Keskin, N. (2023). “Debates Over the Trilemma and Dilemma Hypotheses within the Framework of Monetary Policy Independence Following the 2008 Crisis”, Eskişehir Osmangazi Üniversitesi İİBF Dergisi, 18(2), 549 – 572.
Doi: 10.17153/oguiibf.1242861

Başvuru: 26.01.2023 Kabul: 26.04.2023 *Araştırma Makalesi/Research Article*

Debates Over the Trilemma and Dilemma Hypotheses within the Framework of Monetary Policy Independence Following the 2008 Crisis

Nagehan Keskin[1]

2008 Krizi Sonrasında Para Politikası Bağımsızlığı Çerçevesinde İmkânsız Üçleme ve İkilem Hipotezine İlişkin Tartışmalar

Öz

Bu çalışma, literatürde süregelen üçleme-ikilem tartışmaları ile ilgili ampirik çalışmaların bulgularından hareketle, tartışmaya genel bir bakış açısı sağlamayı ve gelecekteki araştırmalara ışık tutmayı amaçlamaktadır. Üçleme hipotezinin geçerliliğini araştıran çalışmalardan bazılarında, üçleme hipotezinin geçerliliğini koruduğu sonucuna ulaşılırken, bazı çalışmalarda ikilem hipotezini destekleyen kanıtlar elde edilmiştir. Sınırlı sayıda çalışmada ise üçleme ve ikilem hipotezinin kısmen geçerli olduğuna ilişkin bulgular ortaya konulmuştur. İncelenen ampirik çalışmaların sonuçları bir bütün olarak değerlendirildiğinde; esnek döviz kurları çevre ülkelere daha fazla parasal bağımsızlık sağlamaya devam etmekle birlikte, günümüzde giderek artan finansal entegrasyonla birlikte döviz kurunun şok emici rolünün zayıfladığını söylemek mümkündür.

Anahtar Kelimeler: İmkânsız Üçleme, İkilem, Para Politikası Bağımsızlığı, Küresel Finansal Döngü, Döviz Kuru Rejimi

JEL Kodları: E52, F3, F41

Debates Over the Trilemma and Dilemma Hypotheses within the Framework of Monetary Policy Independence Following the 2008 Crisis

Abstract

Based on the findings of empirical studies examining the trilemma-dilemma debate, this study aims to offer a general overview of this debate and light the way for future studies. We note that although some studies investigating the validity of the trilemma hypothesis conclude that it is still valid, others have found evidence in support of the dilemma hypothesis. Furthermore, a limited number of studies report that both hypotheses are partially valid. Examining the findings of these empirical studies as a whole, we can say that although flexible exchange rates continue to provide peripheral countries with more monetary independence, the steady increase in financial integration is weakening the shock-absorbing role played by the exchange rate today.

Keywords: Trilemma, Dilemma, Monetary Policy Independence, Global Financial Cycle, Exchange Rate Regime

JEL Codes: E52, F3, F41

Araştırma ve Yayın Etiği Beyanı	Bu çalışma bilimsel araştırma ve yayın etiği kurallarına uygun olarak hazırlanmıştır.
Yazarların Makaleye Olan Katkıları	Çalışma yazar tarafından hazırlanmıştır.
Çıkar Beyanı	Yazarlar açısından ya da üçüncü taraflar açısından çalışmadan kaynaklı çıkar çatışması bulunmamaktadır.

[1] Assist. Prof., Dokuz Eylül University, Faculty of Economics and Administrative Sciences, Department of Economics, nagehan.keskin@deu.edu.tr

1. Introduction

The financial markets have become significantly more integrated since the 1990s following deregulation, financial liberalization, and innovations, resulting in a considerable increase in cross-border capital flows (Cordemans et al., 2019: 1,4). The gradual increase in international financial integration has resulted in the monetary and financial conditions in developing countries becoming more dependent on global financial conditions and the monetary policy practices in developed countries. The expansionary monetary policies of the developed countries starting with the United States (US) in the wake of the 2008 Global Financial Crisis exposed the developing countries to larger scale and more volatile capital flows, generating a risk in terms of financial stability. These developments prompted debates over the ability of developing countries to isolate themselves from global financial shocks and the monetary policy changes in center countries such as the US, and called the validity of the trilemma (impossible trinity) hypothesis into question (Obstfeld et al., 2019:279; Kharroubi and Zampolli, 2016: 194).

The trilemma hypothesis is a central principle of open macroeconomics. It argues that it is not possible for a country to have a fixed exchange rate regime, free movement of capital, and an independent monetary policy at the same time, and that the policymakers will only be able to achieve two of these objectives by refraining from the third. To illustrate, according to the trilemma hypothesis, adopting a floating exchange rate regime by refraining from a fixed exchange rate regime under the free flow of capital will allow countries to apply an independent monetary policy (Georgiadis and Mehl, 2015: 1). But Rey (2015) called into question the classical trilemma hypothesis by asserting that the free flow of capital restricts monetary policy autonomy[2] even under a floating exchange rate. According to Rey (2015), the gradual increase in international financial integration gave rise to a strong global financial cycle as characterized by large the co-movement among the countries of gross capital flows, asset prices, leverage, and credit growth. Rey (2015) found evidence that US (center country) monetary policy is being transferred to other countries (peripheral countries) through global financial cycles, regardless of the exchange rate regime applied, suggesting that in all cases where capital moves freely, central banks outside the US cannot implement independent monetary policy, even in the presence of flexible exchange rates (Rey, 2015).

In this case, the classical trilemma hypothesis, as independent from the exchange rate regime, transforms into a dilemma in which the countries have to choose between the free flow of capital and monetary policy independence. In other words, a country has to choose between preserving its monetary independence by restricting capital flows, or forgoing monetary independence by permitting the free flow of capital. Rey (2015) argues that countries other than the center country are required to control their capital flows or adopt macroprudential policies to reduce their sensitivity to the global financial cycle and secure monetary policy autonomy.

