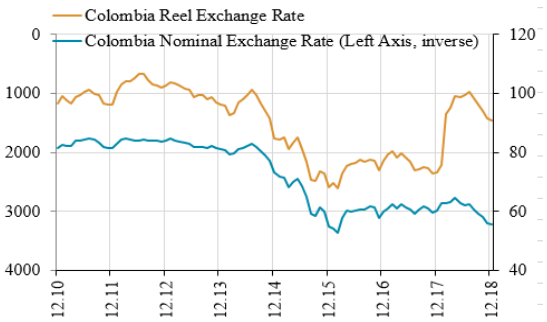


Figure 14. Colombia Exchange Rate

3.1.4 Czechia

Czechia with more than 20,000 US dollar per capita GDP has relatively higher ranking compared to many other emerging economies. In addition to GFC period, Czechia has a recessionary period between 2012 and 2013. On the other hand, in the recent period, economic activity remained robust with 4-5% GDP growth levels. During this period, headline inflation remained well below EM average. The positive consequences of such robust macroeconomic outlook have also been transmitted into labor market developments. Moreover, the local exchange rate followed a relatively stable path in the examined episode.

Figure 15. Czechia CPI (YoY, %)

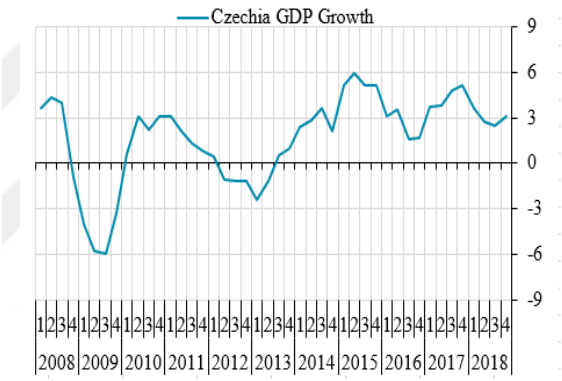


Figure 16. Czechia GDP Growth (%)

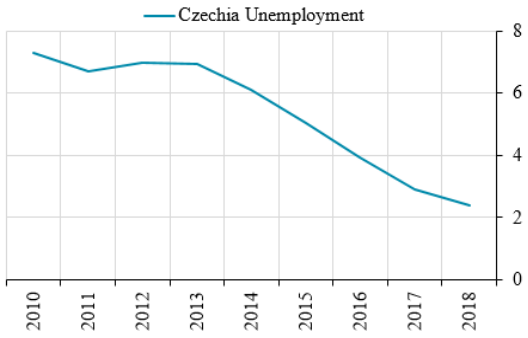


Figure 17. Czechia Unemployment (%)

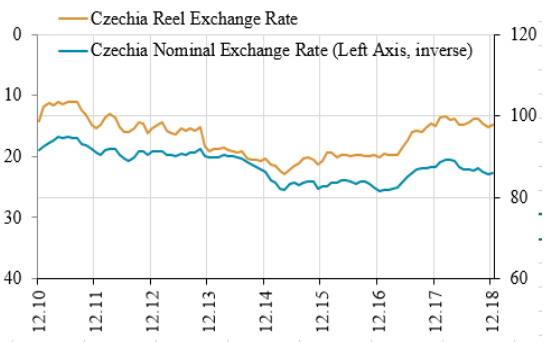


Figure 18. Czechia Exchange Rate

3.1.5 India

Considering its high population, India's relatively abundant natural resources are not sufficient and it is one of the net oil importing countries in EM group. In addition to information technologies dominated services sector, agriculture also plays a crucial role in the economy. Apart from the GFC period, India's solid economic growth performance makes it one of the highest growing EM country. However, the country's inflation record is not that much promising due to several shocks it has experienced such as weather, food inflation etc. However, compared to other EMs' labor market conjuncture, more positive outlook is observed. Lastly, the local currency followed a declining trend.

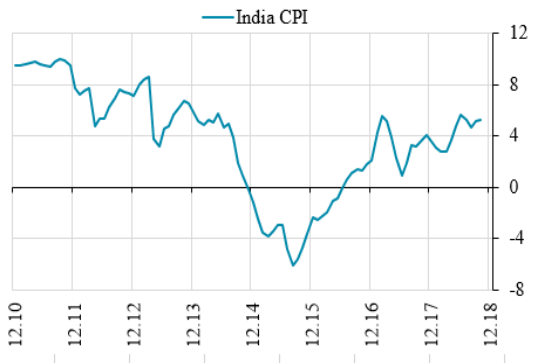


Figure 19. India CPI (YoY, %)

Figure 20. India GDP Growth (%)

Figure 21. India Unemployment (%)

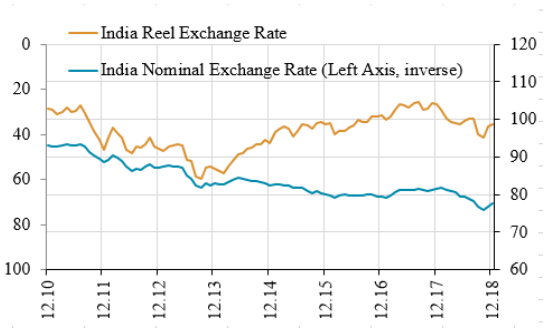


Figure 22. India Exchange Rate

3.1.6 Indonesia

Except for fluctuations during GFC period, Indonesian economy has shown quite robust economic growth at 6% levels, similar to its counterparties in Asia. However, consumer price pressures have been more volatile and the level of inflation is above EM average during the examined period, while we see some sort of stabilization in near time. On the other hand, unemployment levels decreased to 4% levels. Lastly, the local currency rate followed a depreciation trend.

Figure 23. Indonesia CPI (YoY, %)

Figure 24. Indonesia GDP Growth (%)

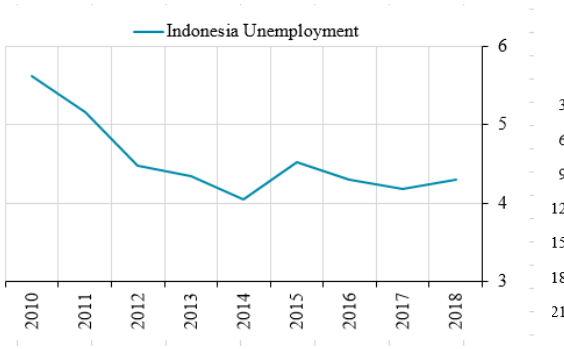


Figure 25. Indonesia Unemployment (%)

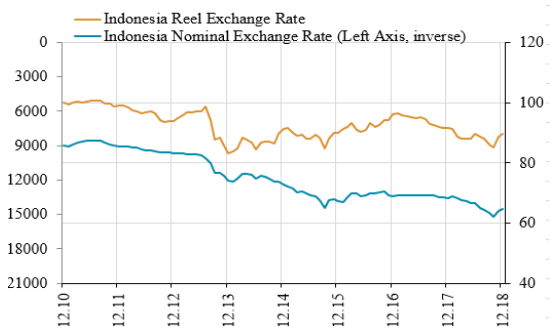


Figure 26. Indonesia Exchange Rate

3.1.7 Israel

With above 40,000 US dollar GDP per capita levels, Israel ranked at the top of the EM list. Even, some classification criteria dictate that Israel should be defined as a developed country. However, considering many other structural development criteria, Israel is mostly categorized under the EM group. After GFC period economic growth of Israel have fluctuated between 2% to 6% on an annual basis. On the other side, headline inflation following a declining trend and it almost reached to 1% levels. Being exposed to several domestic and global shocks, local currency has fluctuated during the post-crisis period.

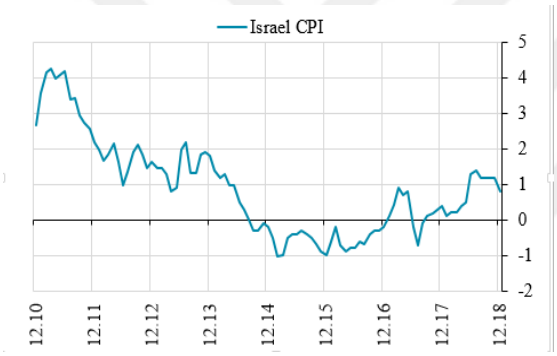


Figure 27. Israel CPI (YoY, %)

Figure 28. Israel GDP Growth (%)

Figure 29. Israel Unemployment (%)

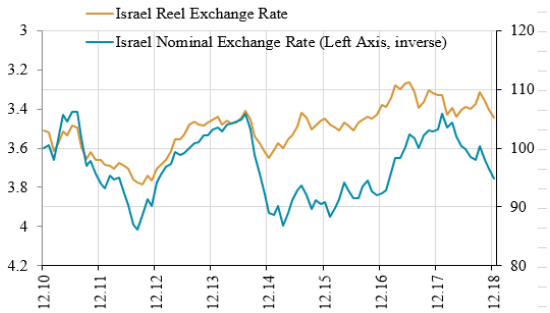


Figure 30. Israel Exchange Rate

3.1.8 Mexico

Mexico was severely affected by GFC and the contraction in the economic activity reached up to almost 10%. Thereafter, during the later times of examined sample period, economic growth recovered and stabilized around 3% level. In terms of price developments, headline inflation remained stable at 4% levels before it increased to 6% in 2017. On the other hand, the local currency of Mexico has followed a depreciation trend similar to many EM countries. Unemployment levels are below 5% level in the recent period.

Figure 31. Mexico CPI (YoY, %)

Figure 32. Mexico GDP Growth (%)

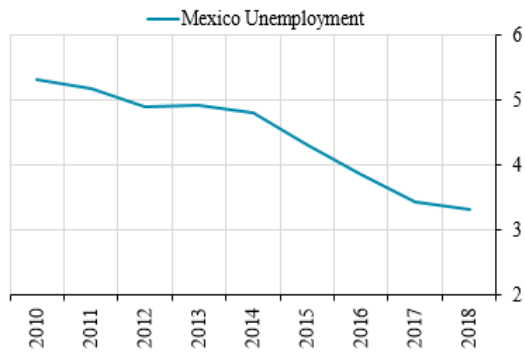


Figure 33. Mexico Unemployment (%)

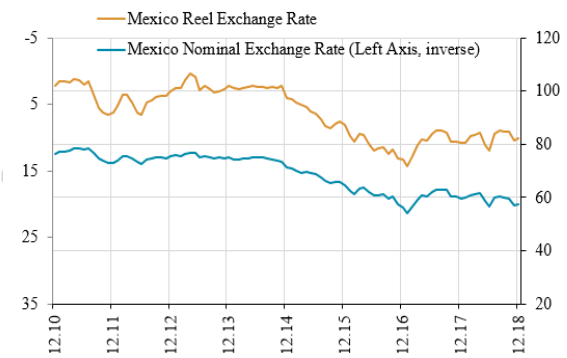


Figure 34. Mexico Exchange Rate

3.1.9 Peru

Although there exists a declining trend in Peru's economic activity after GFC, compared to EM average, its growth rate remained stable at 4% levels. Moreover, headline inflation and the unemployment rate stayed below 4% which is below EM average as well. Prognosticatively, the local currency of Peru has followed a depreciation trend similar to many EM countries.

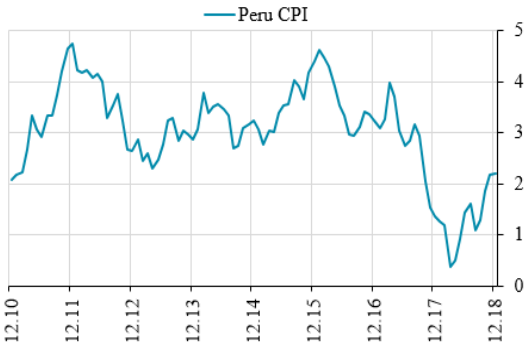


Figure 35. Peru CPI (YoY, %)

Figure 36. Peru GDP Growth (%)

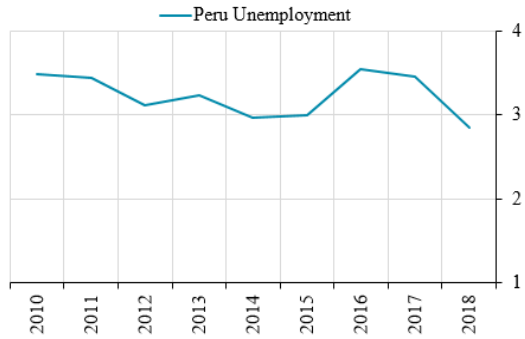


Figure 37. Peru Unemployment (%)

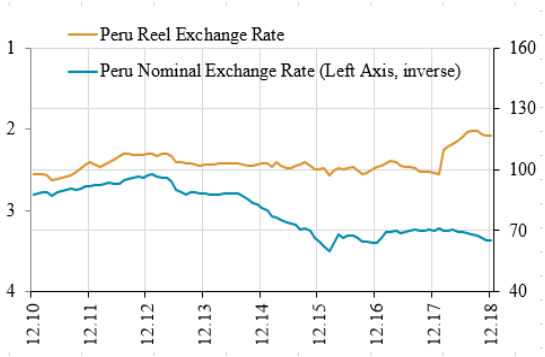


Figure 38. Peru Exchange Rate

3.1.10 Philippines

Although there happens to be a relative acceleration lately, Philippines' consumer inflation rate remained below EM average levels. Having said this, with almost 6% GDP growth, Philippines showed a solid growth performance. Moreover, in line

with such robust economic outlook unemployment levels restrained. The local currency of Philippines has been losing value against US dollar which is broadly in line with EM countries after GFC.

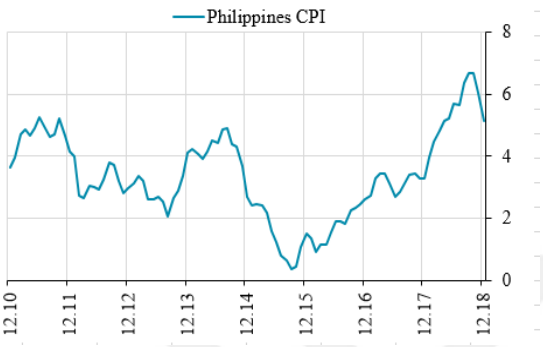


Figure 39. Philippines CPI (YoY, %)

Figure 40. Philippines GDP Growth (%)

Figure 41. Philippines Unemployment (%)

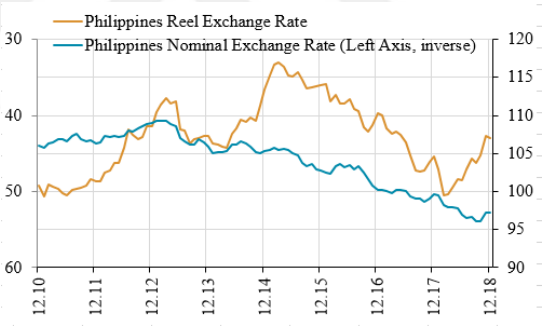


Figure 42. Philippines Exchange Rate

3.1.11 Romania

After GFC, Romanian economy has experienced a relatively longer recessionary period. Thereafter, it has experienced a smooth recovery period. During that period, headline inflation declined significantly until 2016, then displayed a rebound. In terms of labor market, the unemployment rate remained elevated until 2015, then decreased to 4%. In addition to these, the local exchange rate followed a similar depreciation trend.

Figure 43. Romania CPI (YoY, %)

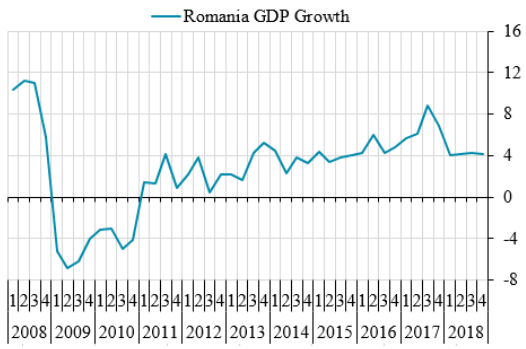


Figure 44. Romania GDP Growth (%)

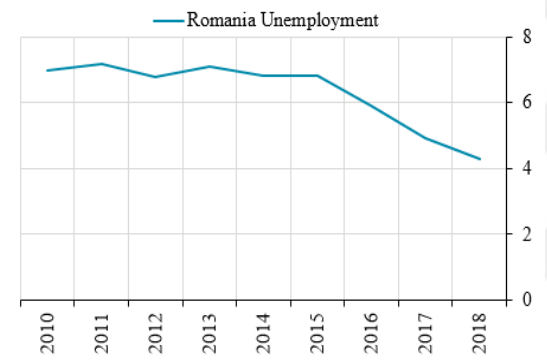


Figure 45. Romania Unemployment (%)

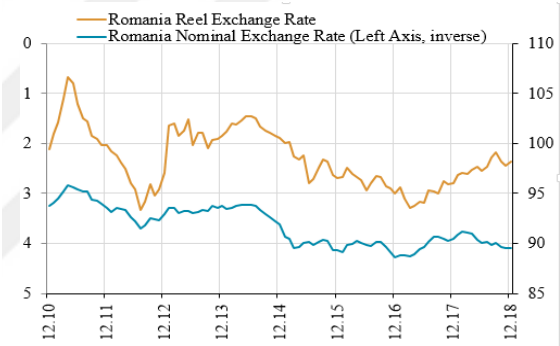


Figure 46. Romania Exchange Rate

3.1.12 Russia

Apart from the natural gas and petroleum, Russia has an abundant resources of precious metals and minerals which have considerable effects on Russian economy. The trajectory of oil prices has been also transmitted into macroeconomic indicators such as inflation and GDP growth. After GFC period, Russia experienced volatile and higher inflationary levels. On the other hand, its economy underwent several deceleration period, and on average GDP growth stayed 5% level. Moreover, during that period, the effects of such external shocks can be seen from exchange rate developments as well.

Figure 47. Russia CPI (YoY, %)

Figure 48. Russia GDP Growth (%)

Figure 49. Russia Unemployment (%)

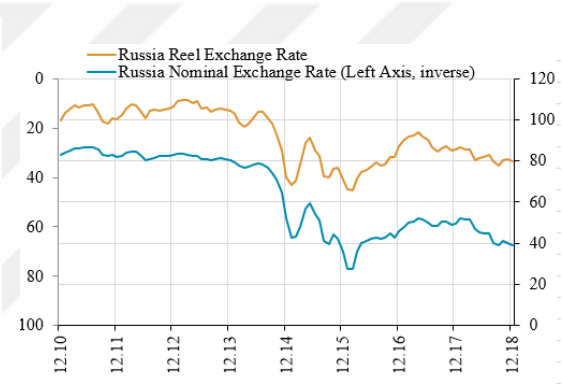


Figure 50. Russia Exchange Rate

3.1.13 South Africa

In line with other EMs, South Africa experienced a recessionary period during GFC. After that, economic activity recovered but remained weak compared to EM average. Although the inflation volatility is quite low, the level of inflation in the country remained well-above EM average. Moreover, the unemployment rate in South Africa is considerably high compared to other EMs. The country faces several exchange rate shocks as well during that period.

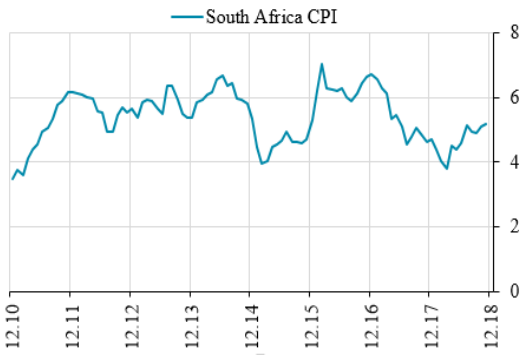


Figure 51. South Africa CPI (YoY, %)

Figure 52. South Africa GDP Growth (%)

Figure 53. South Africa Unemployment (%)

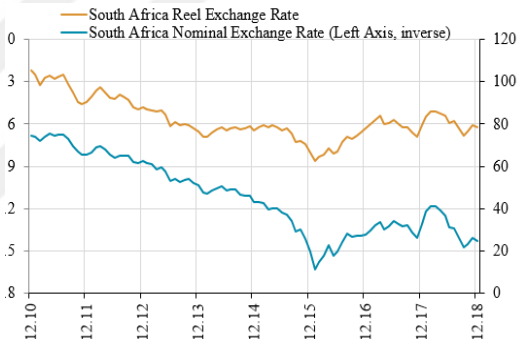


Figure 54. South Africa Exchange Rate

3.1.14 Turkey

Due to several domestic and global shocks, macroeconomic indicators of Turkey has followed a relatively volatile path after the GFC period. GDP growth firstly recovered from -10% levels to above 10%. However, recently economic activity in Turkey has decelereted again. On the other hand, inflation level remained above EM average during the post-crisis era and increased sharply in the current period. Moreover, unemployment levels hovered around 10% levels. Lastly, abovementioned external shocks have also transmitted into exchange rate developments and local currency followed a depreciation trend.

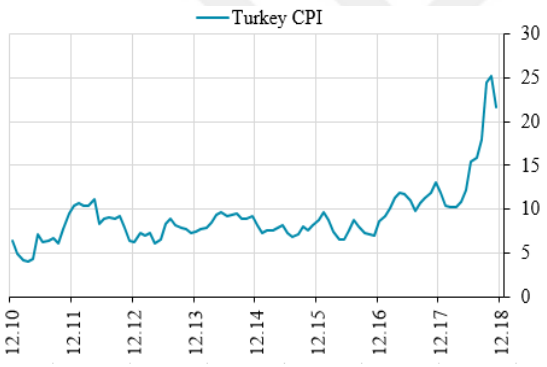


Figure 55. Turkey CPI (YoY, %)

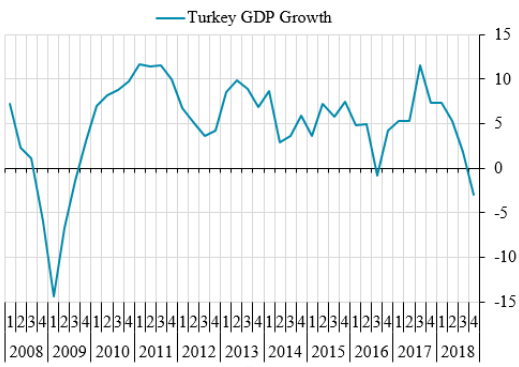


Figure 56. Turkey GDP Growth (%)

Figure 57. Turkey Unemployment (%)

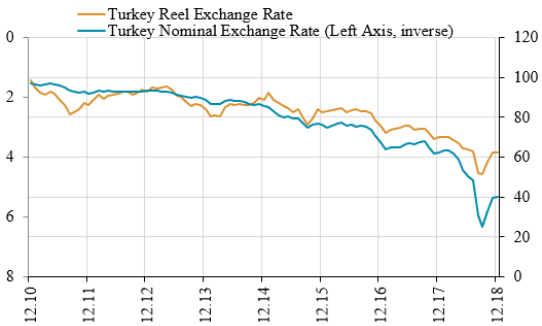


Figure 58. Turkey Exchange Rate

Table 3.

Selected Countries GDP Per Capita Levels (US dollar)

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018
Brazil	11286	13246	12370	12300	12113	8814	8713	9881	8921
Chile	12808	14637	15352	15843	14671	13574	13748	15037	15923
Colombia	6327	7324	8043	8213	8114	6176	5871	6376	6651
Czechia	19808	21717	19730	19916	19745	17716	18463	20380	22973
India	1358	1458	1444	1450	1574	1606	1729	1981	2016
Indonesia	3122	3643	3694	3624	3492	3332	3563	3837	3894
Israel	30659	33701	32543	36344	37734	35855	37372	40544	41614
Mexico	9271	10203	10242	10725	10922	9606	8739	9281	9698
Peru	5082	5869	6529	6757	6679	6228	6205	6701	6947
Philippines	2124	2345	2573	2749	2831	2867	2941	2982	3103
Romania	8210	9105	8535	9555	10027	8977	9567	10793	12301
Russia	10675	14351	15435	16007	14101	9314	8745	10751	11289
South Africa	7329	8007	7501	6829	6428	5733	5262	6121	6340
Turkey	10672	11336	11707	12519	12096	10949	10821	10500	9311

3.2 Selected Emerging Economies Structural Vulnerabilities

3.2.1 Measures of Dollarization and the Relation with ERPT

Although there are various definitions, the dollarization can be broadly described as the situation in which the foreign currency (mainly USD or Euro) function as the benchmark currency in most of the transactions in the domestic economy from both asset and liability side. In other words, the degree to which assets or liabilities are denominated in FX is called as dollarization. Regarding EMs, dollarization has become a significant source of vulnerability, especially after the abundance of global liquidity and accompanying risk-taking behavior in the post-Global Financial Crisis era.

In line with the literature, we can proxy the dollarization level in EMs as the portion of total loans in the banking system denominated in FX which is provided by IMF International Financial Statistics (IMF IFS) database[2] . Although some declining trend has experienced in EM dollarization levels recently, there exist large heterogeneity across countries.

To be able to categorize EM countries, historical averages for this ratio are calculated (for the years covering 2010 and 2018 period) and EM countries are assigned into two groups based on the median value of the averages. While countries with the below-the-median ratios are termed as low-dollarization economies, others are labeled as high-dollarization ones (Yılmaz et al., 2019).

[2] The IMF IFS database includes data for almost 200 countries around the world. The database covers subtopics regarding the balance of payments, exchange rates, industrial production, interest rates, money and banking, national accounts, price indices and some others.

Table 4.

Dollarization Level Summary Statistics (FX Loans to Total Loans, Percentage)

Countries	Mean	Std. Dev.	Min	Max
Brazil	15.4	2.5	11.7	19.3
Chile	16.6	3.0	11.2	20.0
Colombia	7.4	0.8	6.1	8.4
Czechia	23.4	3.8	20.9	29.1
India	9.8	2.1	7.3	12.2
Indonesia	15.7	0.8	14.8	17.0
Israel	13.5	2.2	10.3	16.6
Mexico	12.2	1.3	10.3	13.9
Peru	37.8	7.5	28.7	46.5
Philippines	11.9	0.8	10.6	13.1
Romania	54.4	10.2	37.2	63.4
Russia	26.6	4.6	21.3	35.3
South Africa	9.1	1.4	6.7	11.2
Turkey	28.8	3.0	25.0	33.7

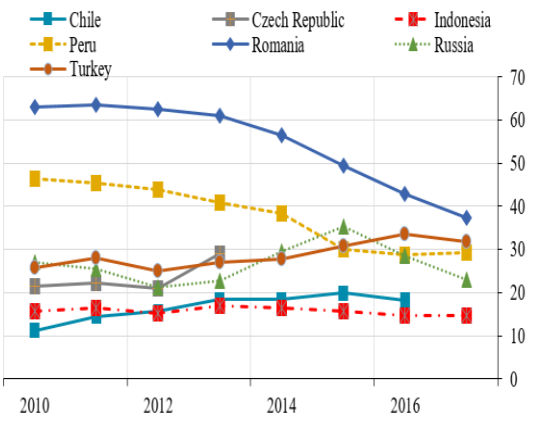


Figure 59. FX Loans to Total Loans-Highly Dollarized Countries

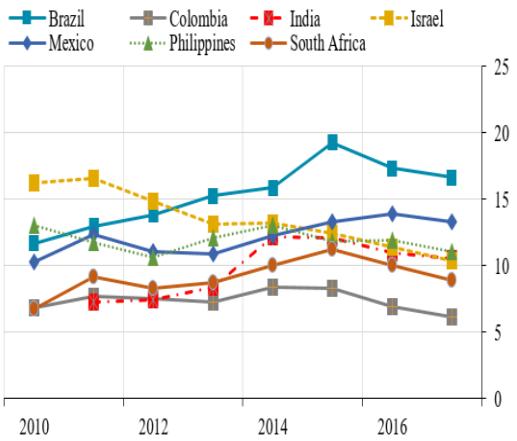


Figure 60. FX Loans to Total Loans-Low Dollarized Countries

The possible channels through which dollarization increases ERPT can be listed as direct cost channel, balance sheet channel and indexation channel. Put it differently, dollarization might have direct effects on the pricing mechanism of tradable goods, but it might have indirect implications regarding indexation for wages, non-tradables, and expected returns in EMs particularly in higher uncertainty periods (Bayramoglu and Allen, 2017). First of all, when we examine the firms in highly dollarized countries, imported input ratio seems to be quite high in these countries. In the case of local currency depreciation, to be able to prevent possible squeeze in their profit margins, firms rise their prices by also taking demand conditions into consideration. Actually, this mechanism is also valid for intermediary agents selling imported final consumption goods into domestic markets in local currency. Moreover, from the balance sheet perspective, FX mismatches might occur between firms' assets and liabilities in highly dollarized economies which can result in transaction and economic FX risk (Alper, 2008). In the times of local currency deprecation, financing costs of firms will inevitably increase if they face with such FX mismatches in their balance sheet.

Therefore, to be able to protect their markups, firms tend to inflate prices and reflect the extra cost they incurred to the customers. In high dollarization countries, there exists a common approach to index returns price changes to hard currencies as well. When wage contracts are formed or expected profits from any investment are anticipated, FX movements constitutes a threshold level which, in turn, brings ERPT. In short, it is claimed that high dollarization can harm monetary transmission mechanism and effective policy-making, due to the higher exposure of dollarized EMs to external currency shocks.

3.2.2 Measures of Current Account Deficit/Financing Compositions and the Relation with ERPT

Current account deficit (CAD) is incurred when the export of goods and services of a country do not balance its imports. Therefore, the country should be able to find the required capital to finance this deficit. In the literature, both the sources of CAD and the way it is financed attract attention, while there is no consensus regarding the effects of CAD. Overall, it is mostly argued that the sources of CAD is influential in terms of possible implications on the real economy. To exemplify, if a country running CAD, invest the capital coming from abroad in productive sectors and build up the necessary infrastructure for technological improvement; this will probably have a positive effect on growth. However, if a country builds up CAD in an unsustainable way and assign the resources to inefficient industries, there will be many negative outcomes due to increased credit risk concerns (Forbes, Hjortsoe, and Nenova, 2017).

As highlighted above, the interpretation of CAD is contingent. To put it another way, if we focus on the difference between exports and imports, CAD might signal lower competitiveness of the country. On the other hand, if we consider CAD as the difference between the amount of investment and savings of a country, CAD might be the result of the high growth trajectory of the country or possibly excessive consumption habit. Thus, linking CAD to better or worse economic performance without deep analysis would be a misinterpretation.

Generally, the pace of economic activity in EMs is associated with CAD because of the insufficient domestic savings to fund investment. This kind of economic growth comes with the cost of increased vulnerability of the economy to external resources. Many argue that such growth pattern is short-lived and exposed to quick reversal when the global risk appetite worsens or the country-specific sustainability issues arise. In other words, although in good times CAD might seem to good for growth in EMs via extending the resource availability, in times of turmoil, in case of funding dries up, it propagates the effect of financial crisis further.

In terms of CAD financing, short term capital which is also called “hot money” instead of long term investment may create further fragilities for EM countries. First of all, short term financing leads to roll-over risk while this funding source can exit from the country easily. However, long term financing sources (FDI) are more robust and stable funding alternatives. When foreign investor confidence disturbed, the reversal of short term financing are easier than FDI’s. Therefore, FDI ratio (FDI/GDP) in the economy can be seen as a structural soundness indicator when external balance and financing considered.

To sum up, CAD and its financing sources should be considered seriously when the soundness of EMs are taken into account. More clearly, CAD and long/short term financing of it have important implications for EM in terms of output growth and inflation. These vulnerabilities regarding external balance might put pressure on exchange rates, confidence of agents and pricing behavior of firms. In this respect, the detailed analysis may raise the question that apart from the direct effect coming through exchange rate fluctuations; CAD and its financing source might have indirect implications on pricing behavior of the firms in EMs. Therefore, CAD and its financing style might be possible candidates affecting ERPT in EMs.

As a result, countries facing higher CAD, are more exposed to larger exchange rate shocks and higher inflationary pressures. It should be noted here that the price increases in such countries are larger than the exchange rate shocks they face imply probably due to vulnerabilities coming from external balance may increase the ERPT via distorting pricing mechanisms (Kılınç et. al., 2016).

Table 5.

Current Account Balance (CAB) Summary Statistics (As a Percentage of GDP)

Countries	Mean	Std. Dev.	Min	Max
Brazil	-2.7	1.2	-4.2	-0.5
Chile	-1.9	1.7	-4.0	1.4
Colombia	-3.9	1.2	-6.3	-2.9
Czechia	-0.6	1.7	-3.5	1.5
India	-2.3	1.5	-5.0	-0.5
Indonesia	-1.7	1.4	-3.2	0.7
Israel	3.2	1.5	0.5	5.3
Mexico	-1.7	0.7	-2.6	-0.5
Peru	-3.1	1.4	-4.8	-1.3
Philippines	2.3	1.8	-0.7	4.2
Romania	-2.9	1.9	-5.1	-0.7
Russia	3.2	1.4	1.5	5.0
South Africa	-3.7	1.6	-5.8	-1.5
Turkey	-5.6	1.7	-8.9	-3.7

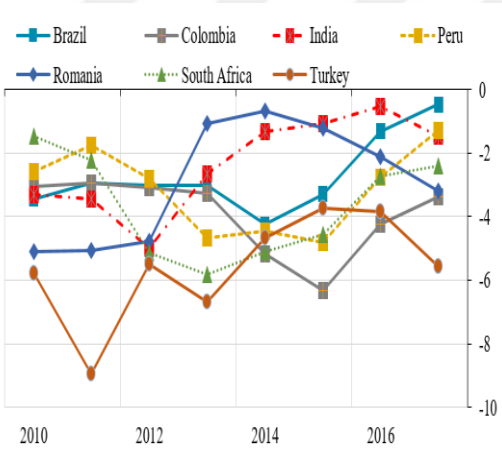


Figure 61. Current Account Balance - High Deficit Countries

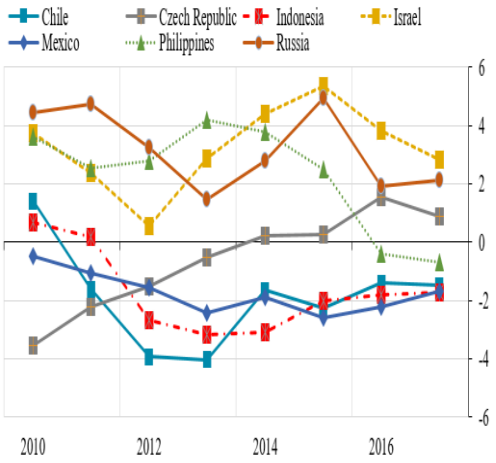


Figure 62. Current Account Balance - Low Deficit/Surplus Countries

Table 6.

Financing of Current Account Deficit Summary Statistics (FDI As a Percentage of GDP)

Countries	Mean	Std. Dev.	Min	Max
Brazil	3.8	0.5	2.8	4.3
Chile	7.6	2.8	2.3	11.3
Colombia	4.1	0.8	2.2	4.9
Czechia	3.7	1.6	0.9	5.6
India	1.7	0.3	1.3	2.1
Indonesia	2.1	0.7	0.5	2.8
Israel	3.6	0.9	2.0	5.2
Mexico	2.6	0.8	1.5	3.7
Peru	4.3	1.3	2.2	6.1
Philippines	1.7	0.9	0.5	3.2
Romania	2.2	0.6	1.3	3.3
Russia	2.1	0.9	0.5	3.0
South Africa	1.1	0.6	0.4	2.2
Turkey	1.6	0.3	1.2	2.1

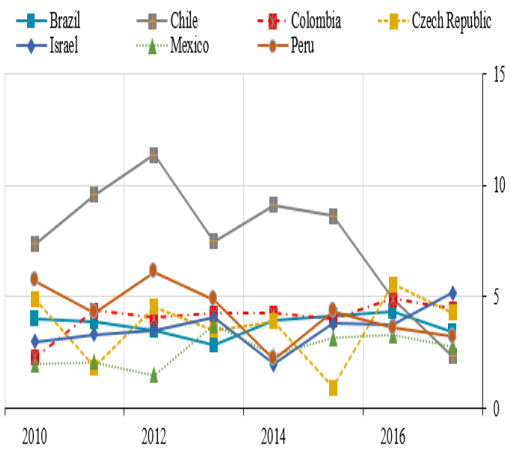


Figure 63. High FDI Financing Countries

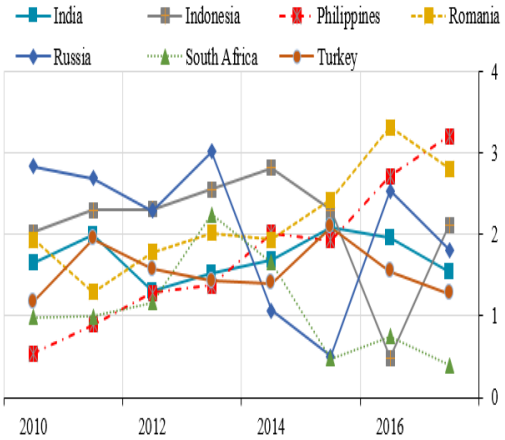


Figure 64. Low FDI Financing Countries

3.2.3 Measures of External Financing Need and Relation with ERPT

In addition to CAD, broader external financing need measure which is defined by Institute of International Finance (IIF) as the sum of the current account balance, amortization on medium to long-term external debt and short term external debt can be controlled while assessing the EM vulnerabilities. Countries exceeding the benchmark level in terms of external financing requirements might be considered as high-risk countries. Such countries with substantial external financing needs are more exposed to changes in global risk appetite and possible capital reversal. Therefore, vulnerabilities coming from external financing needs can exacerbate the possible negative impacts of external shocks domestic economy via distorting pricing mechanism in both financial markets and goods markets in either direct or indirect manner.

Table 7.

External Financing Needs Summary Statistics (FDI As a Percentage of GDP)

Countries	Mean	St. Dev.	Min	Max
Brazil	8.5	1.7	6.6	11.0
Chile	16.0	1.8	13.4	18.5
Colombia	12.0	3.1	8.9	16.6
Czechia	37.3	11.0	27.8	61.7
India	9.1	1.5	7.5	11.8
Indonesia	11.7	2.7	7.6	15.1
Israel				
Mexico	11.8	2.2	7.9	14.7
Peru	10.4	1.2	7.8	11.4
Philippines	6.5	1.7	4.1	8.6
Romania	28.3	3.6	23.0	33.0
Russia	5.1	2.5	1.3	9.2
South Africa	14.7	3.6	8.9	17.4
Turkey	24.7	2.4	21.8	29.3

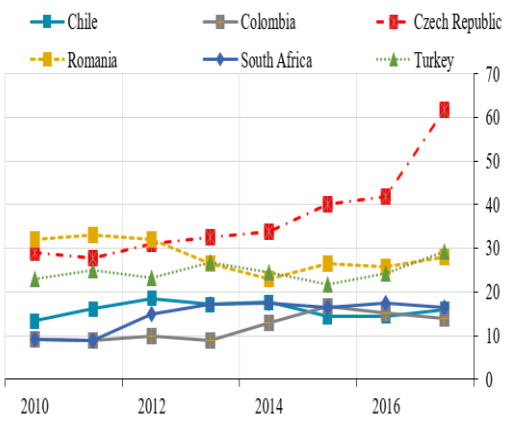


Figure 65. High External Financing Need Countries

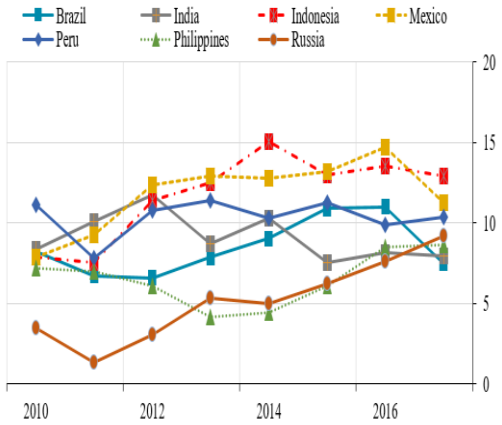


Figure 66. Low External Financing Need Countries

3.2.4 Measures of FX-Denominated Debt and Relation with ERPT

Especially after GFC, lower interest rate environment in advanced economies leads to ample liquidity transfer from developed markets to emerging economies with the return-seeking investor behavior. In such favorable liquidity conditions, corporates in EMs switched to borrow in foreign currency to be able to lower their funding costs. Thus, FX denominated debt held by corporates in EMs increased sharply to 8.5 trillion dollars in 2018, 2 times higher than the level before GFC. This high amount of FX debt formation becomes a major concern with the normalization of monetary policy stance in advanced economies. In other words, tightening in financial conditions in developed economies led to a sharp decrease in fundings flow to EMs, even reversal of these funds to Advanced Economies to some extent. Such shifts in sentiment created additional risks for EMs in the form of rising funding costs and debt roll-over issues. Under these circumstances, depreciation pressures on the exchange rate became more prominent.