The debates over the trilemma and dilemma hypotheses help policy-makers formulate the right policy by taking into account international capital flows and financial fragility. If the trilemma hypothesis is valid, policy-makers should focus on finding the optimal construct of actual capital flow and the choice of exchange rate regime to pursue an independent

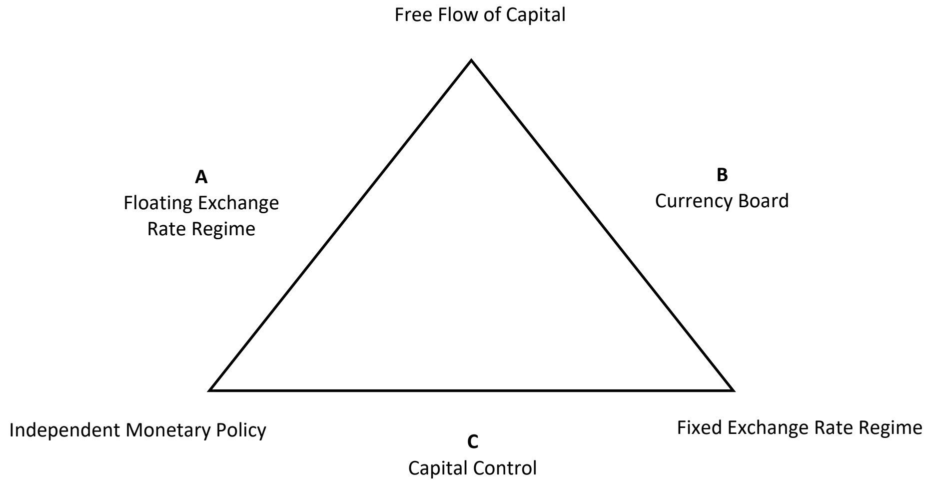
[2] In this study, the concepts of "monetary policy independence" and "monetary policy autonomy" are used interchangeably.

monetary policy. But if the dilemma hypothesis is valid, policy-makers should discuss the effectiveness of capital flow management policies such as capital controls and macroprudential regulations (Ligonniere, 2017: 4; Majumder and Nag, 2020:2). After Rey (2015) put forward her dilemma argument, numerous studies were made asking whether the trilemma hypothesis was still valid or not, and a growing literature formed on the subject. Based on the trilemma/dilemma debates in the literature, this paper has been written to provide an overall perspective on the debate and to shed light on future studies by examining empirical studies on the subject using the descriptive analysis method. To this end, the trilemma hypothesis is explained in part 2 and the global financial cycle and dilemma hypothesis are explained in part 3. Part 4 covers the policy options suggested for overcoming the dilemma hypothesis, namely, capital controls and macroprudential measures and their effects. Part 5 is a detailed review of the empirical literature on trilemma-dilemma debate. The final part of the study presents inferences and evaluations on the subject presented based on the reviewed empirical literature.

2. The Trilemma Hypothesis

The trilemma or impossible trinity hypothesis is based on the work by Mundell (1963) and Fleming (1962) and posits that a fixed exchange rate regime, free flow of capital, and an independent monetary policy cannot be applied at the same time. It states that policy-makers have to opt for two of these three objectives. The trilemma hypothesis is generally depicted using the triangle in Figure 1. Each corner of the triangle represents one of the three available policy options. A country can opt for only two corners of the triangle, and this state implies forgoing the option in the third corner. In other words, a country can only choose a policy combination represented by one of the edges of the triangle. Accordingly, if a country opts for free flow of capital and a fixed rate of exchange, it must forgo having an independent monetary policy in favor of adopting a currency board (side B). A country that opts for a fixed exchange rate regime and independent monetary policy will have capital control (side C). A country that opts for an independent monetary policy and free flow of capital must forgo a fixed exchange rate and allow a floating exchange rate (side A) (Feng and Cheng, 2016:5; Klein and Shambaugh, 2015:34).

Figure 1: Trilemma Hypothesis



Source: Klein and Shambaugh, 2015:34.

The trilemma hypothesis offers a significant analytical framework for policy choice in open macroeconomics and reflects the scarcity of policy instruments relative to policy objectives in general (Aizenman, 2018: 3). Throughout history, countries have adopted different policy combinations in an attempt to overcome the trilemma. During the gold standard period, countries abandoned monetary policy independence in favor of fixed exchange rates and the free flow of capital. During the Bretton Woods era, the free flow of capital was abandoned in favor of a fixed exchange rate regime and an independent monetary policy. Different practices were adopted in the post-Bretton Woods period, however. Many countries preferred free capital flows and an independent monetary policy, abandoning the goal of a fixed exchange rate and adopting a floating exchange rate regime (Feng and Cheng, 2016:5-6; Obstfeld et al., 2019: 279).

One of the most significant developments in the post-Bretton Woods period was the financial liberalization experienced throughout the world. Financial liberalization began in developed countries toward the end of 1970s, then expanded to cover the developing countries with the support of such international financial institutions as the IMF in the 1980s, with many countries removing restrictions on capital flows. The volume of capital flows to developing countries aiming to overcome capital inadequacies with financial liberalization policies increased steadily and reached significant proportions in the 1990s (The Central Bank of the Republic of Turkey-TCMB, 2015a: 9). The liberalization of capital flows contributed to economic growth (Aizenman et al. 2022:6) by paving the way for more efficient allocation of sources, by assisting the transfer of technological or managerial information, and by increasing domestic savings. But the sudden inflows and outflows of capital flows, referred to as hot money, made the developing countries more vulnerable to shocks emanating from the finance market, hence the crises[3], that began to occur more frequently as of 1990s and that

[3] 1994 Mexico and Turkey, 1997 Asia, 1998 Russia, 1999 Brazil, 2001 Turkey and Argentina.

spread easily from one country to another. These crises prompted high-level debates on the effects of capital flows on the developing countries. Arguments claiming that capital flows were the single most important dynamic in economic crises began to gain importance (TCMB, 2015a: 9; İnsel and Sungur, 2003: 6). Aizenman (2018) asserts that the crises that affected the developing countries in 1990s added financial stability to the three policy goals framed by the original trilemma. Many developing countries thus tended to accumulate international reserves to insure themselves against the risk of sudden stops or reversals of capital flows, resulting in massive increases in their stocks of reserves (Aizenman, 2018: 8-11).

Another development that came to the fore in the 2000s in the post-Bretton Woods period was the spillover effect of the monetary policies implemented by developed countries, especially the United States, on developing countries after the Global Financial Crisis of 2008. The global liquidity surplus created as a result of the unconventional expansionary monetary policies implemented by the central banks of developed countries after the 2008 Crisis increased capital flows to developing countries. As these capital flows were high volume and short-term, they posed a risk to financial stability by causing such problems as rapid credit growth, appreciation of local currency, and increase in current deficit. Moreover, the possibility of sudden stops and reversals in capital flows increased the concerns over financial stability. The expansionary monetary policies implemented by developed countries brought macroeconomic and financial risk to developing countries through capital flows. This in turn called the impossible trinity hypothesis into question and led to capital flows playing a determining role in the monetary policy approaches of developing countries in the post-2008 Crisis period. Against this backdrop, many developing countries extended their policy instruments by adopting capital controls and macroprudential measures to reduce the risks from capital flows as well as ensure price stability (TCMB, 2011: 27; Barlas and Kaya, 2013: 1-4; TCMB, 2015b: 2).