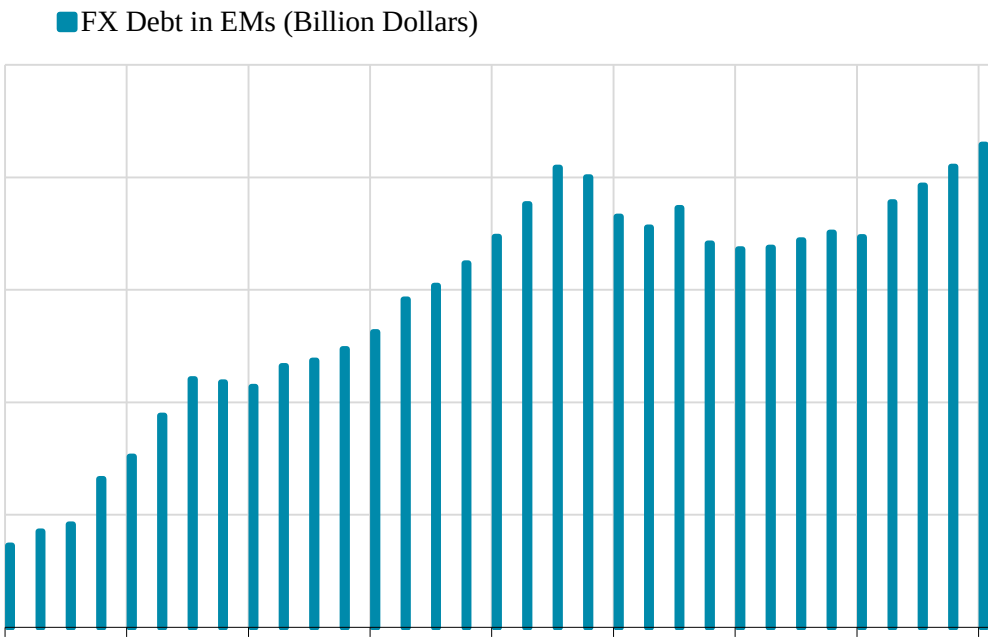


Figure 67. FX Debt in Emerging Markets (Billion Dollars)

Additionally, with the increased volatility of exchange rates, financial stability concerns have emerged. For example, economic agents face difficulties while evaluating the projects or valuing assets in such a volatile environment. Apart from that, confidence in the economy may decline significantly. Therefore, uncertainty in the economy shows contagion and spillover behavior among agents and lead to financial instability via forward and backward linkages. On the top of financial stability-related risks, such fluctuations in exchange rates have also the potential to disturb pricing behavior and create risks on the price stability front. More clearly, it might be argued that structural vulnerability coming from huge FX debt of corporates in emerging markets revives as a potential catalyzer of ERPT, due to increased sensitivity to currency fluctuations. Firms will face difficulties to service their FX-denominated debt if this exposure is not hedged properly. Thus, the mechanism through which exchange rate fluctuations affect domestic prices is more visible, due to sensitivities against exchange rate shocks coming from a significant amount of corporate debt denominated in FX.

Micro-dynamics and heterogeneity across sectors in terms of FX sensitivities also play a crucial role in pricing behavior. If the majority of FX debt is accumulated in the sectors which are not export-oriented exporting (or in other words, without natural hedge), servicing in the non-tradable area, or do not have hedging tendencies; ERPT effect might be amplified.

All in all, emerging economies with high and persistent CAD tend to accumulate a sizeable debt burden. Additionally, the proportion of the FX-denominated debt in EMs soared in recent years. This situation prompts concerns regarding financial and price stability perspectives of EMs. First of all, twin vulnerability (given high levels of CAD and FX debt) leads to frequent pressures on EM exchange rates to depreciate. Moreover, recent normalization tendencies in advanced eceonomies' monetary policies are observed to cause tighter financial conditions and increased interest rates. These developments will probably raise the funding costs in EMs. Considering such a scenario possible swings in global risk appetite might further disturb price stability and financial stability.

When we look at the foreign currency debt of non-financial corporates (NFC) relative to gross domestic product data which is collected from Institute of International Finance (IIF) database, even some decline in recent years, there exist a significant rise. Moreover, EM countries cannot be considered homogenous in terms of NFC FX debt.

Table 8.

FX Denominated Debt of NFC Summary Statistics (FX Debt As a Percentage of GDP)

Countries	Mean	Std. Dev.	Min	Max
Brazil	14.7	3.5	10.2	20.1
Chile	30.9	5.2	24.0	38.1
Colombia	9.9	3.6	5.4	14.8
Czechia	19.4	2.5	16.3	22.8
India	10.4	0.7	9.1	11.3
Indonesia	9.3	1.9	6.5	11.6
Israel	23.8	1.4	21.9	25.6
Mexico	17.5	1.5	15.9	19.9
Peru				
Philippines				
Romania				
Russia	20.2	2.8	17.1	25.2
South Africa	13.4	3.0	9.2	17.3
Turkey	28.9	6.5	19.5	37.0

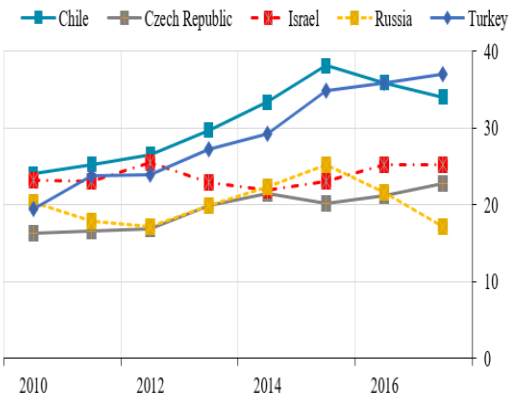


Figure 68. High NFC FX Debt Countries

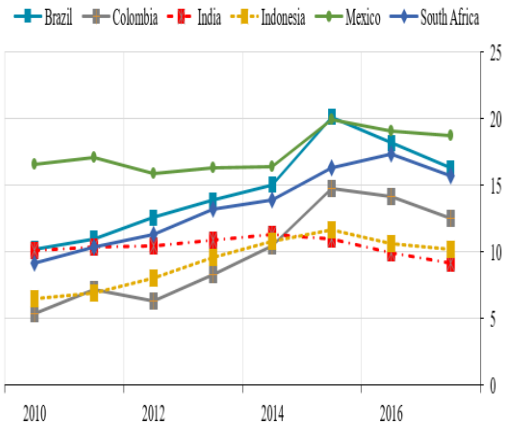


Figure 69. Low NFC FX Debt Countries

Table 9.

EM Debt Currency Breakdown (As Percentage of GDP, As of 2018)

Countries	NFC		Government		Financial		HH	
	LC	FC	LC	FC	LC	FC	LC	FC
Brazil	23.9	16.8	83.7	3.6	26.2	8.9	27.2	0
Chile	64.9	29.9	20.2	5.3	36.2	8.5	42.3	2.0
Colombia	23.2	11.2	36.9	13.9	0.4	4.7	26.1	0.1
Czechia	33.3	24.6	33.0	3.5	26.7	6.5	32.2	0.1
India	37.2	8.2	66.5	1.9	1.0	3.6	11.3	0
Indonesia	12.2	10.8	20.3	9.4	4.5	5.3	16.6	0.4
Israel	46.0	25.1	49.4	10.9	8.3	1.8	42.3	0.3
Mexico	7.8	19.1	29.5	6.0	13.6	2.9	16.4	0.0
Peru								
Philippines								
Romania								
Russia	31.9	15.3	11.4	3.7	5.8	5.7	16.3	0.2
South Africa	22.8	15.6	49.5	7.3	13.2	10.4	32.7	0.4
Turkey	35.2	40.1	16.9	15.4	4.5	23.1	17.1	0

3.2.5 Measures of Foreign Ownership of Local Currency Government Securities and Relation with ERPT

Another type of structural vulnerability which has a considerable effect on financial stability and price stability is relevant to foreign ownership of local currency financial markets, in particular, debt securities. Previous studies have shown that higher foreign investors participation rate in local bond markets may increase the maturities and lower the cost of funding (Sienaert, 2012). However, in case of a sudden shift in global risk appetite and considerable withdrawal of foreign funds might create fragilities in these markets also (Turner, 2012). Therefore, when the domestic currency is hit by an external shock and local currency depreciates, higher participation rate of foreign investors might exacerbate the effects on real economic outcomes. Therefore, in terms of the pricing mechanism, the effect of ERPT can also be boosted in such a scenario. In this study, we measure the foreign ownership with the proxy of non-resident's share in local currency sovereign bond market.

The data regarding foreign ownership of local debt markets is retrieved from IIF database. The data show mixed evidence regarding the recent trajectory in emerging market countries. Whilst in some EM countries foreign ownership increase, in some others there exist declining pattern.

Table 10.

Foreign Ownership of Local Currency Government Securities Summary Statistics (As a Percentage of GDP)

Countries	Mean	Std. Dev.	Min	Max
Brazil	14.6	3.2	10.9	19.5
Chile				
Colombia	11.2	9.3	1.7	25.9
Czechia	21.3	12.5	12.7	47
India	3.5	0.8	2.3	4.3
Indonesia	34.2	4.6	26.8	39.4
Israel				
Mexico	31.3	7.5	15.8	36.9
Peru	45.0	9.0	25.3	54.7
Philippines				
Romania	18.2	2.4	14.2	21.5
Russia	22.3	7.0	9.9	30.5
South Africa	33.8	3.9	26.7	37.1
Turkey	18.4	3.9	11.2	23.4

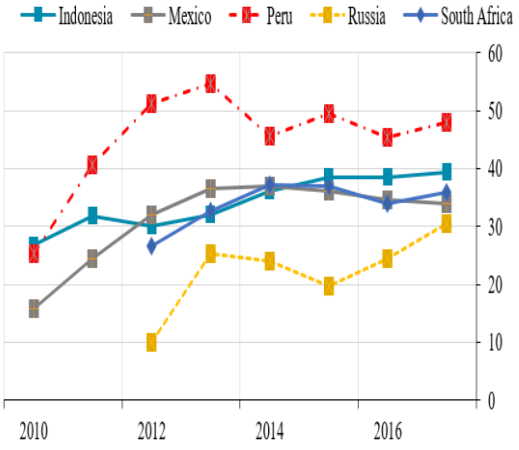


Figure 70. High Foreign Ownership Countries

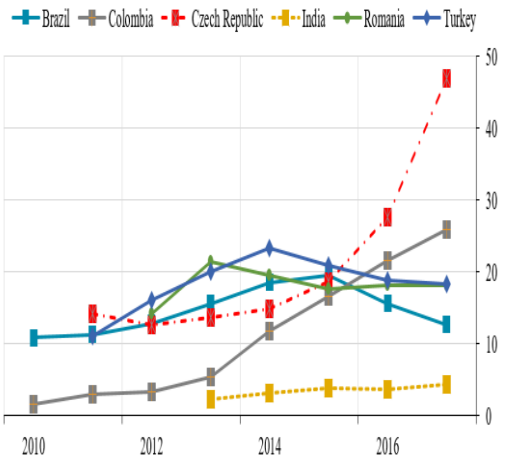


Figure 71. Low Foreign Ownership Countries

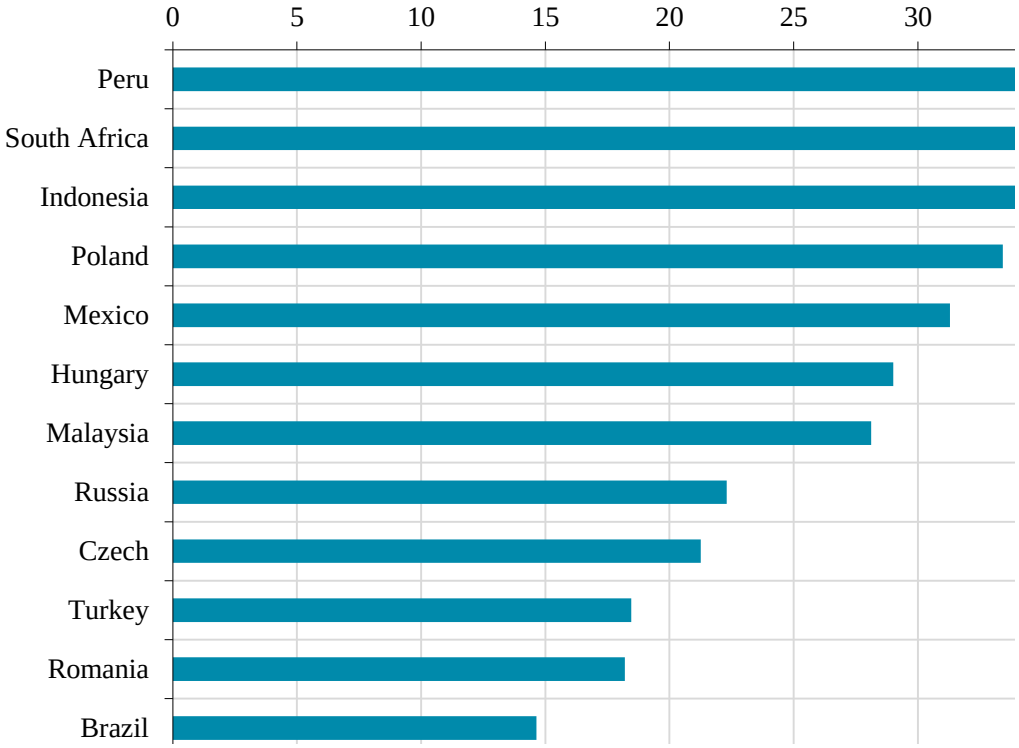


Figure 72. Foreign Ownership of Local Currency Government Securities (As of 2018, %)

3.2.6 Measures of Country Risk Premium and Relation with ERPT

Country risk premium can be considered as an indicator of investor perception regarding the riskiness of a country compared to its peers. In addition to this, the country risk premium is one of the main components of external financing cost of a country. Therefore, it has significant implications in terms of financial stability as well as price stability especially in EMs. For example, movements of risk premium are somewhat transmitted into currency behavior which is controlled in our analysis. However, there might be additional pressures coming from an increase in risk premium via creating financial vulnerabilities and distorting pricing behavior through influence on ERPT (Gagnon & Ihrig, 2004).

Within this framework, country risk premium can be followed through Credit Default Swap (CDS) spread[3]. When we look at EMs, there is significant heterogeneity in terms of CDS spread. Therefore, it can be argued that such heterogeneity might be a driving factor for ERPT differences. Apart from that, another indicator of country risk premium Emerging Market Bond Index Global[4] spreads are controlled as robustness.

CDS and EMBIG spread data is compiled from Bloomberg database. Both of the indicators show similar movements regarding risk premiums of EM countries. Across EMs, a common trend is observed regarding risk premiums such as there is a significant increase after Quantitative Easing (global shock), then with the normalization of process risk premiums declined.

[3] Credit Default Swap (CDS) is a financial derivative product which enables transferring credit/ default risk of the underlying asset to another counterparty.

[4] Emerging Markets Bond Global Index (EMBIG) is a benchmark index constructed by JP Morgan which tracks the performance of EM government bonds denominated in foreign currency which satisfy specific conditions.

Table 11.

Country Risk Premium Summary Statistics (CDS Spread, Basis Points)

Countries	Mean	St.d Dev.	Min	Max
Brazil	196.5	85.8	122.0	339.0
Chile	87.0	13.4	66.0	105.3
Colombia	140.6	37.7	101.1	211.9
Czechia	56.2	18.3	44.3	91.3
India				
Indonesia	170.1	24.6	116.9	196.7
Israel				
Mexico	123.1	23.5	84.1	166.1
Peru	125.3	21.6	88.2	151.1
Philippines	119.5	31.4	75.5	158.9
Romania	174.4	67.9	124.8	302.1
Russia	215.7	75.4	156.5	376.5
South Africa	192.6	47.4	142.7	286.1
Turkey	207.8	32.3	166.6	266.7

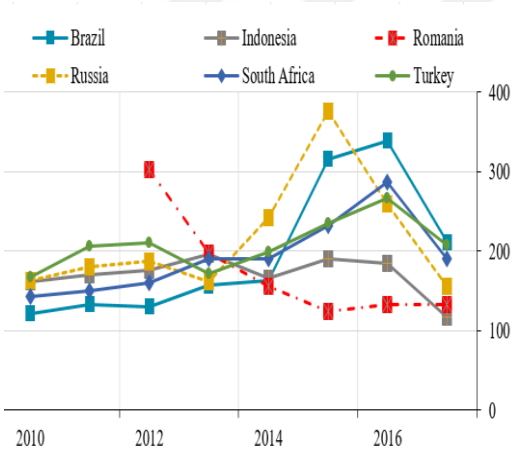


Figure 73. High CDS Risk Premium Countries

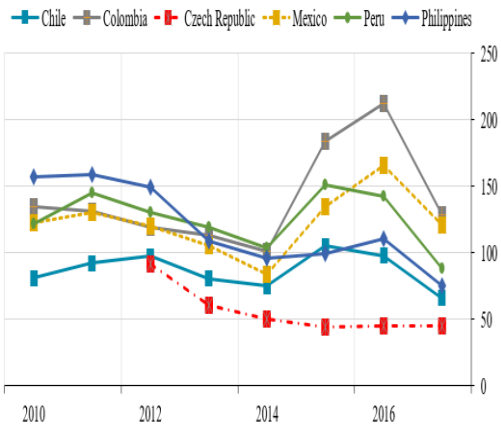


Figure 74. Low CDS Risk Premium Countries

Table 12.

Country Risk Premium Summary Statistics (EMBIG Spread, Basis Points)

Countries	Mean	Std. Dev.	Min	Max
Brazil	255.3	79.8	183.5	393.8
Chile	154.0	25.8	129.4	199.9
Colombia	194.1	46.5	147.8	278.6
Czechia				
India				
Indonesia	241.7	32.2	187.7	282.0
Israel				
Mexico	217.8	46.0	182.5	303.2
Peru	173.3	21.2	145.1	200.9
Philippines	149.0	41.8	96.3	205.0
Romania				
Russia	258.7	65.3	173.3	384.5
South Africa	242.5	57.3	166.7	343.2
Turkey	267.6	32.8	221.0	317.7

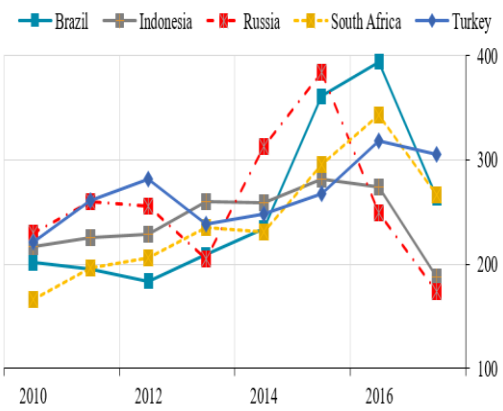


Figure 75. High EMBIG Risk Premium Countries

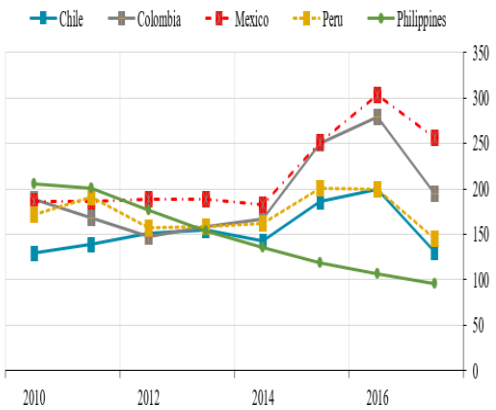


Figure 76. Low EMBIG Risk Premium Countries

3.2.7 Measures of Import Content and Relation with ERPT

The level of import content of the final demand can also be attributed to structural vulnerabilities. If the consumption of a country is more dependent on external sources, this means that external shocks may have significant effects on both the

quantity and price of consumed goods through direct and indirect channels. In a direct way, depending on the weight of the import content, the effect of exchange rate movements on domestic prices vary. In addition to this, higher dependence on imports in terms of consumption habits may create further fragilities on pricing behavior via altering the effect of exchange rate shocks on domestic prices. The import content is followed by total value added in final demand statistics which is provided in OECD statistics database. A considerable level of heterogeneity is observed in the level of import content as well among EM countries**.**

Table 13.