3. Global Financial Cycle and the Dilemma Hypothesis

Although today’s steadily increasing financial integration has demonstrated the importance of external shocks to national economic conditions, economists and policymakers alike agree that the trilemma hypothesis was valid up until the 2008 Crisis. But in the period after the 2008 Crisis, through the studies conducted particularly by Rey (2015, 2016) and co-authors (Miranda- Agrippino and Rey, 2015; Passari and Rey, 2015), it started to question more and more whether exchange rate flexibility alone was enough for an independent monetary policy (Anaya, 2016:1-2). According to the dilemma argument suggested by Rey (2015), in the presence of strong global financial cycles, monetary policies implemented by the center countries (generally the US) are transmitted to peripheral countries regardless of the exchange rate regime. This renders invalid the traditional trilemma hypothesis of an open economy that holds that in a world where capital flows freely, independent monetary policies are only feasible when there is a floating exchange rate.

In her study using the data of 53 countries from 1990 to 2012, Rey (2015) initially examined the relationships between gross capital flows in different geographical regions and of different types. She determined that the gross capital flows move strongly together in terms of both types of capital flows and geographical regions. She also found a negative

correlation between the movements in the gross capital flows and the VIX index[4], a measure of uncertainty and risk aversion. Capital flows increase when VIX is low and decrease when VIX is high. She also found similar correlations with VIX for asset prices, leverage of global banks, and credit growth. They all had a negative correlation with VIX. Rey (2015) found extensive common movement between countries in gross capital flows, asset prices, the leverage rate of global banks, and credit growth, and characterized this status as the "global financial cycle." She indicated that VIX is one of the main driving powers of global financial cycle, and then investigated the relationship between US monetary policy and the global financial cycle. The results of VAR analysis revealed that US monetary policy is a significant determinant of the global financial cycle acting along with VXI. An expansionary US monetary policy shock decreases the uncertainty and global risk perception, and accordingly increases the leverage rates of global banks, extends international capital flows, accelerates credit growth, and increases asset prices. She reported that monetary conditions are transferred from the center country to the rest of the world via capital flows and credits due to the presence of global financial cycle regardless of the implemented exchange rate regime and asserted that this invalidated the classic "trilemma" hypothesis. According to Rey (2015), whenever capital is freely mobile, the global financial cycle restricts the national monetary policies independently of the exchange rate regime, and so the classic "trilemma" ("impossible trinity") hypothesis turns into to a "dilemma" ("irreconcilable duo"). In this case, independent monetary policies are only possible when the capital account is managed, directly or indirectly, regardless of the exchange rate regime. In other words, according to the dilemma hypothesis, countries have to choose between monetary policy autonomy and capital account openness, and not among the three policy objectives of the trilemma. A similar study was made by Passari and Rey (2015). The study covered the period from 1990 to 2012 and used a sample consisting of 53 developed and emerging market economies. Their analysis showed that cross-border capital flows, asset prices, and global leverage rates were moving together between countries regardless of the implemented exchange rate regime, and presented evidence of the global financial cycle. They then investigated whether the sensitivity to the global financial cycle (represented by VIX) of the countries' local stock prices and local credit growth was affected by the exchange rate regime, and found that the correlation of stock prices and credit growth with the global financial cycle was systematically not altered by the implemented exchange rate regime. They then analyzed the spillover effects of US monetary policy shocks on the United Kingdom, a country that has adopted the floating exchange rate regime and an inflation targeting regime. They found indication that US monetary policy was significantly affecting the United Kingdom's external financing premium (measured by mortgage margin).

Miranda-Agrippino and Rey (2015) examined in more detail how the presence of the global financial cycle affected the financial spillovers of US monetary policy. The authors first considered 858 different price series covering the asset prices, corporate bond indices, and the prices of commodities traded on all the major global markets (North America, Europe, Asia Pacific, and continental Australia). Using a dynamic factor model, they converted the

[4] VIX is the Chicago Board Options Exchange Volatility Index. It measures the implied volatility in the S&P 500 index options.

movement in the returns of these assets into a single global factor. They determined that this global factor they had formed was by itself forming more than 20% of the common variability in the prices of risky assets in all the continents, and that it was indicating high co-movement. Their study also indicated that this global factor, shaping the co-movement of risk asset prices, had a negative correlation with VIX, which is defined as one of the main driving forces of the global financial cycle. Using the Bayesian VAR method, the authors then analyzed the effect of US monetary policy shocks on the global financial cycle. They obtained evidence indicating that US monetary policy shocks were causing strong movements on international financial variables representing the global financial cycle. Their results indicated that the monetary tightening in the United States was followed by a decrease in the leverage rates of global banks, an increase in risk aversion, a tightening in asset prices' global factor, a regression in global credit, and a decrease in international capital flows. The authors reported that these results were also valid for countries with a floating exchange rate and emphasized that this finding supported Rey's (2015) dilemma argument. Rey (2016) obtained similar results when she tested the dilemma argument for the developed countries, too. In her study in 2016, Rey examined the effects of US monetary policy shocks on those developed countries that employed inflation targeting under a floating exchange rate regime and that had large financial markets (Canada, New Zealand, Sweden, and the United Kingdom). The analysis results revealed that US monetary policy shocks were greatly affecting domestic financial conditions (output, inflation, and asset prices) via international credit and risk-taking channels.

4. Policy Suggestion for the Dilemma Hypothesis: Capital Controls and Macroprudential Measures

Rey (2015) recommends using capital controls or macroprudential measures to decrease non-center economies' sensitivity to the global financial cycle and maintain monetary policy independence. Capital controls are measures designed (generally price- based or administrative) to restrict capital flows by allocating the borrowing instruments on the basis of residence. Macroprudential measures are prudential instruments designed to limit the systemic financial risk and preserve the stability of the financial system (IMF, 2012:21; Landi, 2017:5). The reasons for applying capital controls can be listed as decreasing the volume of capital flows, changing the combination of capital flows (from short-term to long-term), decreasing the pressure on exchange rates, and allowing an independent monetary policy. Capital controls is a subject that has been addressed over and over again in different periods either by policy-makers or academicians. While theoretical models assert that capital controls are beneficial, the discussions regarding the effectiveness and cost-benefit of capital controls in policy making are not yet concluded (Magud et al., 2018:2-3, 23). Interest in capital controls as an alternative policy instrument that may be used to ensure macroeconomic and financial stability renewed following the 2008 Crisis when opinions against capital controls changed in the international environments with leading international institutions and central banks adopting a more open-minded attitude regarding the use of capital controls. The IMF's attitude here is particularly remarkable. Historically, the IMF, which is a strong supporter of free capital mobility, revised its institutional opinion on this subject in 2012 (Rebucci and Ma, 2019: 2). In this context, IMF accepted that free capital flows posed risks to countries in addition to the significant benefits they provided, and suggested using capital controls to complement macroeconomic policies under specific conditions (IMF, 2012). In the period

after the Global Crisis, Brazil, Peru, Colombia, Thailand, and South Korea implemented various capital control measures to decrease the risks posed by capital flows (TCMB, 2010: 47).

While capital controls and macroprudential measures are generally perceived as similar policy instruments, their primary purposes do not always overlap. While capital controls are generally intended to affect the volume or composition of capital flows, macroprudential measures seek to control the accumulation of systemic financial risks under control regardless of the source of risk, be it domestic or foreign (IMF, 2012:21). Moreover, when compared with capital controls, macroprudential measures can be implemented in a more targeted fashion, and their use requires fewer legal restrictions than capital controls (Friedrich et al., 2020: 25). Macroprudential measures include a broad set of policy instruments aimed at keeping systemic vulnerabilities in check and strengthening the resilience of the finance sector. Various macroprudential regulations that increase bank capital and liquidity, limit foreign exchange risks, and target risky credit types can help increase the resilience of the finance sector against global financial shocks, thus ensuring macroeconomic stability (Bergant et al., 2020:4-6). As macroprudential measures can help smooth out excessive cyclic movements in financial markets such as rapid growth in credit and liquidity, thus preventing systematic risk accumulation and formation of financial risk, they can help countries maintain their monetary independence. Macroprudential measures are relatively new policy instruments compared with capital controls. They started being noticed and discussed after some developing countries used them to counter the large and volatile capital flows caused by the expansionary monetary policies implemented by the central banks of developed countries in the wake of the 2008 Global Finance Crisis. For example, following the 2008 Crisis, some developing countries such as South Korea, Brazil, Indonesia, Russia, and Thailand implemented various macroprudential measures to develop resistance against reversal of capital flows and other related financial risks (Aizenman et al., 2020: 2-3,18).

5. Empirical Literature on the Trilemma and Dilemma Hypothesis Debates

After Rey (2015) put forward her dilemma argument, numerous studies were made investigating whether the trilemma hypothesis was still valid, and a growing literature formed on the subject. As the subject has different interconnected and intertwined dimensions, it is hard to make a classification by separating the studies from each other with defined limits according to the topics examined. Nevertheless, the current studies can be evaluated by dividing them roughly into two groups. The studies in the first group questioned the validity of the trilemma hypothesis. Many of them investigated whether the trilemma turned into a dilemma. As monetary policy independence is defined as the freedom to set policy interest rates independently of other countries, the studies conducted to test whether the trilemma turned into a dilemma generally tried to measure to what extent the local interest rates and domestic financial conditions were being directed by the interest rates of the center country (usually the US). When making these measurements, a distinction is usually made between countries that do apply capital controls and those that do not, as well as those that apply a fixed or floating exchange rate regime, taking into account the exchange rate regime of the country being analyzed and the openness of its capital account. Some of the studies questioning the validity of the trilemma hypothesis focused on the role of the global financial cycle and sought to determine how sensitive capital flows, domestic financial conditions, and monetary policy were to the global financial cycle. The studies in the second group consisted

of research contributing to the trilemma and dilemma debate in the context of capital controls and the effects of macroprudential regulations. Rey (2015) recommends using capital controls and macroprudential measures to overcome the effects of the global financial cycle and dilemma. In this context, other studies investigated whether capital controls and macroprudential measures help countries to reduce their sensitivity to the global financial cycle and increase their monetary policy independence (Georgiadis and Mehl, 2015:3; Kharroubi and Zampolli, 2016:195; Friedrich et al., 2020:5).

5.1. Studies Investigating the Validity of the Trilemma Hypothesis

Most of the studies questioning the validity of the trilemma hypothesis following Rey's (2015) claim sought to answer the question as to whether the trilemma had transformed into dilemma. Some studies reported findings that supported the validity of the trilemma hypothesis and others had findings in support of the dilemma hypothesis. A limited number of studies reported findings showing that both hypotheses were partially valid.

Georgiadis and Mehl (2015) used a sample of 61 developed and developing countries to examine whether the trilemma hypothesis transformed into a dilemma due to financial globalization for the period 1999-2009. The findings of the study, made using the VAR model, indicated that flexible exchange rates continued being crucial for monetary policy autonomy with capital mobility, which meant the trilemma hypothesis remained valid. One of the studies supporting the validity of the trilemma hypothesis was conducted by Obstfeld (2015) who examined the effect of exchange rate regimes in the transmission of US monetary policy to developing countries. His findings revealed that the co-movement of long-term interest rates under floating exchange rates was very high and not statistically different from that of fixed exchange rates. By contrast, they found that the co-movement of short-term interest rates continued to depend on the exchange rate and that floating exchange rates allowed for greater monetary policy independence. The author emphasized that while floating exchange rate provided more monetary autonomy, the exchange rate flexibility would not be enough by itself to insulate economies against external financial and monetary shocks. Klein and Shambaugh (2015) investigated whether exchange rate flexibility and capital controls allow for monetary policy independence in a study of more than 100 developed and developing countries from 1973 to 2011. The authors concluded that not only floating exchange rates but even a limited amount of exchange rate flexibility increase monetary policy autonomy, especially in developing countries. They also reported that partial capital controls did not usually deliver more monetary autonomy than open capital accounts unless these controls were quite extensive. The authors stated that while some countries were implementing long-standing, extensive capital controls ("walls"), a significant group of countries was implementing periodical limited controls ("gates")[5], and noted that the walls were more effective than the gates in limiting the increases in asset prices and the fluctuations in the real exchange rate. In the light of their findings, the authors emphasized that the simplest and most precise way of ensuring monetary autonomy without firmly closing the capital account was to allow the fluctuation of exchange rate, and thus they supported the trilemma hypothesis. Aizenman et al. (2016) investigated how sensitive financial variables (real effective exchange rates, stock exchange prices, and policy rates) in developing and emerging market economies (peripheral countries) were to financial conditions and policy changes in