Import Content of Final Demand Summary Statistics (As a Percentage of GDP)

Countries	Mean	Std. Dev.	Min	Max
Brazil	12.8	0.8	11.6	13.7
Chile	28.6	1.5	26.0	30.3
Colombia	18.6	1.3	16.4	20.4
Czechia	38.4	1.5	36.0	40.2
India	22.0	1.9	19.1	24.3
Indonesia	20.3	1.2	18.1	21.4
Israel	22.5	1.4	20.6	24.6
Mexico	21.8	1.1	20.4	23.6
Peru	22.5	0.8	21.7	23.6
Philippines	25.6	0.8	24.8	27.1
Romania	28.6	0.7	27.4	29.5
Russia	19.3	0.3	18.9	19.6
South Africa	24.7	1.2	22.7	26.0
Turkey	23.1	1.2	21.8	25.1

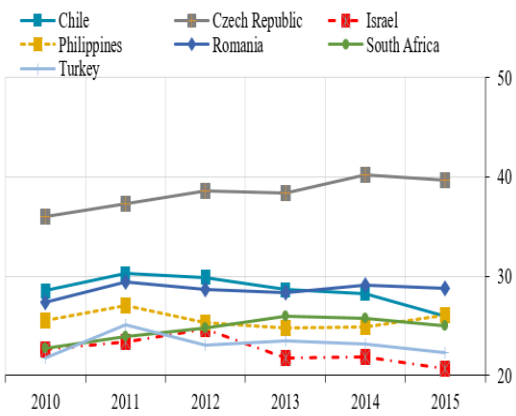


Figure 77. High Import Content Countries

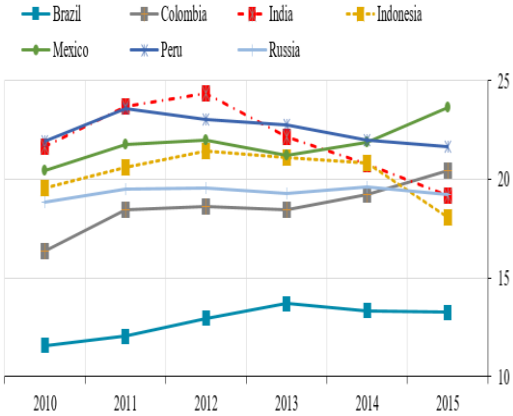


Figure 78. Low Import Content Countries

3.2.8 Measures of Reserve Adequacy and Relation with ERPT

In relation to abovementioned structural vulnerability factors such as higher external financing needs, reliance on short-term capital flows and NFC FX exposure; the level of international reserves holds importance as well. If a country does not have enough FX buffers and its reserve coverage regarding external debt is low, it becomes much unprotected against external shocks. Especially, the sudden shocks derived from the change in risk sentiments towards EM might endanger the countries with less reserve coverage more. Therefore, rather vulnerable EM countries seem to be more exposed to concerns regarding financial and price stability. In other words, domestic prices (asset prices or consumption goods prices) are more sensitive and fragile to external shocks.

Although there is no consensus regarding the best indicator showing the adequacy of reserves, alternative measures constituted by IMF are generally accepted and used in the empirical analysis. Among these measures, the ratio of reserves to short-term debt metric which is compiled from IMF is employed. When we look at the data, there are fluctuations and no common trend among EMs. Additionally, heterogeneity among EMs is present in this measure as well.

Table 14.

Reserve Adequacy Summary Statistics (Reserves to Short-term Debt Ratio, Percentage)

Countries	Mean	Std. Dev.	Min	Max
Brazil	3.3	0.7	2.3	4.2
Chile	1.1	0.2	0.9	1.4
Colombia	2.1	0.4	1.6	2.7
Czechia				
India	2.1	0.4	1.6	3.0
Indonesia	2.3	0.4	1.8	3.0
Israel				
Mexico	1.9	0.4	1.5	2.6
Peru	4.9	1.0	3.3	6.2
Philippines	4.5	0.6	3.9	5.5
Romania	1.0	0.2	0.8	1.2
Russia	3.4	1.0	1.9	4.8
South Africa	1.2	0.2	0.9	1.5
Turkey	0.8	0.1	0.6	0.9

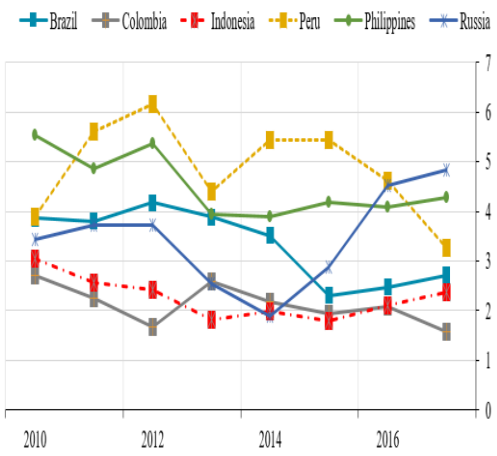


Figure 79. High Reserve Adequacy Countries

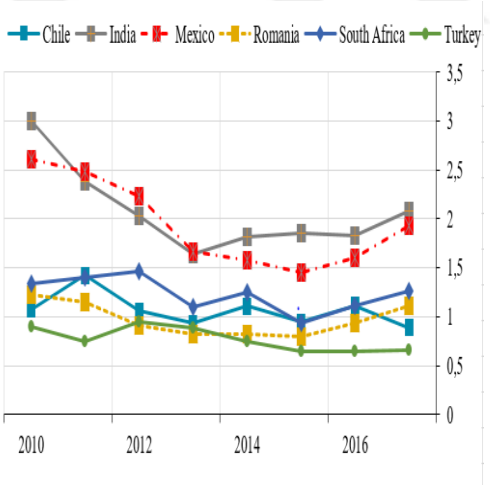


Figure 80. Low Reserve Adequacy Countries

3.2.9 Measures of Inflation Level and Relation with ERPT

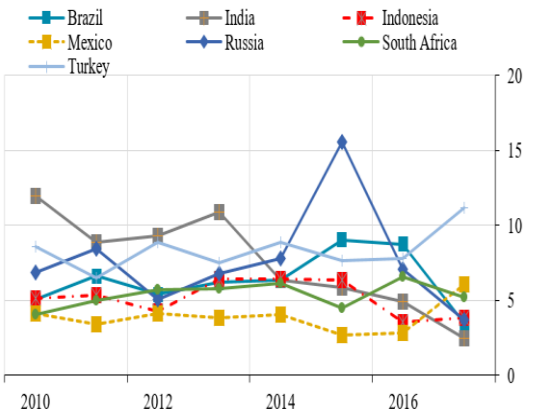
Lastly, the level of inflation can also be considered as an indicator representing soundness of macroeconomic environment which might have effects on pricing mechanism more specifically exchange rate-inflation nexus. In the high inflation environment, the credibility of policies damaged and persistency of external shocks increases. Moreover, the transmission of these shocks to domestic macroeconomic indicators occurs rapidly at a larger amount. One of such mechanism can work through the exchange rate shocks and pricing behavior.

To be able to understand the link between the level of inflation and ERPT, closer data investigation and more detailed analysis is required. Within this framework, inflation data referring to the averages of year on year changes in headline inflation is compiled from IMF IFS database.

Table 15.

Inflation Level Summary Statistics (Percentage)

Countries	Mean	Std. Dev.	Min	Max
Brazil	6.4	1.9	3.4	9.0
Chile	3.1	1.2	1.4	4.7
Colombia	3.8	1.8	2.0	7.5
Czechia	1.5	1.0	0.3	3.3
India	7.6	3.2	2.5	12.0
Indonesia	5.2	1.2	3.5	6.4
Israel	1.1	1.5	-0.6	3.5
Mexico	3.9	1.0	2.7	6.0
Peru	3.1	0.7	1.5	3.7
Philippines	2.8	1.3	0.7	4.7
Romania	2.4	2.8	-1.5	6.1
Russia	7.6	3.5	3.7	15.5
South Africa	5.4	0.8	4.1	6.6
Turkey	8.4	1.4	6.5	11.1



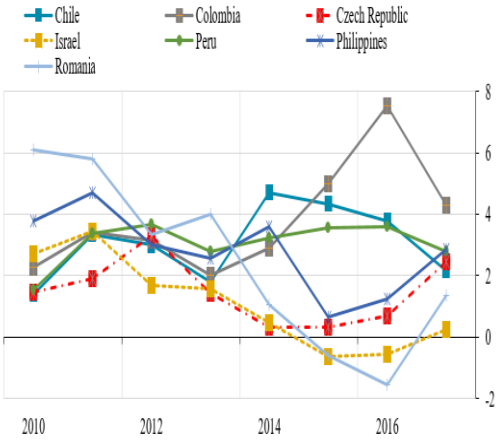


Figure 81. High Inflation Countries

Figure 82. Low Inflation Countries

Overall, when we look at the general picture of vulnerability indicators across countries and different indicators Turkey, South Africa and Romania are the countries in the highly vulnerable group in most of the vulnerability indicators. On the other hand, Colombia, Philippines and Peru are mostly in the low vulnerable category (Table 24).

When we look at across different vulnerability indicators, the countries attributed as highly vulnerable in terms of inflation level are also mostly in the highly vulnerable category according to country risk premium and FDI specification. Moreover, highly vulnerable countries with respect to external financing need are generally in the highly vulnerable category in terms of import content of final demand as well. Lastly, countries with less reserve buffer are mostly associated as highly vulnerable in terms of external financing need and import content of final demand (Table 25).

CHAPTER 4

METHODOLOGY

In terms of the methodological perspective, we can categorize the statistical approaches employed in the previous studies estimating ERPT mainly under three subgroups: single equation method, vector autoregressive (VAR) models and the others. Closer examination of these methods reveals that each group has its own advantages and disadvantages (Tunç, 2017).

Single equation models are built on the assumption that price movements can be captured by exchange rate fluctuations and changes in some other macro-financial indicators. In this setup, exchange rates are taken as an exogenous variable which means that there is an assumption of the non-existence of bi-causal relationship between movements in the exchange rate and inflation. The first issue related to this methodology is that it does not take into account the possible endogeneity by which inflation may affect the exchange rate as well. Secondly, in this type of modeling, ERPT is taken as fixed and no variation throughout the time is allowed. But, as it is also mentioned before, this restrictive assumption clearly contradicts with the existing literature claiming that ERPT can vary substantially over time (Campa and Goldberg, 2010). However, the convenience of single equation models to test possible non-linearities and asymmetry can be regarded as an advantage of these models compared to alternative ones.

To be able to deal with possible endogeneity problems when estimating ERPT, most of the previous studies in the empirical literature use vector autoregression (VAR) models which allow the identification of causal relationships along the price distribution chain (McCharty, 1999; Tunç, 2017). VAR models also capture the pace and duration of ERPT over time which is very valuable input for policy-makers.

Although it is commonly utilized in the literature, there are some deficiencies of VAR methodology as well. First of all, ordering of the variables in VAR models plays a very crucial role. Generally, Cholesky decomposition of a variance-covariance matrix is the procedure embedded in VAR models to conduct the ordering of the variables, in line with their relative exogeneity (with the most exogenous variables placed at the top and the least exogenous ones at the bottom of the vector of variables). However, estimation results might not be robust to the ordering of the variables motivated by economic intuition. Lastly, modeling asymmetric or non-linear ERPT in VAR-type models requires considerable effort compared to other alternatives mentioned above. The situation can be more problematic if one faces with the degrees of freedom problem (due to the number of parameters increasing considerably, even when few variables are added to VAR setting), particularly in the case single country studies with less number of observations covering relatively shorter time period.

Finally, some studies in the literature prefer other estimation techniques such as state-space models (Darvas, 2001), panel fixed effect estimation (Goldfajn and Werlang, 2000) and system GMM approach (Jasova et al., 2016).

In order to exploit the variations among country characteristics, to account for unobserved heterogeneities across countries, to support the inference process with more number of observations and to cope with omitted variables problem in a better way; longitudinal version of VAR model is employed in this thesis. Specifically, our empirical identification strategy includes the use of panel VAR model. This type of framework is also suitable in understanding the dynamic lead/lag relations among the variables in addition to the pace, duration and size of the ERPT.

4.1 Interacted Panel Vector Autoregression (IPVAR) Model

Furthermore, incorporation of countries' relative positions with respect to vulnerability indicators within ERPT analysis must be done for inference. Although there are many studies directly adding interaction terms into a single equation model, their use in VAR setup is rather a new technique. In this study, to do that, Interacted Panel Vector Autoregression (IPVAR) model which is introduced by Towbin and Weber (2013) is used to analyze the effects of structural characteristics on ERPT. In other words, a structural panel VAR model with interaction terms is designed to identify potential structural determinants of transmission from exchange rate fluctuations to domestic prices in EMs. The use of interaction terms in panel VAR models enables us to get varying coefficients across time and countries deterministically. It can be seen as an alternative to Bayesian time-varying parameters (TVP) models with a particular difference such that, in this approach, the change in the coefficients are derived deterministically instead of a stochastic process (Wieladek, 2016). In distinction from the standard VAR models, IPVAR adds the cross-sectional of data set and, thus it allows to exploit the heterogeneous information in cross-country which is one of the aims of this study. It also increases the sample size and degree of freedom to reduce the risk of over-fitting and to eliminate idiosyncratic effects (Gavin and Theodorou (2005)).

Our IPVAR model enables us to get VAR coefficients varying with dummy variables regarding the structural determinants such as dollarization, current account deficit and its financing source, FX debt of corporates and others as well.[5]

In order to differentiate the impact of structural characteristics (dollarization, CAD, long-term financing of CAD, NFC FX Debt, etc.) on ERPT, for each vulnerability indicator, we have divided the sample countries into two sub-groups separately as high and low categories. "High category" refers to the countries whose average are

[5] In the model, we identify impulse response functions based on a simple Cholesky ordering. As a robustness check, alternative ordering of the variables are also tested and similar results are obtained.

higher than median level (of all countries throughout the sample). On the other hand, "low category" countries have values lower than median levels in such categories. With this categorization, we run separate IPVAR estimations with respect to abovementioned categorization for each structural variable[6]. The differences in the impact of structural determinants have been extracted by comparing and contrasting standardized impulse-response functions generated from IPVAR estimation. All the specifications whose results are provided in the Empirical Results chapter (Chapter 6) appear to be compatible with model requirements of IPVAR models.

In order to identify the effects of structural country characteristics on ERPT, IPVAR methodology is utilized as stated above. After that IPVAR model, shocks are identified in chain-like causality among variables via Cholesky decomposition. In this methodology, variables are ordered from the most exogenous to the most endogenous variable based on economic intution. Utilizing a lower triangular restriction matrix for residuals (in line with Cholesky ordering), our ordering implies that the variable is not affected by the contemporaneous shocks stemming from the variables placed latter than it is.

Considering the small open economy nature of the emerging markets, in line with the previous studies in the literature (McCarthy, 2007; Ogunc et. al., 2018), ordering of the selected variables is specified as follows:

$$Oil_t \rightarrow \quad FX_{it} \rightarrow \quad X_{it} \rightarrow \quad \Delta i_{it} \rightarrow \quad \pi_{it}$$

In the above model, Oil_t represents monthly changes in Brent oil prices. FX_{it} demonstrates the monthly appreciation or depreciation of local currencies against USD, whereas Δi_{it} stands for changes in interest rate. Moreover, X_{it} and π_{it} denote the output gap and monthly inflation of EMs respectively.

[6] Because of the data limitations, our sample only covers 14 EM countries which makes harder to control variables simultaneously.

The selection of the variables employed in the model is mainly in line with the existing literature. The selected variables capture supply and demand side factors which are influential on inflationary movements in EMs. More specifically, oil price is ordered first and identified as a supply-side and cost-based shock. Therefore, it is not expected to be affected by other variables contemporaneously. After that, exchange rate is ordered as a second variable because exchange rate fluctuations are exogenous variable for small EMs, which are heavily affected by external shocks like global liquidity conditions and investor risk appetite. On the other hand, exchange rate fluctuations can affect output and prices contemporaneously. Then, the rest of the variables are included to be able to capture mainly demand side factors on inflation and ordered as output gap, interest rates, respectively. Finally, domestic price is ordered as most endogenous variable. Such ordering implies that shocks coming from output gap have contemporaneous effects on interest rate settings. Then, the interest rate shocks are transmitted to domestic prices through demand and cost channels.

After that, related impulse-response functions are calculated and the difference between the two categories is examined for each vulnerability indicator. In addition to the graphical representation of the cumulative impulse response function (IRF) differences between high and low regimes in each interaction variable, Forecast Error Variance Decomposition (FEVD) analysis is also performed to test the differences in ERPT from one category to another. In short, thanks to IPVAR methodology, we can easily observe the drastic changes in responses of ERPT to different structural characteristics. Therefore, we will be able to understand and quantify changes in the degree of ERPT given policy implementations regarding such structural vulnerabilities.

It should be noted once again that in a standard panel VAR setting, the coefficients remain constant over time and across countries. However, in IPVAR framework, the coefficients are functions of country-specific characteristics (i.e dollarization level, current account deficit etc.) which can also vary over time.

4.2 Empirical Model

In line with the pioneering works of Tobwin and Weber (2011, 2013), the IPVAR model has the following representation:

$$J_{i,t}Y_{i,t} = \tilde{C}_{\iota} + \sum_{k=1}^{L} \tilde{A}_{i,k}\, Y_{i,t-k} + \tilde{C}^{1} X_{i,t} + \sum_{k=1}^{L} \tilde{A}_{k}^{1}\, X_{i,t} Y_{i,t-k} + \tilde{u}_{i,t}$$

$$\tilde{u}_{i,t} \sim N(0, \tilde{\sum} i, t)$$

where

- $Y_{i,t}$ *is a vector of explanatory variables,*
- $\tilde{C}_{\iota}$ *is a vector of country-specific intercepts,*
- $\tilde{A}_{i,k}$ *is a matrix of autoregressive coefficients up to lag L and*
- $\tilde{u}_{i,t}$ *is a vector of one step ahead prediction errors, normally distributed with a covariance matrix* $\tilde{\sum}$.
- $X_{i,t}$ *is the interaction term that influences the dynamic relationship between the endogenous variables.*
- $J_{i,t}$ *is a lower triangular matrix with ones on the main diagonal,*
- *t (1, …, T) refers to time and i (1, …, N) refers to country.*

By estimating the model in recursive form we allow for variation in contemporaneous correlation of variables across countries. One can note that, in this model, coefficient-variation is parameterized as a function of structural determinants in contrast to other studies that use single-country VARs with stochastically time-varying coefficients.

$$\begin{pmatrix} \pi_{it} \\ X_{it} \\ \Delta i_{it} \\ FX_{it} \\ Oil_{it} \end{pmatrix} = \mu_{i,t} + \sum_{i=}^{L} \begin{pmatrix} a_{i,t}{}^{11} & a_{i,t}{}^{12} & a_{i,t}{}^{13} & a_{i,t}{}^{14} & a_{i,t}{}^{15} \\ a_{i,t}{}^{21} & a_{i,t}{}^{22} & a_{i,t}{}^{23} & a_{i,t}{}^{24} & a_{i,t}{}^{25} \\ a_{i,t}{}^{31} & a_{i,t}{}^{32} & a_{i,t}{}^{33} & a_{i,t}{}^{34} & a_{i,t}{}^{35} \\ a_{i,t}{}^{41} & a_{i,t}{}^{42} & a_{i,t}{}^{43} & a_{i,t}{}^{44} & a_{i,t}{}^{45} \\ a_{i,t}{}^{51} & a_{i,t}{}^{52} & a_{i,t}{}^{53} & a_{i,t}{}^{54} & a_{i,t}{}^{55} \end{pmatrix} \begin{pmatrix} \pi_{i,t-1} \\ X_{i,t-1} \\ \Delta i_{i,t-1} \\ FX_{i,t-1} \\ Oil_{i,t-1} \end{pmatrix} + u_{i,t}$$

$$\begin{pmatrix} u_{i,t}{}^{\pi} \\ u_{i,t}{}^{X} \\ u_{i,t}{}^{\Delta i} \\ u_{i,t}{}^{FX} \\ u_{i,t}{}^{Oil} \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ \gamma_{2,1} & 1 & 0 & 0 & 0 \\ \gamma_{3,1} & \gamma_{3,2} & 1 & 0 & 0 \\ \gamma_{4,1} & \gamma_{4,2} & \gamma_{4,3} & 1 & 0 \\ \gamma_{5,1} & \gamma_{5,2} & \gamma_{5,3} & \gamma_{5,4} & 1 \end{pmatrix} \begin{matrix} \varepsilon_{i,t}{}^{\pi} \\ \varepsilon_{i,t}{}^{X} \\ \varepsilon_{i,t}{}^{\Delta i} \\ \varepsilon_{i,t}{}^{FX} \\ \varepsilon_{i,t}{}^{Oil} \end{matrix}$$

In the model, FX_{it} represents monthly appreciation or depreciation of local currencies against USD, whereas Δi_{it} stands for changes in interest rate. Moreover, X_{it} and π_{it} denote the output gap and monthly inflation of EMs respectively. Oil_t represents monthly changes in Brent oil prices.

CHAPTER 5

DATA

The main aim of this thesis is to analyze the structural determinants of ERPT in a cross-country setting with a special emphasis on "vulnerability" indicators of EMs. In this study, the selected sample of EMs comprises 14 countries which are classified as emerging country by major worldwide economic institutions including IMF, OECD and World Banksh[7]. These countries are Brazil, Chile, Colombia, Czech Republic (Czechia), India, Indonesia, Israel, Mexico, Peru, Philippines, Romania Russia, South Africa and Turkey. Selected countries are evaluated to reflect different geographical, market-based and macroeconomic outlook characteristics. As a sample period, we choose to examine the time interval after GFC, therefore the analysis covers the period between January 2010 and October 2018[8]. When determining sample period, apart from data availability, exclusion of structural break during GFC period and examination of contemporary dynamics of inflation developments become influential. Additionally, heterogeneous nature of EMs in terms of structural vulnerability indicators plays a cruicial role especially after GFC period when strong capital inflows directed towards EMs. As an inflation indicator, headline consumer price indices for all countries are taken from IMF IFS database and monthly logarithmic differences of that series are taken. Although some country-specific studies use different core inflation measures, to be able to have a consistent estimator across all countries, it is believed that using headline inflation is quite intuitive in such a cross country study. Moreover, there are some limitations to retrieve core inflation data for all countries covering the sample period.

[7] While sample of EM countries are selected, availability of reliable and frequent data is considered as well.

[8] All the variables used in the study is converted into monthly frequency except for interaction dummies. To be able to satisfy stationarity condition, required transformation of the variables are made. Possible seasonalities are controlled via TRAMO/SEATS procedure of Demetra programme which is developed by Eurostat.

Exchange rate developments are tracked by monthly averages of nominal bilateral exchange rates against US dollar which are collected from Bloomberg Terminal. Similar to price indicators, series are transformed into logarithmic changes. Again, previous studies are utilizing different exchange rate measures like nominal effective exchange rates or real effective exchange rates. However, the central interest of many agents including households, firms and policymakers in this ERPT setup is thought to be associated with nominal exchange rate fluctuations. Thus, we proceed with nominal exchange rate movements.

One of the most controversial variable is definitely the output gap which controls for demand-side factors. As it is widely known that output gap referring to the difference between actual and potential growth of the country. That measure represents to what extent economic activity in sample countries deviates from their long-term trend or potential growth so as to represent the demand-side forces for inflation dynamics. However, creating a monthly indicator to track the course of economic activity requires further econometric analysis. To get monthly output gap series, we are in need of an economic activity indicator in monthly frequency and mostly preferred candidate is Industrial Production Index (IPI), because the usual candidate Gross Domestic Product (GDP) is a quarterly indicator. Here, the popular methodology is utilizing the Hodrick-Prescott (HP) filter[9] in order to differentiate the trend and cycle of the individual IPI series[10]. Although there are some caveats of using HP filter such as end-point bias, it is the most convenient way and standard way to get an output gap. HP Filter can be described as a smoothing method by which long term trend component of a time series can be extracted. Then, the output gap is the residual cycle component (de-trended series) obtained from filtering.

To proxy for the monetary policy stance, we have used the short-term market interest rates (i.e yields on government bonds with 2-year maturities). Simple monthly averages are taken from the data retrieved from Bloomberg Terminal.

[9] Method was firstly used by Hodrick and Prescott (1997) to estimate US business cycles.

[10] We also perform de-trending procedure by using quarterly time dummies, results seem to be indifferent for the method of obtaining output gap.

Apart from that, to be able to control for supply shocks, monthly logarithmic changes of Brent oil prices are included in the study. Summary statistics based on panel structure including the cross sectional and longitudinal variations are depicted in Table 16.

Table 16.

Summary Statistics of the Variables

Variables	Mean	St. Dev.	Min	Max	Data Source
Inflation	0.3297	1.00	-34.60	6.05	IMF IFS Database
Exchange Rate	0.4339	2.65	-12.96	21.62	Bloomberg Terminal
Output Gap	0.0246	2.39	-13.80	15.16	IMF IFS Database, Author's own calculations
Interest Rate	0.0081	0.38	-1.83	4.97	Bloomberg Terminal
Brent	0.0656	7.33	-24.01	17.12	Bloomberg Terminal

Table 17.

Panel Summary Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
Inflat~n	overall	.3297249	1.005347	-34.60157	6.051952	N =	1484
	between		.2013916	.0502621	.7993226	n =	14
	within		.9864259	-34.32211	5.582355	T =	106
Exchan~e	overall	.4339514	2.659071	-12.96578	21.6281	N =	1484
	between		.3274528	-.0334093	1.272727	n =	14
	within		2.64027	-13.27026	20.78933	T =	106
Output~p	overall	.0246809	2.394033	-13.8	15.16	N =	1484
	between		.0428284	-.0237058	.1180188	n =	14
	within		2.393677	-13.89334	15.06666	T =	106
Intere~e	overall	.0081025	.3854513	-1.833017	4.972271	N =	1484
	between		.0462241	-.0590322	.148575	n =	14
	within		.3828672	-1.833292	4.831798	T =	106
Brent	overall	.065654	7.331208	-24.01806	17.12603	N =	1484
	between		0	.065654	.065654	n =	14
	within		7.331208	-24.01806	17.12603	T =	106

Apart from these, the interaction dummies regarding structural determinants are included in the analysis. For all of the variables, we take the country averages with respect to vulnerability indicators as an initial step, and then, we calculate the median values specific for each indicator. In the following step, we divide the countries into two sub-samples as "above the median average" and "below the median average" to create dummy variables taking the value of "1" for highly vulnerable countries and "0" for low ones. We entitle such groups as "highly vulnerable" and "less vulnerable" countries depending on the direction of the indicator. In order to have reliable results from panel VAR, the variables should be stationary. To check that, we have utilized Im-Peseran-Shin (1997); Levin Lin and Chu (2002) and Harris and Tzavalis (1999) first-generation panel unit root tests. All the considered variables are found to be panel stationary. Lag length is chosen as 1 month according to Schwarz Information Criteria.[11]

Table 18.

Im-Peseran-Shin Panel Unit Root Test Results

Variables	Im-Peseran-Shin Test Statistic (Z-tilda stat)	p-value
Inflation	-20.06	0.000
Exchange Rate	-20.85	0.000
Output Gap	-18.85	0.000
Interest Rate	-21.45	0.000
Brent	-20.61	0.000

[11] The model is also analysed for 3 lag structure as a robustness.

Table 19.

Levin-Lin-Chu Panel Unit Root Test Results

Variables	Levin-Lin-Chu Test Statistic (Adjusted t* stat)	p-value
Inflation	-15.95	0.000
Exchange Rate	-20.44	0.000
Output Gap	-11.01	0.000
Interest Rate	-20.03	0.000
Brent	-19.48	0.000

Table 20. Harris–Tzavalis Panel Unit Root Test Results

Variables	Harris–Tzavalis Test Statistic (rho)	p-value
Inflation	0.06	0.000
Exchange Rate	0.31	0.000
Output Gap	0.44	0.000
Interest Rate	0.32	0.000
Brent	0.29	0.000

CHAPTER 6

EMPIRICAL RESULTS

For each of the interaction variable, cumulative impulse response functions (IRFs) are computed as the response of CPI to the shock coming to the exchange rate. In accordance with the literature, due to the fact that IRFs are not linear in terms of OLS estimates, the use of bootstrapping technique to get simulated standard errors instead of using normal standard errors would give better results. Therefore, in the analysis bootstrapping methodology is employed.

In this procedure;

- First, the model is estimated by OLS.
- Then, from the sample distribution of residuals, errors are drawn.
- In the following step, via using conducted draw, the initial observation and the estimated coefficients for dependent variables are simulated recursively.
- Afterward, by making use of the obtained artificial sample and interaction terms, the model is re-estimated and impulse response functions are calculated.
- This procedure is repeated 200 times.

Upcoming figures indicate that how the cumulative impulse-response functions (representing the reaction of CPI changes to one standard deviation shock to exchange rate movements) vary with different country characteristics in separate specifications.

The chart in the left hand-side in each figure demonstrates the impulse-response function for a pool of countries with high vulnerability, while the middle chart indicates the IRF for less vulnerable ones. Furthermore, the charts in the far-right depict the difference between these two. In the figures, red lines represent median estimates while the dashed blue lines are the bootstrapped 90% confidence bands. While the vertical axis shows the ERPT as a share of the cumulative shock, the horizontal ones indicate the number of months passed after the occurrence of shock.

6.1 Dollarization

First of all, when we categorize EMs based on their dollarization tendencies and examine the impulse-response functions, we find that, in high dollarization countries for the recent period, the cumulative response of CPI to exchange rate shock (ERPT) over 24 months is almost 12%, while, in low dollarization countries, ERPT is 7 % and the difference is 5 % with statistical significance. In other words, higher ERPT levels are observed in the countries with higher dollarization level which shows both economic and statistical significance.

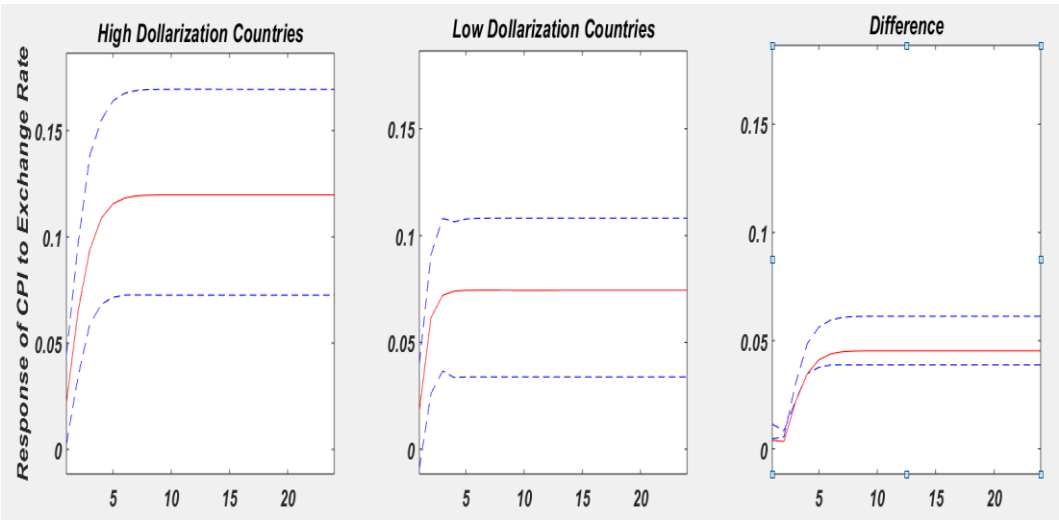


Figure 83. Dollarization Impulse Response Functions

6.2 Current Account Deficit/Financing Compositions

Secondly, when we repeat the same analysis above for the categories identified through the level of CAD instead of dollarization, it is found that countries with higher CAD display higher ERPT tendency compared to countries with lower CAD. It can be understood that high CAD countries are more vulnerable to exchange rate shocks in terms of pricing mechanisms.

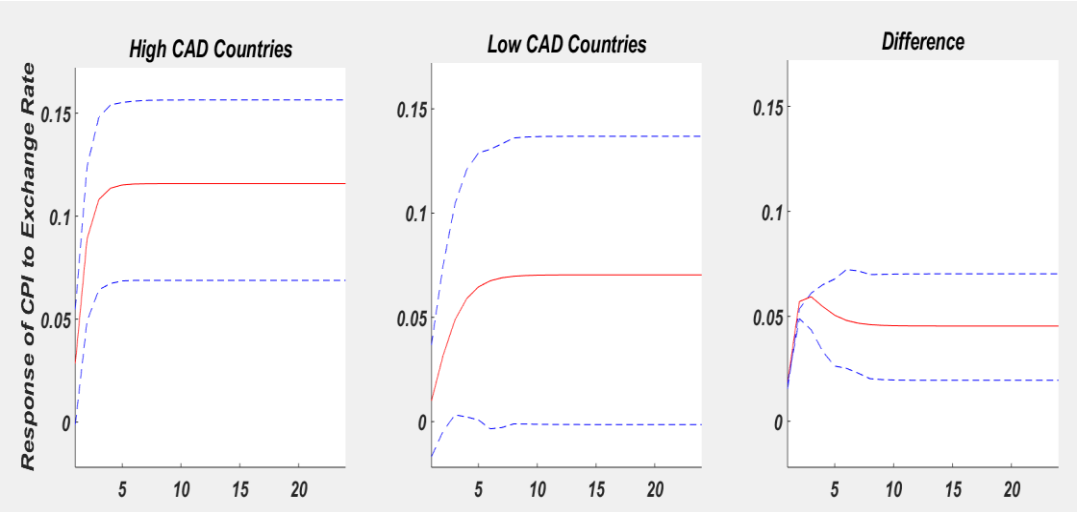


Figure 84. Current Account Deficit Impulse Response Functions

In addition to this, statistical evidence is found for the financing side of CAD (particularly, financing with FDI) in terms of ERPT in EMs. More clearly, if a country is financing its deficit through FDI compared to short-term carry-trade like funds, the sensitivity of domestic prices to exchange rate shocks would lower significantly.

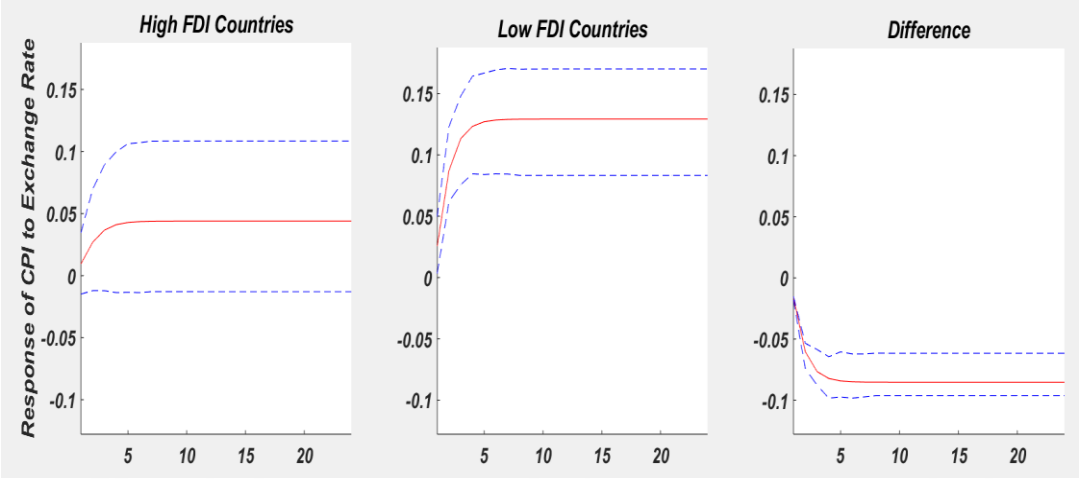


Figure 85. Foreign Dırect Investment Impulse Response Functions

6.3 External Financing Need

Instead of focusing only on CAD, a broader concept which is called external financing need of a country can also be taken into consideration while assessing the structural vulnerability of a country in terms balance of payment side. Results of the empirical analysis indicate that ERPT in the EMs with higher external financing requirement is significantly higher than the countries with lower external financing need. The difference is almost 5% in 24-months interval with statistical significance. Thus, fragilities due to higher external financing needs might exacerbate the sensitivity of domestic prices to external shocks.

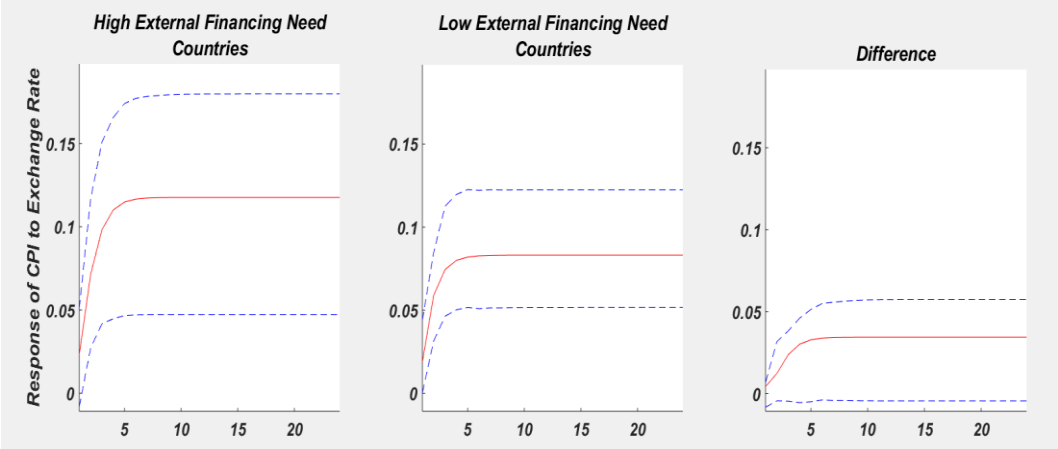


Figure 86. External Financing Need Impulse Response Functions

6.4 Non-Financial Corporates FX Debt

Considering the FX debt of non-financial corporates in EMs as an alternative structural vulnerability category, ERPT level differentiates between high FX-indebted countries and low FX-indebted countries. Although ERPT is found relatively lower in the countries with lower FX Debt, ERPT is almost 13% in the high FX debt EM countries. This finding is quite intuitive while considering firms facing difficulties to service their FX denominated debts without enough hedge instrument. Such sentiment change will create trouble for EMs in terms of increased funding costs and roll-over difficulties in turn will destroy financial stability and pricing mechanism.

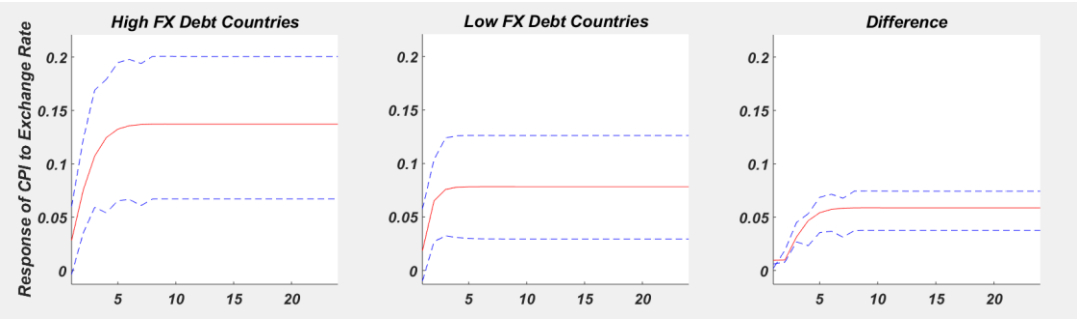


Figure 87. Non-Financial Corporates FX Debt Impulse Response Functions

6.5 Foreign Ownership

Apart from those, one may argue that if foreign ownership in local debt markets is high in a country, it will become more sensitive to adverse capital outflows and such countries are more exposed to external shocks. Within this framework, ERPT should be higher in the countries with higher foreign ownership. However as it can be seen in Figure 32, empirical evidence in our analysis shows the other way around. This might be because of the fact that foreigners are searching for investment opportunities in more sound and resilient countries. Therefore, a higher share of foreigners' participation might be a macroeconomic healthiness signal instead of vulnerability.

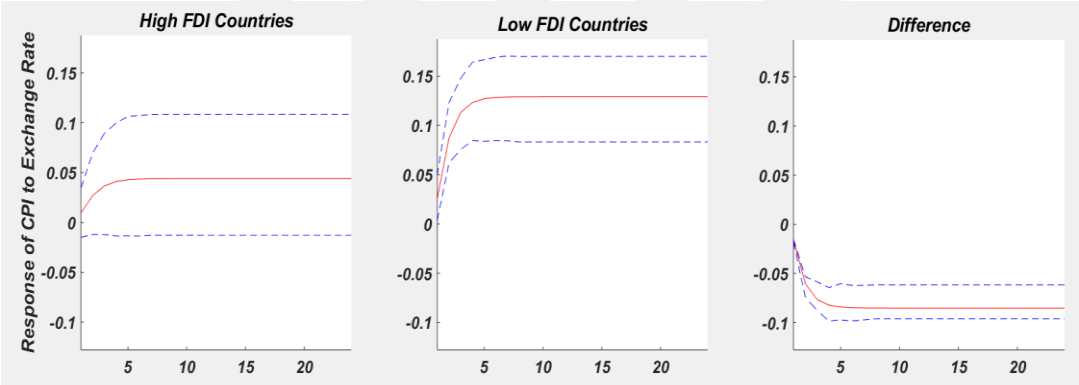


Figure 88. Foreign Ownership in Local Debt Markets Impulse Response Functions

6.6 Country Risk Premium

As an important determinant of external financing cost, CDS premium demonstrates investor perception about the riskiness of a country. When we divide our sample EM countries into two groups based on CDS premium level and analyze the ERPT in such subgroups. Results indicate that there is a statistically significant difference between high and low CDS countries. In the countries with higher CDS, ERPT is almost 10%, but in lower CDS countries ERPT is only 3% in the 24-months period. Therefore, CDS has significant implications in terms of financial stability as well as price stability.