[5] Klein (2012) calls long-standing capital controls "walls" and periodically applied capital controls "gates."

center countries (US, Japan, Euro Zone, and China), and the factors affecting this sensitivity. In the study covered 100 countries from 1986 to 2012 and concluded that the connection between peripheral countries and center countries was very high in the past two decades for both policy interest rate and real effective exchange rate. It also found that the policy interest rates in peripheral countries were more sensitive to global financial shocks (VIX index) during the crises that occurred in the 1990s and after the 2008 Global Finance Crisis. The authors analyzed the factors affecting the sensitivity of peripheral countries to financial conditions in center countries, and reported that the policy regulations such as the exchange rate regime and financial openness implemented in peripheral countries directly affected sensitivity to center countries. They also found that those countries pursuing higher exchange rate stability and financial openness had stronger connections with the center countries. In the light of their findings showing that countries with more stable exchange rates were more sensitive to changes in center countries' monetary policies, the authors concluded that the trilemma hypothesis was still valid.

Using data from 161 countries from 1970 to 2013, Ligonniere (2017) investigated whether the trilemma transformed to dilemma by using the unbalanced panel model. The results of the study showed that the global financial cycle, as represented by the VIX index, reduces monetary policy autonomy. However, the effect of policymakers' decision regarding financial openness and exchange rate regime arises from emergence of global financial cycle through global players (global investors and global banks) rather than VIX. The author found that sensitivity to the global financial cycle depends on the presence of global players in the local economy and not financial fluctuations. He reported that the trilemma weakened with the increasing role of global investors and global banks in the local economy, then the trilemma was weakening, but did not disappear. In other words, there is no gradual transition from trilemma to dilemma taking place. In this context, the study drew attention to the importance of global players within the financial system, and called for more macroprudential regulation to reduce sensitivity to the global financial cycle. Bekaert and Mehl (2019) investigated whether the trilemma transformed into a dilemma by using an alternative financial integration criterion they had developed using the stock return data of 17 countries for the period 1985-2014. The findings of the study were consistent with the trilemma hypothesis and showed that the transitivity from center country interest rate to both short- and long-term domestic interest rates depended on the implemented exchange rate regime. According to this, higher financial integration for countries applying a fixed exchange rate regime increases interest rate transitivity and decreases monetary policy autonomy. On the other hand, in countries with a flexible exchange rate regime, interest rate transitivity is very limited and is not affected by the level of integration of the financial markets. Moreover, the results indicated that even in cases of increased financial integration, the positive relationship between exchange rate flexibility and monetary policy autonomy remains. According to the authors, when the exchange rates are flexible, the central banks outside the United States have more control over domestic interest rates despite the potential presence of the global financial cycle driven by US monetary policy. Obstfeld et al. (2019) used a sample of 43 emerging market economies from 1986 to 2013 to investigate whether the type of exchange rate regime matters in transmitting global financial shocks. The authors analyzed the reaction of a series of local real and financial variables such as credits, prices of risky assets (housing and stock), banking system leverage (credit-deposit rates), and economic activity level against global financial conditions (represented by the VXO index). As

the financial conditions in developing countries are strongly correlated with cross-border capital flows, they investigated whether the sensitivity of capital flows to global financial shocks differs between exchange rate regimes. Their findings indicated that countries with a fixed exchange rate regime are more vulnerable (rapid increase in local credit and housing prices, and increase in bank leverage) to global financial shocks than countries with a floating exchange rate regime. Therefore, exchange rate elasticity decreases the magnitude of the transmission of global financial shocks to domestic credit growth, housing prices, and bank leverage. They also determined that capital flows react more to global financial conditions in fixed exchange rate regimes rather than in flexible exchange rate regimes. The main finding obtained from the study, contrary to Rey’s (2015) claim, was that the type of exchange rate regime applied still matters in the transmission of global financial conditions to other countries.

Habib and Venditti (2019) examined the driving powers of global financial cycle and the effect of this cycle on global capital flows using data from 18 developed and 32 developing economies covering the period from 1990 to 2017. The authors created the Global Stock Market Factor (GSMF) as a global risk measure that summarizes the movement of stock returns in 63 economies together to represent the global financial cycle. They pointed out that the GSMF is strongly correlated with the global financial cycle suggested by Miranda-Agrippino and Rey (2015) and that it affects global capital flows. They noted that the most significant driving power of global risk is financial shocks, and that financial shocks play a more significant role in directing global risk than US monetary policy. The authors also examined how capital account openness and exchange rate regime affect the transfer of global risk to different types of capital flows. They stated that countries that are more open financially and adopt a fixed exchange rate, are more sensitive to global risks, and that it implies confirmation of the trilemma hypothesis. When they examined the subject in terms of different types of capital flows, they reported that the “trilemma” is directed by other investments and to a large extent by bank credits from among the capital flows. They added that this finding confirms the prominent role of global banks in the transmission of global shocks. Georgiadis and Zhu (2019) investigated the validity of the trilemma hypothesis by estimating the reaction functions of Taylor-rule type monetary policy. Their study included data from 47 developed and emerging market economies for the period 2002-2018. The authors supported the trilemma hypothesis by concluding that both exchange rate flexibility and capital controls reduce the peripheral countries’ sensitivity to center country’s policy rate, which means they strengthen monetary policy autonomy. In addition, the authors reported that an economy’s net foreign exchange deficit in its external balance sheet limits the flexible exchange rates’ potential to ensure monetary policy autonomy. This conclusion gains strength particularly when the foreign exchange deficit comes from portfolio debt and bank loans and when the center country tightens its monetary policy. The authors point out that the underlying reason for the periphery countries to mimic the centre country’s monetary policy tightening may be the concern of policymakers about the depreciation of the local currency because local currency depreciation can increase the cost of payment and conversion of foreign currency debts and bank loans to a level that will jeopardize financial stability. In his study covering 30 small open economies (14 developed and 17 developing countries), Demir (2019) examined the effect of the applied exchange rate regime on US monetary policy spillover to local interest rates. The study covered the period 2000-2015 and used the panel VAR method. It found that exchange rate flexibility sharply decreased US

interest rate spillover to local interest rates in line with the trilemma hypothesis. The study also concluded that in countries with a floating exchange rate, the degree of monetary spillover increases with the degree of capital account openness. The study also sought to answer the question as to which factors were effective in enabling local monetary authorities to gain greater monetary autonomy in the face of US monetary policy expansions. It provided evidence showing that reliable monetary and fiscal policies, lower financial dollarization levels, and the adoption of macroprudential policies provide a higher degree of monetary autonomy. Loipersberger and Matschke (2022) investigated the effectiveness of floating exchange rates and capital controls in decreasing the effect of global financial shocks on local financial variables and the real economy. The study used data from 55 developed countries for the period 1995-2016 and found that floating exchange rates and capital controls significantly decreased the spillover effects of global financial shocks on local economies. According to the results of the analysis, floating exchange rates and capital controls were almost equally effective in insulating local economies from international spillovers. The authors also investigated whether a two layered insulation, namely, the use of capital controls and floating exchange rates, provided additional benefit for those developing countries exposed to global shocks, and concluded that they did not. Therefore, to have monetary independence, policymakers may make a choice between a floating exchange rate or capital controls and thus maintain open capital accounts or fixed exchange rates.