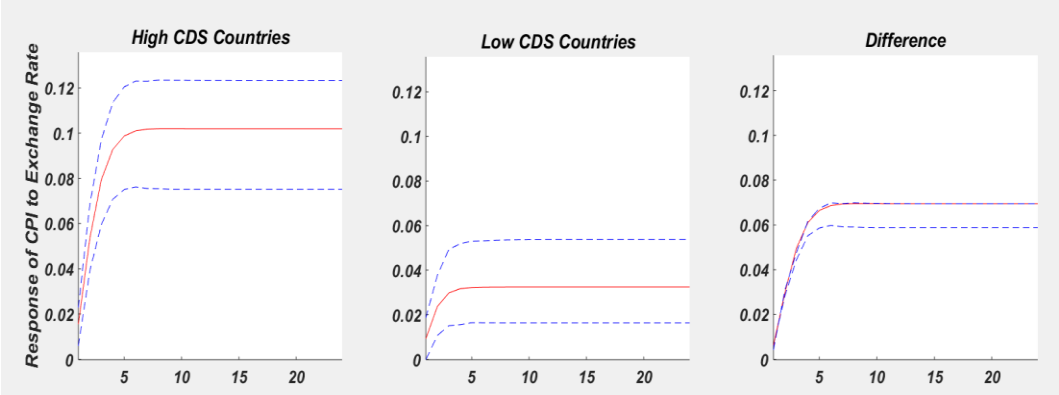


Figure 89. Credit Default Swap Spread Impulse Response Functions

As a robustness check, when we proxy country risk premium via EMBIG spread (instead of CDS premia), very similar results are obtained as shown in the below Figure 34.

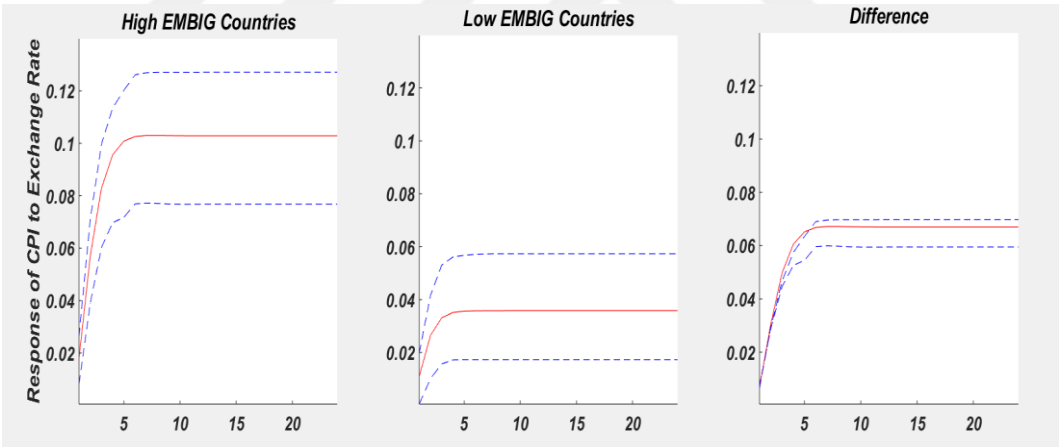


Figure 90. Emerging Markets Bond Idex Global Spread Impulse Response Functions

6.7 Import Content of Final Demand

After categorizing EMs according to the level of import content of the final demand into two subgroups as high and low, considerable heterogeneity is observed in terms of ERPT. ERPT in structurally vulnerable (high import content) group is nearly

13%, but for the robust group (low import content) this ratios is almost 5% lower with statistical significance.

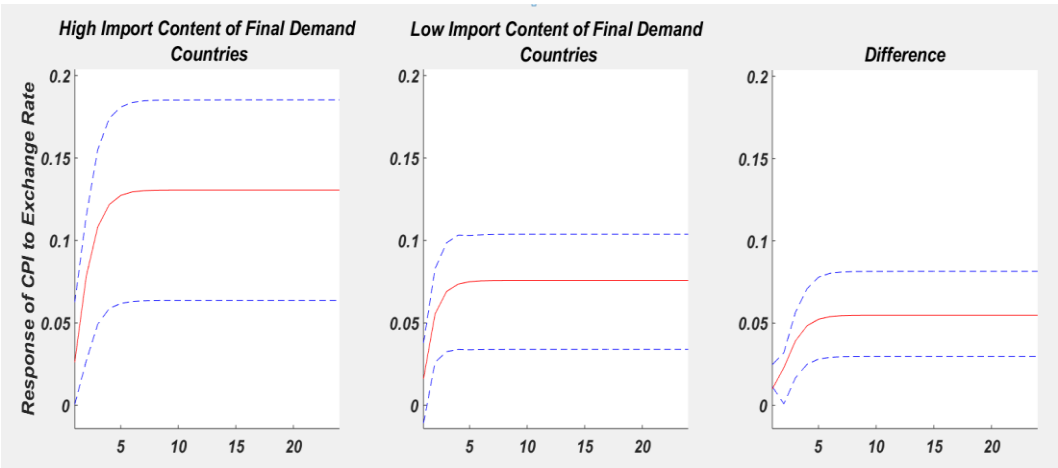


Figure 91. Import Content of Final Demand Impulse Response Functions

6.8 Reserve Adequacy

Additionally, the level of international reserves can play an important role in this framework, because it can be considered as a buffer against external shocks and is subject to increasing the resilience of a country. As it can be seen from Figure 36, our empirical analysis indicates that when reserve coverage of a country is low (more vulnerable) ERPT is almost 5 % higher compared to countries having more reserve buffer.

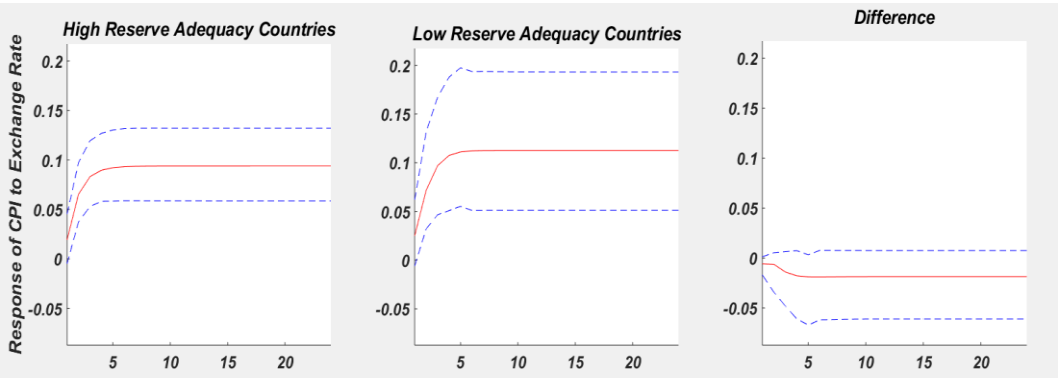


Figure 92. Reserve Adequacy Impulse Response Functions

As a robustness check, reserve adequacy is controlled via another measure defined by IMF (reserves over short-term debt) instead of ARA metric above, the results are broadly unchanged as shown in Figure 37.

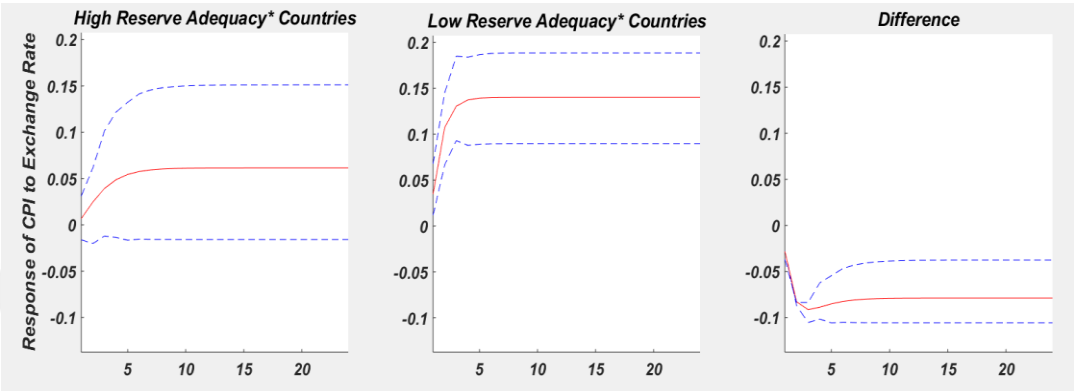


Figure 93. Reserve Adequacy Impulse Response Functions

6.9 Inflation Level

Last but not least, the level of inflation which can be attributed as a source of fragility and vulnerability which has considerable impact on ERPT in EMs given the credibility issues. For instance, in EM countries experiencing relatively higher inflation levels, transmission from exchange rates to prices is also stronger compared to EM countries with a relatively lower level of inflation.

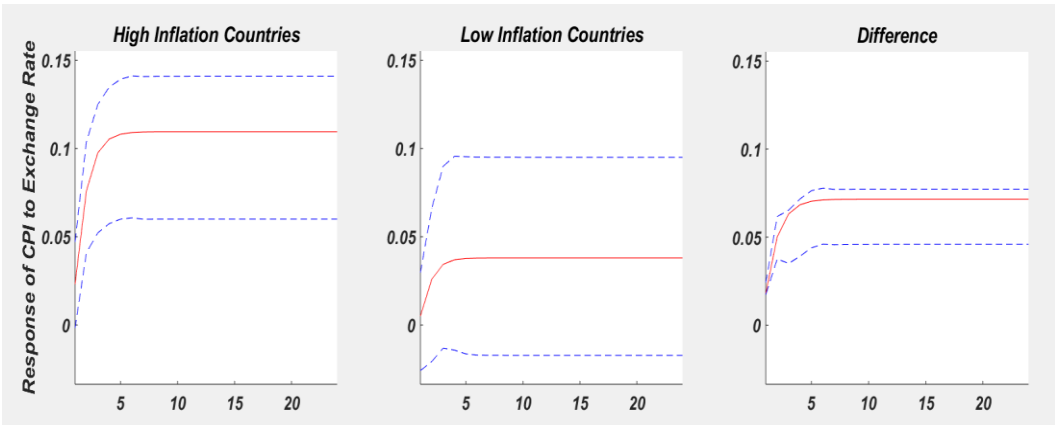


Figure 94. Inflation Level Impulse Response Functions

Table 21.

Variance Decomposition

Indicators	High Group	Low Group
Dollarization	4.18%	2.58%
CAD	5.28%	1.63%
FDI	0.75%	7.09%
Foreign Ownership	9.31%	21.01%
Inflation	4.77%	0.83%
NFC FX Debt	4.48%	2.93%
Import Content of Final Demand	4.16%	2.97%
CDS	19.67%	3.05%
Reserve Adequacy*	1.31%	6.12%
EMBIG	22.01%	3.80%
External Finance Need	3.47%	3.42%

- Forecast Error Variance Decomposition (FEVD) analysis results are shown in Table 21. According to the table, at the median in high dollarization countries exchange rate shocks explain variance in CPI up to 4.2%, however in low dollarization countries exchange rate shocks explain only 2.6% of the variance in CPI.
- Moreover, exchange rate shocks explain almost 5.3% of the variation in CPI in countries with higher CAD, compared to 1.6% in countries with lower CAD.
- Additionally, CDS amplifies exchange rate shocks as well. In EM countries with higher CDS premium than median, the impact of exchange rate shocks on domestic prices is about 20% compared to 3% in the EM countries with lower CDS premium. When we look at another country risk premium indicator, EMBIG, similar interpretations can be made according to results.
- On the other hand, for the FDI and Reserve Adequacy categorizations, in which higher levels implies robustness instead of vulnerability, the explanatory power of exchange rate shocks to variance in CPI is significantly higher in low groups.

CHAPTER 7

CONCLUSION

In this thesis, exchange rate pass-through to consumer prices is analyzed in the context of Emerging Markets. Considering the heterogeneity among EMs in terms of ERPT, structural vulnerability sources affecting the response of domestic prices to exchange rate shocks are examined through the Interacted Panel Vector Autoregression (IPVAR) approach, which is introduced by Towbin and Weber (2011, 2013). In this methodology, shocks are identified in chain-like causality among variables via Cholesky decomposition. After that, related impulse response functions are calculated and the difference between the two regimes in each structural variable is examined. In addition to the graphical representation of the difference between high and low regimes in each interaction variable, FEVD analysis are constructed to assess the relative importance of exchange rate shocks on domestic prices under different regimes for each categorization.

All in all, thanks to IPVAR methodology, we analyze the changing responses of ERPT to different structural characteristics of the EM countries. Therefore, we are able to understand and quantify changes in the degree of ERPT given policy implementations regarding such structural vulnerabilities.

The results mainly indicate that,

- The difference between high and low dollarization countries in terms of the cumulative response of CPI to exchange rate shock (ERPT) over 24 months is 5% with statistical significance. In other words, higher ERPT levels are observed in the countries with higher dollarization level.

- Secondly, when countries are separated accoding to the level of CAD, it is found that countries with higher CAD show higher ERPT tendency compared to countries with lower CAD. This means that high CAD countries are more vulnerable to exchange rate shocks in terms of the pricing mechanism.

- In addition to this, statistical evidence showing that financing of CAD with FDI matters in terms of ERPT as well. If a country is financing its deficit through FDI compared to short-term resources, the sensitivity of domestic prices to exchange rate shocks decreases considerably.

- Results of the empirical analysis indicate that ERPT in the group of EM countries with higher external financing requirement is significantly higher than the countries with lower external financing need. Thus, fragilities due to higher external financing needs might exacerbate the sensitivity of domestic prices to external shocks.

- The level of foreign ownership in local debt markets may influence ERPT through two different channels. Firstly, higher foreign participation might make countries more sensitive/vulnerable to adverse capital flights and external shocks. On the other hand, foreigners might be selective and investing in the more sound and resilient countries. Therefore, a higher share of foreigners might be a healthiness signal instead of vulnerability. Our analysis finds supporting evidence for the latter argument.

- Considering the FX debt of non-financial corporates in EMs as an alternative structural vulnerability category, ERPT is found relatively lower in the countries with lower FX Debt. This finding is quite intuitive while taking firms facing difficulties to service their FX denominated debts without enough hedge instrument. Such sentiment change will create trouble for

EMs in terms of increased funding costs and roll-over difficulties in turn will destroy financial stability and pricing mechanism.

- After categorizing EMs according to the level of import content of the final demand into two subgroups as high and low, considerable heterogeneity is observed in terms of ERPT. ERPT in structurally vulnerable (high import content) group is nearly 13 %, but for the robust group (low import content) this ratios is almost 5 % lower with statistical significance.

- Results indicate that there is a statistically significant difference between high and low CDS countries. In the countries with higher CDS, ERPT is almost 10 %, but in lower CDS countries ERPT is only 3 % in 24 months. Therefore, CDS has significant implications in terms of financial stability as well as price stability especially. As a robustness check, when we controlled country risk premium via EMBIG spread instead of CDS, very similar results are obtained.

- Additionally, the level of international reserves have great importance because it plays a buffer role against external shocks and increases the resilience of a country. Our empirical analysis indicates that when reserve coverage of a country is low (more vulnerable) ERPT is almost 5 % higher compared to countries having more reserve buffer.

Lastly, considering the findings related to ERPT determinants, policy measure suggestions for EM countries regarding determined vulnerabilities will be provided below.

Given the finding that dollarization is one of the key determinants of ERPT, policies should address achieving de-dollarization in EMs. It should be noted that apart from many other macroprudential measures, macroeconomic stability especially price stability is quite necessary for de-dollarization. Reducing dollarization requires comprehensive actions by the authorities combining macroeconomic and microeconomic policies to enhance the attractiveness of the local currency instead of restrictive policies against FX transactions.

Vulnerabilities from the external imbalances require policies to address the current account deficit. On the one hand, policies should aim at controlling imports (especially domestic demand), on the other hand, increasing high value-added exports via improving competitiveness and diversifying destination countries. Additionally, macroprudential policies will help improve the quality of external financing and lower risks from FX exposure in the economy. Large external financing needs and a high share of short-term and portfolio inflows might make EMs more vulnerable to sudden capital flights.

Strategies focusing on the share of imported inputs is of critical importance to be able to decrease CAD as well as to enhance financial stability and price stability. Domestic production should be incentivized without sacrificing productivity. Moreover, the competitiveness of the economy should be improved via well-designed and targeted structural reforms in order to exploit efficiency gains.

Taking the role of external financing and reserve adequacy on ERPT into consideration, EMs should increase their international reserves to become more resilient against external shocks. Considering the EMs with low reserve coverage of external financing need and lower international reserves, reserve accumulation should be addressed by policy-makers with prioritized attention.

FX-denominated debt stock in EMs has increased considerably after the Global Financial Crisis, as firms have taken advantage of ample liquidity and favorable financial conditions. The unhedged proportion of this piled-up debt poses financial stability risks for EMs in case of global upswings. In other words, higher levels of FX-denominated debt of NFCs make EMs more sensitive to external shocks. Macroprudential measures should be taken in order to control risks that might be derived from possible depreciation of local currency. Moreover, NFC balance sheets should be strengthened via controlling their liability structure.

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APPENDICES

APPENDIX A: ADDITIONAL GRAPHS AND TABLES

Table 22.

Inflation Targeting Countries and IT Strategy Adoption Years

Countries	Year of Adoption
New Zealand	1989
United Kingdom	1992
Israel & Czech Republic	1997
South Korea & Poland	1998
Colombia, Chile & Brazil	1999
Thailand & **South Africa**	2000
Hungary & **Mexico**	2001
Philippines & Peru	2002
Romania & Indonesia	2005
Turkey	2006
United States	2012
Japan	2013
Russia	2014
India	2015
Argentina	2016

Source: Agenor and Pereira da Silva, 2019

Table 23.

Interaction Variables Formulas and Sources

Variable Name	Formula	Source
Dollarization	Portion of total loans in the banking system denominated in FX	IMF IFS Database
CAD	Current Account Deficit (% of GDP)	World Bank
FDI	Foreign Direct Investment (% of GDP)	World Bank
Foreign Ownership	Foreign Ownership of Local Currency Government Securities (% of GDP)	IIF
External Financing Need	CAB + Amortization on Medium to Long-term External Debt + Short term External Debt	IIF
NFC FX Debt	Non-Financial Corporates FX Denominated Debt (% of GDP)	IIF
Import Content of Final Demand	Import Content of Final Demand (% of GDP)	OECD
Country Risk Premium	1) Credit Default Swap Spread 2) Emerging Markets Bond Index Global Spread	Bloomberg
Reserve Adequacy	1) Reserves/Short-Term Debt 2) ARA Metric	IMF
Inflation Level	Average Headline Inflation (Year on Year)	IMF IFS Database

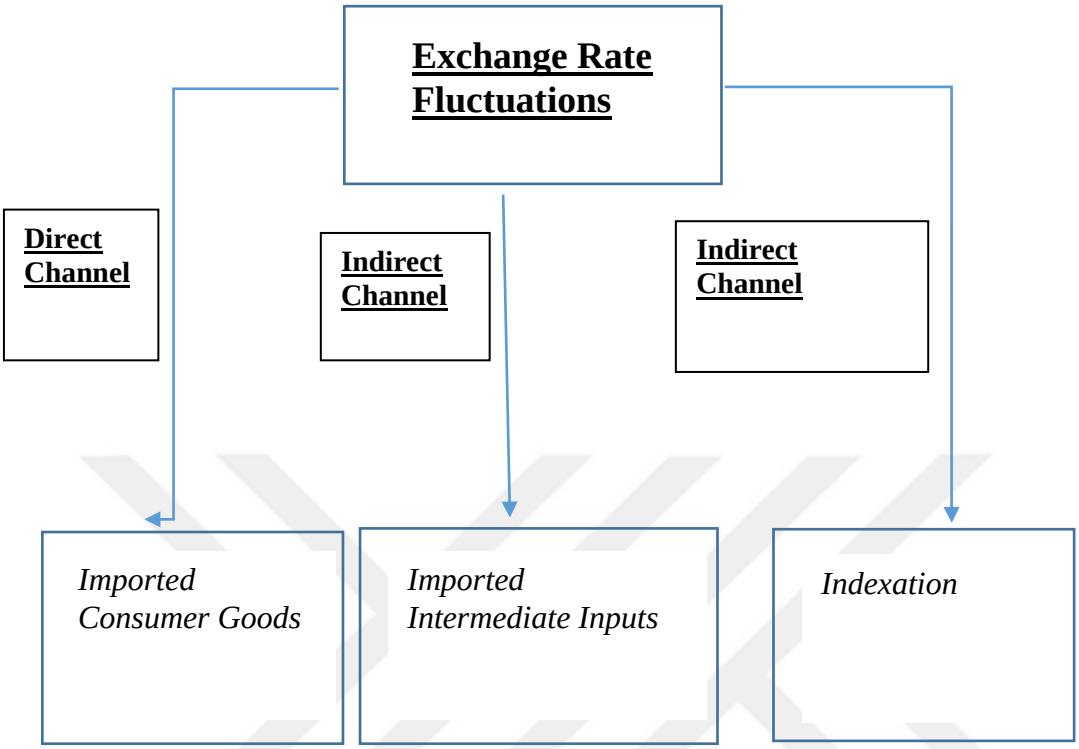

Figure 95. Inflation Transmission Channels

Table 24.