In the literature, there are studies that conclude that flexible exchange rates continue to be correlated with greater monetary policy independence, and that the trilemma hypothesis is still valid as well as studies that assert the transformation of trilemma to dilemma. One significant study supporting the dilemma hypothesis was made by Edwards (2015). The author investigated whether countries with flexible exchange rate regimes can pursue an independent monetary policy by analyzing the extent to which US central bank policy changes are transferred to the policy interest rates of local central banks. The study used data from three Latin American countries (Chile, Colombia and Mexico) that adopted the inflation targeting regime, had a relatively high degree of capital mobility, and a flexible exchange rate regime for the period 2000-2008. The results indicated that for all three countries, there was significant spillover from the US policy interest rate to their policy interest rates, meaning that these countries tended to import the FED policies. In this case, flexible exchange rates could not ensure the complete independence of monetary policy as anticipated in the conventional trilemma hypothesis. Edwards drew attention to the fear of floating as a possible explanation for this result. According to the models in Mundell-Fleming tradition, if capital mobility is less than excellent, an increase in the global interest rate will result in external deficit and depreciation of the local currency. In this case, if there is a fear of floating, local policymakers will resort to tightening their own monetary stance to stop the currency from weakening. Hofmann and Takats (2015), using a sample consisting of 22 developing countries and 8 small open developed countries for the period 2000-2014, examined to what extent US interest rates were affecting local interest rates. Their analysis showed that short and long- term US interest rates demonstrated significant spillover effects on both developing countries and small open developed countries, and this was true for both fixed and floating exchange rate regimes. This finding supports Rey's (2015) opinion that exchange rate flexibility will not protect countries from external monetary spillovers. The authors point out that even under flexible exchange rates, central banks find it difficult to implement a monetary policy that, while technically feasible, is based entirely on domestic factors and ignores monetary

developments in advanced economies. They emphasized that the most important factors directing developing countries and small developed countries to consider US interest rates in their monetary policy decisions are risks arising from capital flows and concerns about exchange rate volatility. Central banks may want to prevent high interest rate differences with the United States to stop the exchange rate from appreciating, which may result in a loss of commercial competitive power, or because they are worried about the risk to financial stability posed by large-volume short-term capital.

Anaya et al. (2015) examined the monetary spillover effects of unconventional monetary policies implemented by the US following the 2008 Crisis on 19 developing countries. The study covered the period 2008-2014 and found that the unconventional monetary policy shock of the US with respect to large-scale asset procurement significantly increased portfolio outflows from the US accompanied by an increase in portfolio inflows to developing countries. Real output levels and stock returns increase with the increase in portfolio investments directed at developing countries, while the local currency appreciates in real terms. This finding suggests that the unconventional monetary policies implemented by the US are driving the financial conditions in developing countries through portfolio investments. Another of the study's findings is that the developing countries are reacting by decreasing their policy interest rates in response to the expansionary monetary policy of the US regardless of the implemented exchange rate regime. This finding suggests that flexible exchange rate regimes do not insulate developing countries from the spillover effects of US monetary policy, and fits the dilemma hypothesis instead of the trilemma hypothesis. Using a broad sample consisting of 22 developed and 38 emerging market economies from 1990 to 2016, Gülşen and Özmen (2017), questioned the validity of the trilemma hypothesis under different exchange rate regimes in the periods before and after 2008 Global Finance Crisis. Their main finding was that domestic interest rates were being set by the global financial cycle as represented by the FED's interest rate and VIX even in floating exchange rate regimes for the whole sample in line with Rey's (2015) dilemma suggestion. This means that the exchange rate flexibility is not effective in insulating the peripheral countries' central bank policy actions from US monetary policy. According to the results of the analysis, the FED's interest rates affect developing countries more than developed countries, and developing countries with managed floating exchange rate regimes are more sensitive to the global financial cycle than those with floating exchange rate regimes. Under a floating exchange rate regime, the spillover effect of the FED's interest rate increased significantly in both developed and developing countries after the 2008 Crisis. Another study that found evidence in favor of the dilemma hypothesis was that conducted by Dees and Galesi (2019). The authors examined the international spillover of US monetary policy on 33 developed and developing countries for the period 1994-2016. The study used the global VAR (GVAR) method and concluded that the US expansionary monetary policy shock contributed to the emergence of the global financial cycle, and that economies with floating exchange rate regime were not fully insulated from US monetary policy shocks. The study also found that the spillover effects of US monetary policy increase as countries become more globally integrated. Using a sample consisting of 15 developed countries, 15 developing countries, and the Eurozone for the period 1990-2018, Degasperi et al. (2021) examined the spillover effects of US monetary policy shocks using the VAR method. Their first finding was that US monetary policy shocks had caused large and very homogenous spillovers onto both developed and developing countries. The second finding was that US monetary policy affected these countries

regardless of the implemented exchange rate regime, and that flexible exchange rate regimes did not provide complete insulation from US monetary policy shocks. Flexible exchange rate regimes are not sufficient by themselves to ensure monetary autonomy even in developed economies and the Eurozone. These findings support the idea of the trilemma becoming a dilemma.