Interaction Variables Categorization

Variable	BR	CH	CO	CZ	IND	IDZ	ISR	MX	PR	PH	RO	RU	SA	TR
Dollar.	0	1	0	1	0	1	0	0	1	0	1	1	0	1
CAD	1	0	1	0	1	0	0	0	1	0	1	0	1	1
FDI	0	0	0	0	1	1	0	0	0	1	1	1	1	1
Ext. Fin. Need	0	1	1	1	0	0	NA	0	0	0	1	0	1	1
NFC FX Debt	0	1	0	1	0	0	1	1	NA	NA	NA	1	0	1
Foreign Owner.	0	NA	0	0	NA	1	NA	1	1	NA	0	1	1	0
CDS	1	0	0	0	NA	1	NA	0	0	0	1	1	1	1
EMBIG	1	0	0	NA	NA	1	NA	0	0	0	NA	1	1	1
Import Content	0	1	0	1	0	0	1	0	0	1	1	0	1	1
Reserve Adeq.	0	1	0	NA	1	0	NA	1	0	0	1	0	1	1
Inflation Level	1	0	0	0	1	1	0	1	0	0	0	1	1	1
Average	0.4	0.5	0.2	0.4	0.5	0.5	0.3	0.4	0.3	0.2	0.8	0.6	0.8	0.9

Table 25.

Vulnerability Indicators Intersection*

	Dollar.	CAD	FDI	Ext. Fin. Need	NFC FX Debt	Foreign Owner.	CDS	EMBIG	Import Content	Reserve Adeq.	Inflation Level
Dollar.		6	8	8	8	5	7	6	8	6	6
CAD			8	8	2	3	8	6	6	7	8
FDI				6	4	6	10	8	8	7	10
Ext. Fin. Need					6	2	6	5	11	9	4
NFC FX Debt						4	3	3	8	6	4
Foreign Owner.							5	4	3	4	7
CDS								10	6	6	10
EMBIG									5	5	9
Import Content										9	4
Reserve Adeq.											7
Inflation Level											

*Number of countries in the same categorization (high/low)

Robustness 3 LAG Impulse Response Functions

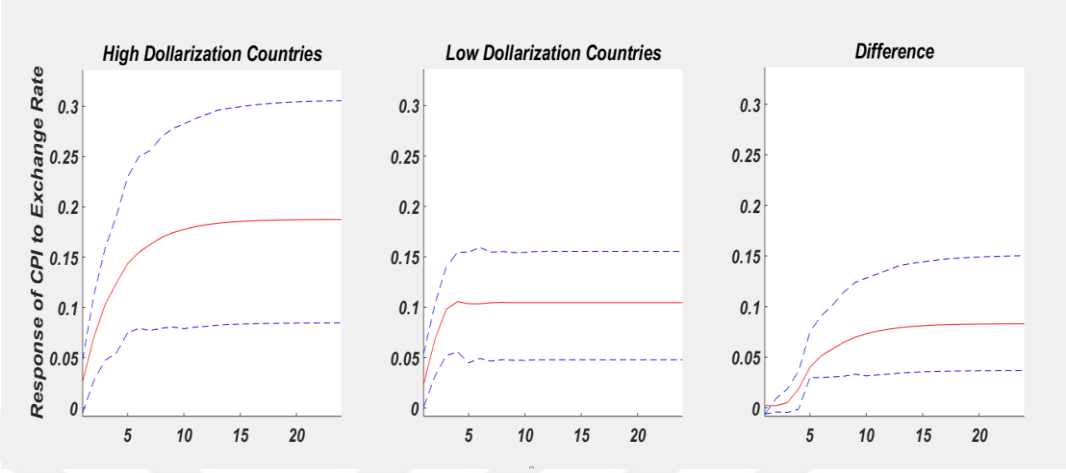

Figure 96. Dollarization Impulse Response Functions (3 Lags)

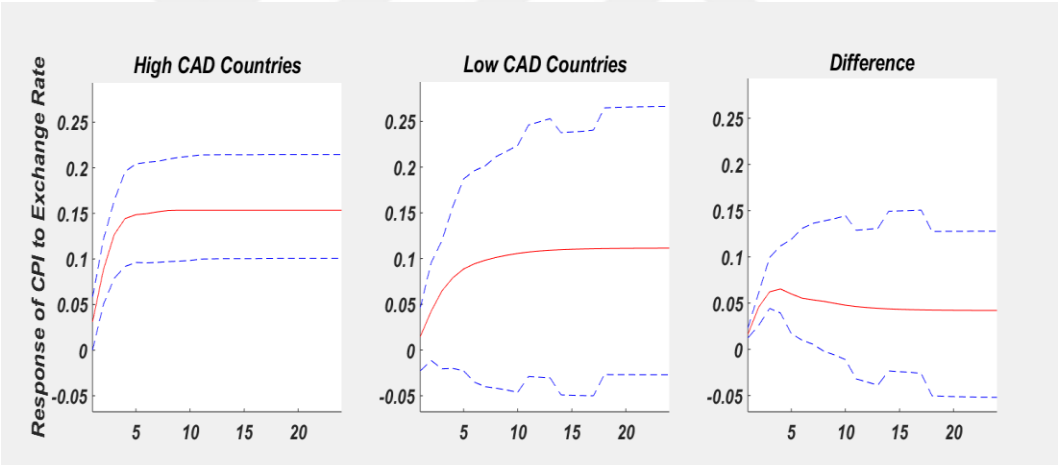

Figure 97. Current Account Deficit Impulse Response Functions (3 Lags)

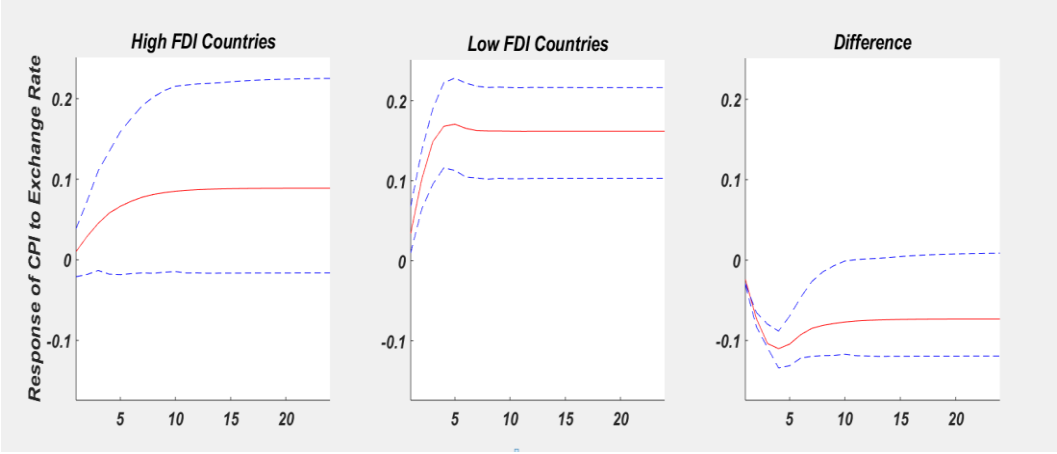

Figure 98. Foreign Dırect Investment Impulse Response Functions (3 Lags)

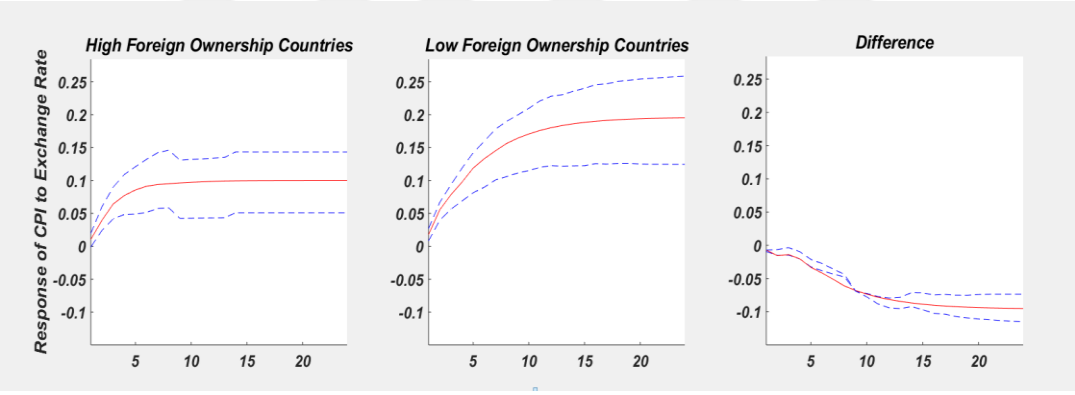

Figure 99. Foreign Ownership in Local Debt Markets Impulse Response Functions (3 Lags)

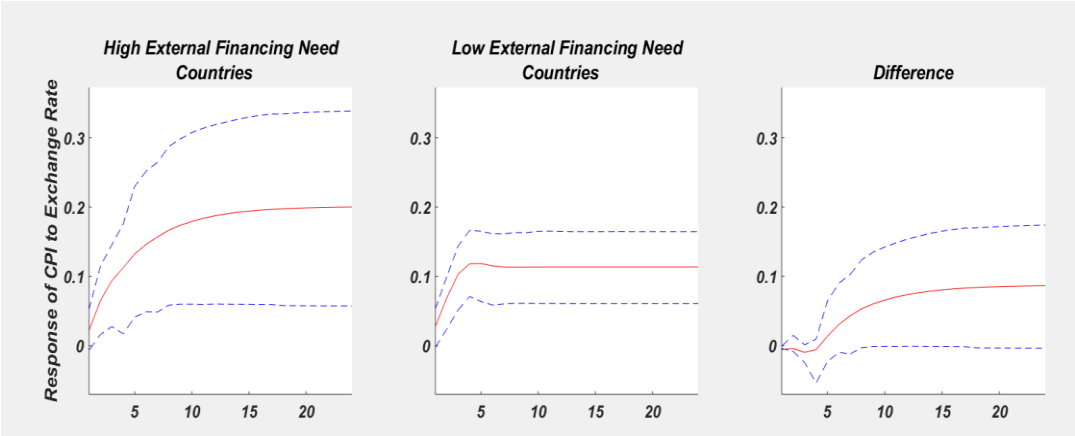

Figure 100. External Financing Need Impulse Response Functions (3 Lags)

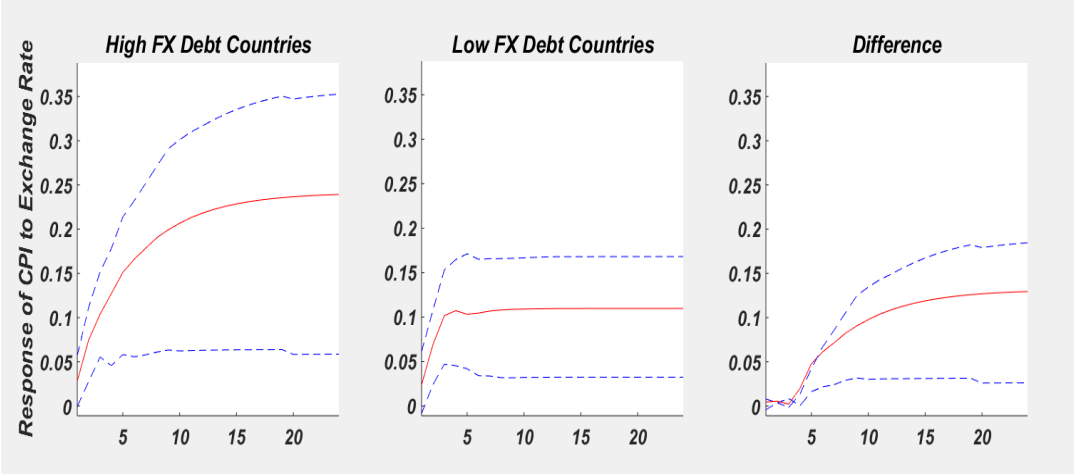

Figure 101. Non-Financial Corporates FX Debt Impulse Response Functions (3 Lags)

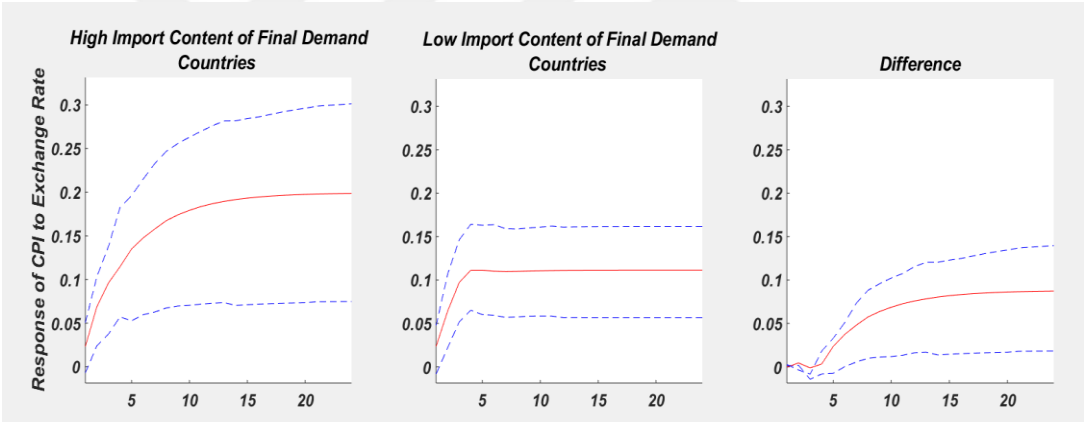

Figure 102. Import Content of Final Demand Impulse Response Functions (3 Lags)

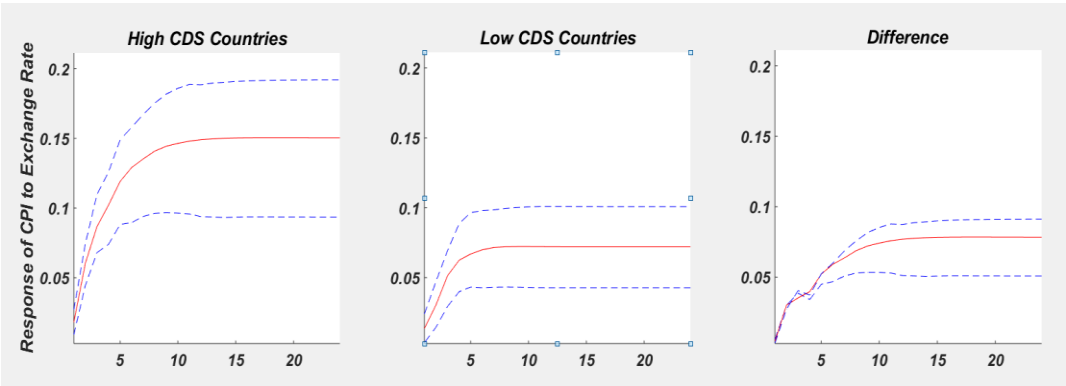

Figure 103. Credit Default Swap Spread Impulse Response Functions (3 Lags)

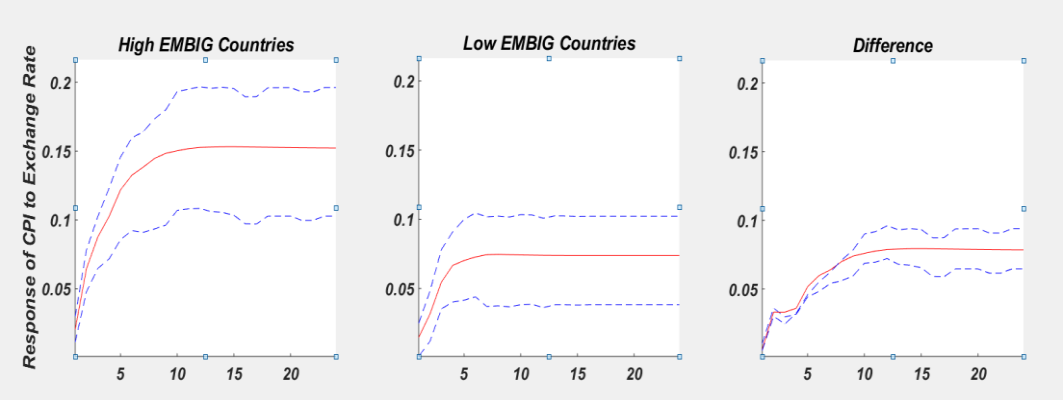

Figure 104. Emerging Markets Bond Idex Global Spread Impulse Response Functions (3 Lags)

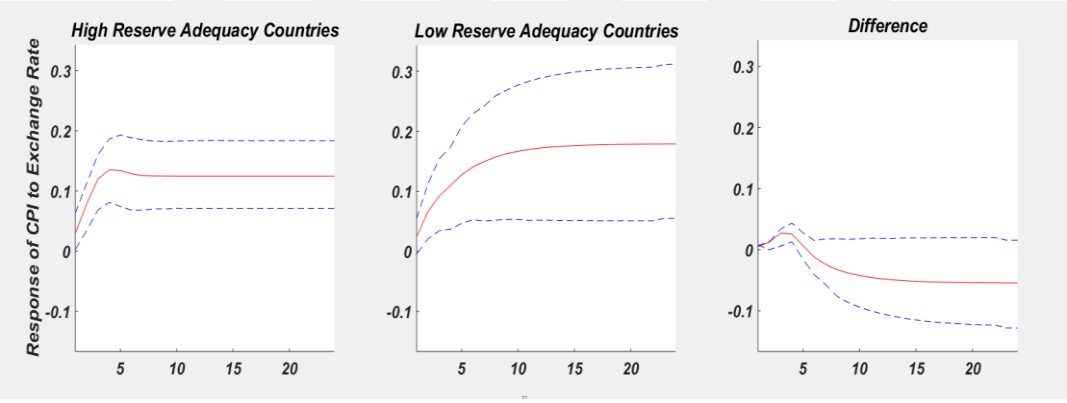

Figure 105. Reserve Adequacy Impulse Response Functions (3 Lags)

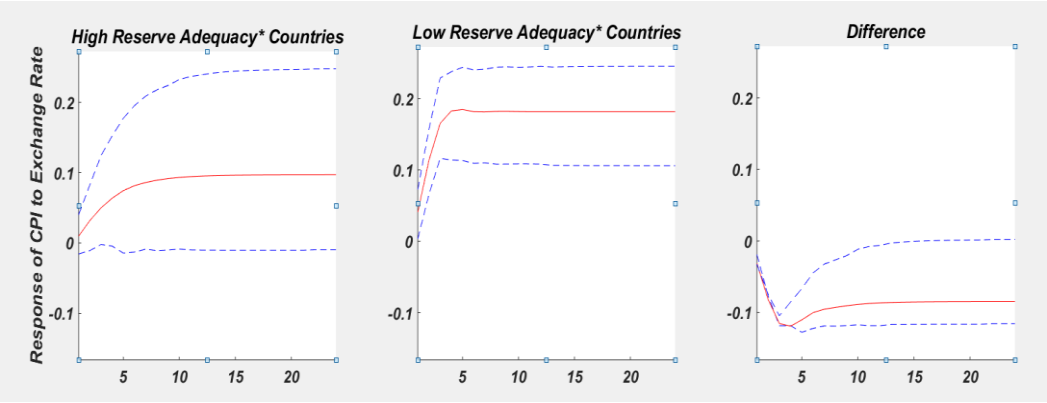

Figure 106. Reserve Adequacy Impulse Response Functions (3 Lags)

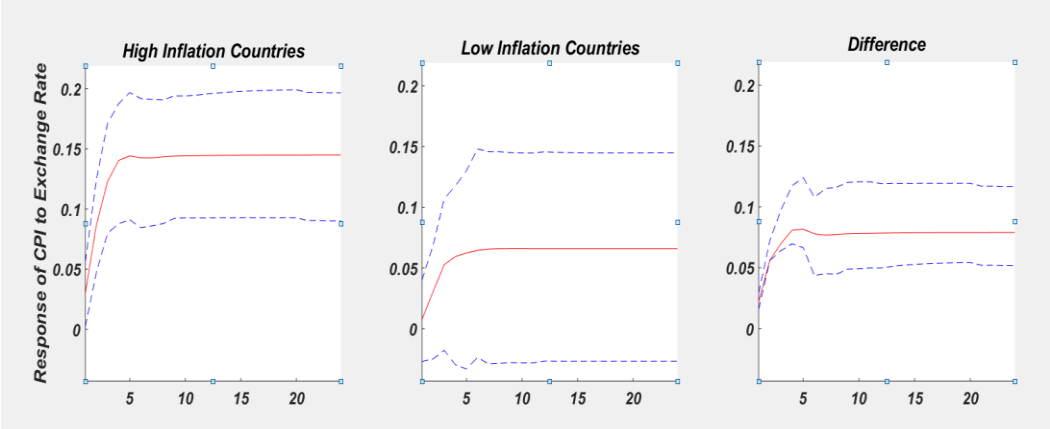

Figure 107. Inflation Level Impulse Response Functions (3 Lags)

APPENDIX B: TURKISH SUMMARY / TÜRKÇE ÖZET

Enflasyon, belirli mal ve hizmetlerden oluşan bir tüketim sepetinin fiyat seviyesindeki sürekli artışları ifade etmektedir. Yüksek enflasyon oranlarının yatırımlar, tasarruf oranları gibi pek çok açıdan ekonomiler için zararlı olduğu değerlendirilmektedir. Ayrıca, azalan rekabetçilik, gelir eşitsizliğinde artış ve reel ücretlerdeki düşüş de sıklıkla yüksek enflasyonla ilişkilendirilmektedir.

Zaman boyunca enflasyon patikası incelendiğinde, hem gelişmiş hem de gelişmekte olan ülkelerde (GOÜ), enflasyonda belirgin bir düşüş trendi olduğu açıkça görülmektedir. Gelişmiş ülkelerdeki dezenflasyon süreci daha erken başlamış sonrasında enflasyondaki düşüş hem farklı göstergeler hem de farklı ülke grupları bazında yayılım göstermiştir. Enflasyondaki bu uzun vadeli düşüş eğilimi gelişmiş ve gelişmekte olan ülkelerde benzerlik gösterse de, düşüşün arkasındaki temel belirleyici faktörler farklılık göstermektedir. Örneğin, gelişmiş ülkelerde, daha çok talep yönlü faktörler fiyat gelişmelerinin belirleyicisi olurken, gelişmekte olan ülkelerde arz yönlü faktörler daha belirgin hale gelmektedir (Benlialper ve ark., 2017). GOÜ'ler tarafındaki arz yönlü faktörler arasında ise temelde enerji/emtia şokları ile çoğunlukla döviz kuru hareketleri ön plana çıkmaktadır.

GOÜ’lerdeki kur hareketleri ile bu hareketlerin makroekonomik ve finansal göstergelere yansıma mekanizmaları politika yapıcılar tarafından yakından takip edilmektedir. Bu bağlamda, küçük ve açık ekonomi özelliği taşıyan GOÜ’lerde, kur hareketlerinin fiyatlama davranışlarına yansımaları da oldukça önemlidir. Literatürde, kur hareketlerinin yurt içi fiyatlamalara yansıma derecesi “Kur Geçişkenliği” olarak adlandırılmaktadır. Kur geçişkenliğinin, GOÜ’ler özelinde yerel para birimlerinin sık ve büyük ölçüde dışsal şoklara maruz kalması nedeniyle uğradığı değer kaybı göz önüne alındığında, fiyat değişikliklerine etkisi akademisyenler ve politika yapıcılar tarafından detaylı bir şekilde incelenmektedir.

Literatüre bakıldığında hem gelişmiş hem de gelimekte olan ülkelerde döviz kuru geçişkenliği ile ilgili birçok teorik ve ampirik çalışmanın olduğu dikkat çekmektedir. Sadece kur geçişkenliğinin boyutu/büyüklüğüne odaklanan çalışmaların yanısıra ülkelerarası olası farklılıklar ve bu farklılaşmaların sebepleri üzerine yoğunlaşan çalışmalar da bulunmaktadır. Kur geçişkenliğinin boyutu ile ilgili olarak, önceki çalışmalar tüketici fiyatlarına geçişkenliğin ülke özelliklerine bağlı olarak önemli ölçüde değişebildiğini göstermektedir. Örneğin, gelişmiş ülkelerde geçişkenlik katsayısının gelişmekte olan ülkelere göre daha düşük olduğu değerlendirilmektedir. Buna ek olarak, geçişkenlik katsayısının sabit olmadığı ve aynı ülke için bile zaman içinde değişebileceği bulgulanmaktadır (Campa ve Goldberg, 2005; Campa ve Goldberg, 2010; Marazzi ve diğerleri, 2005; Bouakez ve Rebei, 2008).

Bu tarz heterojenliklerden hareketle, literatürdeki çalışmaların bazıları hem ülkeler arasında hem de zaman içinde geçişkenlik seviyesinde oluşabilecek farklılıkların arkasındaki olası faktörlere odaklanmaktadır. Bu çerçevede, yapısal faktörlere odaklanan ve ilgili şoku tetikleyen faktörlere odaklanan olmak üzere iki ayrı akım bulunmaktadır. Yapısal faktörler olarak, para politikası güvenilirliği (Lopez-Villavicencio ve Mignon, 2016; Taylor, 2000; Gagnon ve Ihrig, 2004; Choudri ve Hakura, 2006; Caselli ve Roitman, 2016; Carriere-Swallow ve diğerleri, 2016), döviz kurundaki oynaklık (Kohlscheen, 2010; Campa ve Goldberg, 2005), enflasyon seviyesi (Taylor, 2000; Gagnon ve Ihrig, 2004; Choudhri ve Hakura, 2006), ticaret açıklığı (Campa ve Goldberg, 2005) ve ithalat kompozisyonu (Campa ve Goldberg, 2002) ön plana çıkmaktadır. Bunlara ek olarak, döviz kuru değişimlerinin büyüklüğü ve yönü ile dolarizasyon eğilimleri (Reinhart ve diğerleri, 2014; Carranza ve diğerleri, 2009; Sadeghi ve diğerleri, 2015) de önceki çalışmalarda öne çıkmıştır. Ayrıca, fiyat değişim sıklığı (Devereux ve Yetman, 2003; Corsetti ve diğerleri, 2008), piyasadaki rekabetçi ortam (Amiti ve diğerleri, 2016) ve riskten korunma ürünlerinin kullanımı (Amiti ve ark., 2014) da literatürde kur geçişkenliği üzerinde etkili olabilecek diğer yapısal faktörler olarak görülmektedir.

Öte yandan, fiyatların döviz kuru dalgalanmalarına duyarlılığı döviz kuru şokunu tetikleyen faktörlerle de ilişkilendirilmektedir. (Comunale ve Kunovac, 2017; Forbes, Hjortsoe ve Nenova, 2017). Bir başka deyişle, döviz kurlarındaki hareketlere neden olan farklı etkenler kur geçişkenliği ve fiyat oluşumunda farklı etkilere sahip olabilmektedir. Bu nedenle, döviz kuru geçişkenliğini incelerken, sadece ilgili kur hareketlerinin büyüklüğünün değil, aynı zamanda tetikleyici faktörlerin de dikkate alınması gerektiği savunulmaktadır. Örneğin çalışmalarda, GOÜ'lerde yurtiçi para politikası şoklarından kaynaklanan döviz kuru hareketlerinin, iç talep şokları kaynaklı hareketlere göre daha yüksek kur geçişkenliği ima ettiği bulgulanmaktadır. Bu nedenle, para politikası çerçevesini tasarlarken döviz kurlarındaki dalgalanmaların kaynaklarının da göz önünde bulundurulması gerektiği vurgulanmaktadır.

Bu tez çalışmasında ise, gelişmekte olan ülkelerde küresel finansal kriz sonrası dönemde yapısal kırılganlık faktörlerinin döviz kuru ile enflasyon arasındaki ilişki üzerindeki etkisi incelenmektedir. Ampirik analize geçmeden önce, GOÜ'lerde fiyat hareketleri üzerinde etkisi olduğu düşünülen yapısal kırılganlık faktörleri ve olası etkileri hakkında kısa bir tartışma sunmak bilgilendirici olacaktır.

Bu kırılganlık göstergelerinden dolarizasyon, herhangi bir yabancı para biriminin (çoğunlukla ABD Doları veya Avro) hem varlık hem de yükümlülük tarafındaki yurtiçi işlemlerin çoğunda gösterge para birimi olarak işlev görmesi durumu olarak tanımlanabilir. GOÜ'ler özelinde, dolarizasyon özellikle Küresel Finansal Kriz sonrası dönemde likidite bolluğu ve beraberinde getirdiği risk alma iştahı sonrası önemli bir kırılganlık kaynağı haline gelmiştir. Dolarizasyonun ticarete konu olan malların fiyatlandırma mekanizması üzerinde doğrudan etkileri olmakla beraber özellikle yüksek belirsizlik dönemlerinde GOÜ'lerdeki ücretler ve beklenen getiriler üzerinden endeksleme yoluyla dolaylı sonuçları da olabilmektedir. Kısaca, yüksek dolarizasyonun parasal aktarım mekanizmasında bozulmaya ve etkin politika oluşturmaya zarar vereceği ve fiyatlama davranışları ile finansal istikrar açısından önemli bir kırılganlık unsuru olabileceği değerlendirilmektedir.

Cari açık ve cari açığın finansmanı da kur geçişkenliği ve fiyatlama davranışları üzerinde risk oluşturabilecek faktörler olarak ele alınmaktadır. Cari açık, kabaca ülkenin ihracatının ithalatını karşılayamadığı durumlarda gerçekleşir. Bu durumda, aradaki açığı kapatabilmek için dış fonlama ihtiyacı oluşur. Cari açığın reel ekonomi üzerindeki etkisi hangi durumda ve hangi koşullarla verildiğine bağlı olarak pozitif veya negatif olarak değerlendirilebilmektedir. Eğer verimli, büyümeyi destekleyici, kapasite artırıcı yatırımlara yönlendiriliyorsa cari açık büyüme açısından olumlu değerlendirilirken tüketim veya düşük getirili yatırımlara dönüşüyorsa olumsuz olarak nitelendirilmektedir. Bunun yanısıra, cari açığın finansmanı tarafında eğer kısa vadeli portföy yatırımları ağırlıkta ise bu kaynakların çevrimsel hareketlere ve risk iştahına olan yüksek duyarlılığı özellikle GOÜ'ler açısından risk oluşturmaktadır. Öte yandan, cari açığın finansmanı noktasında uzun vadeli Doğrudan Yabancı Yatırımlar (DYY) oranının yüksekliği ise daha sağlıklı bir finansman yöntemine işaret etmektedir. Bu çerçevede cari açık ve DYY'nin GSYİH'ya oranı küresel risk iştahındaki değişimler ve risk algılamalarındaki bozulmalar kaynaklı fiyat istikrarı ve finansal istikrar üzerinde etkili olabilecek ve döviz kuru hareketleri ile enflasyon arasındaki ilişkiyi etkileyebilecek farklı kırılganlık göstergeleri olarak değerlendirilmektedir. Ek olarak, daha geniş bir kapsamı olan ve OECD tarafından derlenen ülkelerin dış finansman ihtiyacı göstergesi de benzer kanallarla döviz kuru şoku karşısında fiyatlama mekanizmasını etkileyebilecek kırılganlık göstergelerinden biri olarak ele alınmaktadır.

Reel sektör firmalarının yabancı para borçluluğu da bir ekonomideki dış şoklar karşısında fiyatlama davranışlarının istikrarı konusunda fikir verebilecek unsurlardan biridir. Özellikle Küresel Finansal Kriz sonrası yüksek kâr motivasyonuyla GOÜ'lere yönelen sermaye akımları, bu ülkelerde finansal koşulların genişlemesine ve risk iştahının artmasına neden olmuştur. Bu dönemde, finansmana erişim anlamında hem miktar hem maliyet anlamında pozitif olarak görünen sermaye girişleri, GOÜ'lerde yabancı para cinsi borç birikimini tetiklemiştir. Oluşan yabancı para borç riskinin önemli bir kısmının doğal veya türev enstrümanlar yoluyla kontrol altına alınmadığı da bilinmektedir. Bu şartlar altında,

küresel sermaye hareketleri veya risk algısındaki olası ani bozulmalar şirketlerin yabancı para borçluluğu kanalıyla fiyat istikrarı ve finansal istikrar üzerinde risk teşkil etmektedir.

Bunun yanı sıra, yerel para cinsi devlet tahvillerindeki yabancı payı da bir ülke için kırılganlık göstergesi olarak atfedilebilir. Örneğin, eğer ülke tahvillerinde yabancı payı yüksek ise yabancıların portföylerindeki ani hareketler, önce finansal sonra yerel piyasaları önemli oranda ve ani bir şekilde etkileyerek fiyatlama davranışlarının bozulmasına neden olabilir. Özellikle döviz kuru şokları ve yabancıların portföy yatırımlarındaki hareketlerinin yakından ilişkili olduğu düşünülürse bahsedilen kırılganlık göstergesi ile kur geçişkenliği arasında bir ilişki olması muhtemeldir.

Ülke risk primi, yatırımcı algısında bir ülkenin emsallerine oranla göreli riskliliğini göstermektedir. Buna ek olarak, ülke risk primi, bir ülkenin dış finansman maliyetinin ana bileşenlerinden biridir. Bu nedenle, özellikle GOÜ'lerde finansal istikrarın yanı sıra fiyat istikrarı açısından da önemli etkileri vardır. Bu bakımdan, CDS ve EMBIG primleri üzerinden kontrol edilen ülke riskliliği fiyatlama davranışlarında bozulmalara yol açarak kur geçişkenliği üzerinde ilave baskılar oluşturabilir.

Nihai yurtiçi talebin ithal içeriğinin seviyesi de üretim zincirinin farklı kanallarıyla GOÜ'lerde yapısal kırılganlıklara neden olabilecek bir diğer faktördür. Bir ülkenin tüketiminin dış kaynaklara bağımlılığı ne kadar yüksek ise dış şokların doğrudan veya dolaylı kanallarla ülkedeki tüketim miktarı ve tüketim mallarının fiyatları üzerinde oynaklık yaratma ihtimali daha çok olur. Bu bağlamda, OECD tarafından derlenen nihai talepteki yurtdışı katma değer oranı göstergesi üzerinden ithal içeriğin döviz kuru şoklarının fiyatlara yansıması üzerindeki olası etkileri incelenmektedir.

Yüksek dış finansman ihtiyacı, kısa vadeli sermaye akımlarına bağlılık ve reel sektörün yabancı para borcu gibi bahsedilen yapısal kırılganlık faktörleri ile ilişkili olarak; uluslararası rezervlerin seviyesi de büyük önem arz etmektedir. Bir ülkede yeterli miktarda yabancı para rezerv tamponu yoksa dış şoklara karşı daha korunmasız hale gelir. Özellikle, GOÜ'lere yönelik risk algılamalarındaki ani değişimler kaynaklı şoklar, rezerv tabanı daha az olan ülkelerde yüksek oynaklıklara sebep olabilir. Bu çerçevede, kırılgan olarak değerlendirilen GOÜ'lerde yurtiçi fiyatlar (varlık fiyatları veya tüketim malları fiyatları) dış şoklara karşı daha hassas ve kırılgan olabilmektedir.

Son olarak, enflasyon seviyesi, makroekonomik çerçevenin sağlamlığını temsil eden ve fiyatlandırma mekanizmasını ve özellikle de döviz kuru-enflasyon ilişkisini etkileyebilecek diğer bir gösterge olarak değerlendirilebilir. Yüksek enflasyon ortamında, politika güvenilirliği zarar görür ve dış şoklara maruziyet daha sürekli hale gelir. Ayrıca, bu şokların yerel makroekonomik göstergelere aktarılması daha da hızlanabilir. Bu tür mekanizmalardan biri, döviz kuru şokları ve fiyatlama davranışı yoluyla gerçekleşebilir.

Çalışmada öncelikle bahsedilen kırılganlık göstergeleri bakımından GOÜ'ler arasında belirgin bir heterojenlik olduğu görülmektedir. Gelişmekte olan ülkeler her bir kategorizasyon için ortanca seviyelerine göre "yüksek hassasisetli" ve "düşük hassasiyetli" olarak iki alt gruba ayrılmaktadır. Ardından, yüksek ve düşük gruplar arasındaki olası kur geçişkenliği farklılıkları IPVAR (Interacted Panel VAR) metoduyla analiz edilmektedir. Her bir yapısal kırılganlık göstergesi bakımından yüksek ve düşük hassasiyetli grupların etki tepki fonksiyonlarındaki farklılaşma ekonomik ve istatistiksel olarak incelenmektedir.

Sonuçlar, görece daha dirençli ülkelerin daha düşük kur geçişkenliğine sahip olduğunu açıkça göstermektedir. Örneğin, yüksek dolarizasyon seviyesine sahip ülkeler, düşük dolarizasyon ülke grubuna kıyasla daha yüksek kur geçişkenliği göstermektedir. Ayrıca, cari açığı veya dış finansman ihtiyacı yüksek olan ülke grupları daha yüksek geçişkenliğe sahip olmaktadır. Ek olarak, yüksek enflasyon seviyesi, yüksek ülke risk primi ve yüksek reel sektör yabancı para borçluluğu ile yüksek ithal içerik oranı da artan geçişkenlik seviyesi ile ilişkilendirilebilmektedir. Öte yandan, yüksek rezerv yeterliliği seviyesine sahip veya doğrudan yabancı yatırım paylarında daha yüksek olan ülkeler düşük ülke grubuna kıyasla daha düşük kur geçişkenliği göstermektedir.

Fiyat istikrarı kapsamında atılabilecek politika adımları incelendiğinde, GOÜ'lerde dolarizasyonun kur geçişkenliğine etkisinin belirgin olduğu ve azaltılmasına yönelik gerekli tedbirlerin alınmasının önem taşıdığı anlaşılmaktadır. Bu anlamda alınabilecek kısa vadeli makroihtiyati tedbirlerin yanısıra, makroekonomik istikrarın sağlanmasının dolarizasyonu azaltmada gerekli olduğu düşünülmektedir. Politika yapıcıların koordinasyon içerisinde yabancı para işlemleri kısıtlamaktan ziyade yerel para biriminin cazibesini ve itibarını artıracak politikalara odaklanması daha yapısal ve kalıcı bir çözüm oluşturacaktır.

Dış dengede kaynaklı kırılganlıklar cari açığa yönelik sistemli bir politika yaklaşımını gerekli kılmaktadır. GOÜ'lerde bir yandan ithalat kompoziyonunun gözetilmesi (özellikle iç talep tarafında), diğer yandan ise rekabet gücünün artırılarak ve partner ülkeler çeşitlendirilerek yüksek katma değerli ihracatın artırılması hedeflenmelidir. İthal edilen girdilerin yapısına da odaklanan stratejiler, cari açığı düşürmenin yanı sıra finansal istikrar ve fiyat istikrarını sağlamada da kritik öneme sahiptir. Daha dayanıklı bir piyasa yapısı için yerli üretim, verimlilikten ve rekabetçilikten ödün vermeden teşvik edilmeli, gerekli yapısal reform adımları atılmalıdır.

Dış finansman ihtiyacı ve rezerv yeterliliğinin kur geçişkenliği üzerindeki rolü göz önüne alındığında, dış şoklara karşı daha dayanıklı olmak, finansal istikrarı ve fiyat istikrarını korumak için uluslararası rezerv tamponları uygun koşullar altında artırılmalıdır. GOÜ'lerde rezervlerin azlığı ve dış borç karşılamadaki düşük seviyesi dikkate alındığında ilgili politikaların önceliği ve önemi daha net anlaşılmaktadır.

Küresel Finansal Kriz sonrası dönemde, GOÜ'lerde reel kesim firmalarının bol likidite ve elverişli finansal koşullardan yararlanmaları sonucu yabancı para cinsi borçlulukları önemli ölçüde artmıştır. Firmalar bu borç kaynaklı önemli miktarda kur riskine maruz kalmıştır. Risk algısının değiştiği ve küresel koşulların bu kadar elverişli olmadığı dönemlerde ise GOÜ'ler açısından finansal istikrar üzerinde bu kanaldan riskler oluşmaktadır. Bir başka deyişle, yüksek yabancı para cinsi borç GOÜ'leri dış şoklara karşı daha hassas ve kırılgan yapmaktadır. Yerel para biriminin olası değer kayıplarından kaynaklanabilecek riskleri kontrol etmek için gerekli makro ihtiyati önlemler alınmalı reel kesim borçlanmaları gözetilerek bilanço yapıları güçlendirilmelidir.

APPENDIX C: TEZ İZİN FORMU / THESIS PERMISSION FORM

TEZ İZİN FORMU / THESIS PERMISSION FORM

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Enformatik Enstitüsü / Graduate School of Informatics ☐

Deniz Bilimleri Enstitüsü / Graduate School of Marine Sciences ☐

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Bölümü / Department : İktisat

TEZİN ADI / TITLE OF THE THESIS (**İngilizce** / English) : The Impact of External Vulnerabilities on Exchange Rate Pass-Through: Recent Longitudinal Evidence From Emerging Markets

TEZİN TÜRÜ / DEGREE: **Yüksek Lisans** / Master ■ **Doktora** / PhD ☐

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