In addition to studies with findings in favor of the trilemma and dilemma hypotheses, a limited number of studies found evidence documenting the partial validity of the trilemma and dilemma hypotheses. Using data from 28 countries for the period 1999-2014, Han and Wei (2016) examined the role of exchange rate regime and capital controls in the transmission of international monetary policy shocks from developed countries to emerging market economies. Their findings characterized neither a complete trilemma nor a dilemma, and instead reflected a situation between trilemma and dilemma (2.5-lemma). According to the authors, a flexible exchange rate regime provides asymmetric or insufficient insulation from external monetary policy shocks such that for those peripheral countries not implementing capital control, a flexible exchange rate regime ensures slight monetary autonomy when the center country tightens its monetary policy. But when the center country loosens its monetary policy, the “fear of appreciation” steps in, and even if the local Taylor rule indicates the opposite, peripheral countries adopt a looser monetary policy echoing that of the center country. The study also found that capital controls helped insulate the peripheral countries from external monetary policy shocks even if the center country lowers the interest rate. Vanegas (2019) tested the validity of the trilemma hypothesis for Colombia, Chile, Mexico, and Peru for the period 2003-2017. The findings indicated that the trilemma remains valid in low credit periods, but that it became a two-goal dilemma in periods of relatively high credit growth. This dilemma took the form of monetary independence and capital mobility in Chile, Mexico, and Peru, and monetary independence and exchange rate stability in Colombia. The author noted that while this finding does not align completely with Rey’s (2015) opinion regarding the insignificance of exchange rate regimes, it does support the idea of a significant change in the structure of trade-offs between policy objectives in periods of excessive borrowing. Cheng and Rajan (2020) tested the dilemma hypothesis against trilemma hypothesis across a wide sample consisting of 88 countries for the period 1973-2014. Overall, the authors provide evidence that the trilemma hypothesis still holds true and that a flexible exchange rate does insulate countries from the effects of international monetary policy transmission. The first of their findings was that while fully flexible exchange rates do allow monetary autonomy, moderately flexible regimes do not. The second finding was that when the center countries loosen their monetary policies, flexible exchange rates allow monetary policy autonomy to a certain extent for those peripheral countries not implementing capital control. But when the center countries implement tight monetary policies, those peripheral countries with high reserve levels do not tend to go along with the center country in terms of interest rates, but those peripheral countries with low reserves closely pursued the center countries’ interest rates and tightened their monetary policies. This finding indicates the presence of an asymmetric pattern between the trilemma and dilemma similar to the results of Han and Wei (2016). However, according to Han and Wei (2016), the peripheral country maintains monetary policy autonomy when the center country adopts a tight monetary policy. According to Cheng and Rajan (2019), the peripheral country maintains its monetary policy autonomy when the center country implements a loose monetary policy. So, according to the findings of the study, this asymmetric reaction to the

center country's monetary policy occurs in countries with low reserve level. The authors asserted that this is due to concerns about reversal of capital flows or reserve loss in countries with low reserve level, and they drew attention to the fact that higher reserve levels help maintain monetary policy autonomy.

As the global financial cycle and its effects constitute a part of Rey's (2015) original analysis, the effects of global financial cycle were also addressed in some of the above-mentioned studies investigating whether the trilemma turns into a dilemma. In addition, despite fewer in number compared to studies, investigating whether the trilemma turns into a dilemma, there are also studies, investigating the sensitivity of domestic financial conditions, capital flows and monetary policy to global financial cycle. One such study was made by Cerutti et al. (2017). The authors questioned the importance of the global financial cycle for capital flows by using data on capital flows disaggregated by direction and type for 85 countries between 1990 and 2015. The main finding of the study was that the role of the global financial cycle in determining capital flows was limited and smaller than the one implied in the literature. As the result of analysis based on a series of factor model estimations, the authors concluded that the global financial cycle was unable to explain more than 25% of the change in capital flows. They reported that most of the changes in capital flows did not appear to be the consequence of common shocks, or they were not caused by observable incidents in a center country such as the US. Davis et al. (2019) examined the effect of the global financial cycle on gross and net capital flows using a sample of 20 developed and 38 developing countries for the period 1996-2015. They reported that the effect of the global financial cycle on both gross and net capital flows was stronger in countries with larger net external liabilities. Moreover, the authors included many variables in the analysis which could affect the sensitivity of capital flows to global factors, and revealed that the policy variables such as capital controls, exchange rate regime, corporate quality, and reserve accumulation did not have a significant explanatory power in limiting the effect of the global financial cycle on capital flows. These findings drew attention to the fact that financial sector regulations limiting the size of net debt liabilities were more effective than capital controls in limiting the sensitivity to global financial cycle.

Cordemans et al. (2019) investigated the Eurozone countries to determine whether the local financial conditions were being directed by the global financial cycle. The study created a financial conditions index representing local financial conditions and used the Global Stock Market Factor (GSMF) developed by Habib and Venditti (2019) to represent the global financial cycle. The results showed that the financial conditions in the Eurozone were strongly correlated with the global financial cycle. Another significant finding was that sensitivity to the global financial cycle depended significantly on the countries' net international investment position. Those countries with net liabilities were reacting to the global financial cycle twice as strongly as countries with net assets. Moreover, those countries with net liabilities, particularly the ones financing themselves with other investments (essentially the banks' debt financing), were more vulnerable to the boom/bust periods of the global financial cycle. The authors pointed out that such a strong correlation between the financial conditions in the Eurozone and the global financial cycle tended to indicate a financial dilemma for Eurozone similar to the one posited by Rey (2015). Such a dilemma implies that the monetary and financial conditions in the country are directed mainly by global factors rather than an independent monetary policy as long as the capital account is open. In their

study, Friedrich et al. (2020) developed a criterion representing the global financial cycle by estimating a factor model changing the regime for cross-border stock flows in a sample consisting of 61 countries. Using this criterion, they investigated the effect of global financial cycle on monetary policy autonomy for a sample consisting of 9 developing countries and 7 small, open, developed countries**.** Their first finding was that the power of the global financial cycle changed over time, and that this change exhibited significant heterogeneity among the countries. Analyses of the independence of monetary policy showed that the central banks of developing and developed economies experienced lower degrees of monetary policy independence when the power of the global financial cycle was high. The authors reported that the central banks of these countries would tighten their policy rates in response to unexpected increases in the inflation gap when the power of the global financial cycle was low, but would not react to the same unexpected changes in the inflation gap when the power of the global financial cycle was high (i.e., they did not pursue a model consistent with the Taylor rule).

5.2. Studies Investigating the Effects of Capital Controls and Macroprudential Measures

Many empirical studies evaluating the effectiveness of capital controls and questioning whether capital controls and macroprudential measures help reduce countries' sensitivity to the global financial cycle and increase their monetary policy autonomy were conducted after the 2008 Crisis. Some studies analyzed the effects of either capital controls or macroprudential measures while other studies analyzed both.

Farhi and Werning (2014) examined the optimal use of capital controls within the framework of the New Keynesian model, and obtained results that were similar to and different from the trilemma hypothesis. In line with the trilemma hypothesis, they found that the exchange rate regime matters and that the optimal management of capital flows depend significantly on the exchange rate regime. In addition, contrary to the trilemma hypothesis, they concluded that capital controls were still beneficial even with floating exchange rates. The study found that capital controls play a significant macroeconomic stability role in ensuring monetary autonomy in a fixed exchange rate system. It also found that under a floating exchange rate regime, capital controls help reduce i) the depreciation in the exchange rate and terms of trade, ii) the decrease in consumption, and iii) capital outflows. Pasricha et al. (2015) used the panel VAR method to examine both the effects of capital controls on the local country and the spillover effects to other countries in 17 emerging market economies before and after the 2008 Global Crisis. The results revealed that capital controls have a very limited effect on net capital inflows, monetary policy autonomy, and the exchange rate. The effects, being very limited before the Global Crisis, had weakened more in the period after the Crisis. The study also examined the spillover effects of capital controls to other countries and found that the capital controls implemented by the BRICS countries (Brazil, Russia, India, China, and South Africa) spread significantly to other developing countries. It also found that such spillover effects stemmed particularly from actions restricting the capital inflows, mainly through cross-border bank loans, and became stronger after the Global Financial Crisis. Based on these findings, the authors pointed out that caution should be exercised when using them as a tool for macroeconomic management as the effects of capital controls were limited and situation-specific and may have spillover effects to other countries. One of the most extensive studies on macroprudential policies was performed by Cerutti et al. (2015). The study used data from 119 developed and developing countries in the period 2000-2013 to analyze the

use and effect of macroprudential policies. The data used in the study was obtained from the survey called Global Macroprudential Policy Instruments (GMPI), which is the most extensive database of macroprudential policies, covering 18 different instruments (12 of which were used in the study) and conducted by the IMF. The findings indicated that macroprudential policies were more frequently used in developing countries than developed countries, and that foreign exchange-based policies were more frequently preferred by developing countries. The authors concluded that macroprudential policies operated better in the bust periods of financial cycles rather than the boom periods, and that these policies were much more effective in mitigating credit booms, more so in developing countries than in developed countries. Davis and Presno (2017) used the dynamic general equilibrium model to investigate the relationship between monetary policy independence and capital controls in small, open economies with a flexible exchange rate. The authors used Klein and Shambaugh's (2015) data and concluded that the use of capital controls in countries with flexible exchange rate regime allows for higher monetary policy autonomy. Their findings showed that capital controls allow the monetary policy to focus less on the foreign interest rate and more on local variables such as inflation and outflow.

One of the most exhaustive studies of capital controls and the one that compiled the current evidence regarding the extent to which controls would be successful in practice was made by Magud et al. (2018). That study was based on a meta-analysis of the current literature with respect to capital controls. It standardized the results of about 40 empirical studies by forming two capital control indexes (Capital Controls' Effectiveness Index, and Weighted Capital Controls' Effectiveness Index). The study drew attention to the change of capital controls' effectiveness by time, country, and type of measures used, and found that the controls were less beneficial in practice than suggested by theoretical models. While the findings showed that capital controls on inflows increase monetary policy autonomy and change the combination of capital flows, the evidence showing that controls reduce pressure on the exchange rate was weak and controversial. The study also concluded that controls on the inflows were not effective in decreasing the volume of capital flows. Rebucci and Ma (2019) evaluated the theoretical and empirical contributions to the literature by examining studies on capital controls in the post-2008 Crisis period. Going by the theoretical and empirical evidence they reviewed, the authors stated that capital controls could at best only complement the exchange rate flexibility but could never replace exchange rate policy. The authors stated that the longest-standing and best-understood motivation for using capital controls is to maintain monetary policy independence. They noted that the available evidence suggests that capital controls are necessary to escape the trilemma under fixed exchange rates but that the evidence regarding capital controls under flexible exchange rates is much weaker and that more research is needed to assess the dilemma hypothesis. Coman and Lloyd (2019) indicated that prudential policies were effective in decreasing the US monetary policy's macro financial spillover effects, and so prudential policies may be significant and beneficial instruments for developing countries that want to preserve the monetary policy autonomy in the face of the global financial cycle. Their study looked at 29 developing countries over the period 2000-2017, and analyzed data measuring the prudential policy actions such as sectoral capital buffers, loan-to-value ratio limits (LTV), required reserves, interbank credit limits, and concentration rate limits. The main finding was that the prudential policies implemented in developing countries reduce the spillover effects of US monetary policy. The authors found that the most effective prudential policy instruments are required reserves and LTV ratio

limits. They reported that required reserves significantly reduced the spillover effect of US monetary policy on domestic credit supply, particularly through bank loans, and that LTV ratio limits reduce the spillover effect on housing prices.

Zehri (2020) used the panel VAR method to examine the effect of capital controls on 24 developing countries in the period 2009 to 2016. The results indicated that capital controls reduced capital inflows, allowed for greater monetary policy autonomy, and reduced pressure on the exchange rate. The author pointed out that the developing countries accumulated excessive international reserves after the 2008 Crisis. Investigating the relationship between capital controls and international reserve accumulation, the author found that the capital controls implemented by the developing countries do not prevent reserve accumulation. The study also found evidence to suggest that capital controls may cause negative spillover effects onto other countries, and stressed that policy coordination among the countries is required to mitigate such negative effects. One of the studies examining the effects of macroprudential policies was made by Aizenman et al. (2020) for the period 1986-2015. The study focused on the link between center and peripheral countries through policy interest rates, and investigated whether this link is affected by a number of macroprudential instruments. To this end, the study first examined the effect of the monetary policies of center countries (US, Japan, and Eurozone) on peripheral countries (146 developing countries), and found that the center countries' policy interest rates do affect peripheral countries. The study then investigated whether macroprudential policies affect the financial link between the center countries and peripheral countries, i.e., whether macroprudential policies are effective in achieving peripheral countries monetary policy autonomy. The study used the macroprudential policy dataset first used by Cerutti et al. (2015). Empirical results show that when the expansionary monetary policy implemented by center countries results in capital inflow to peripheral countries, extensive macroprudential policies are effective in ensuring peripheral countries monetary policy autonomy. The study pointed out that the effectiveness of macroprudential policies varies depending on the policies and macroeconomic conditions in the peripheral countries implementing the same, and concluded that the macroprudential policies are being more effective when the peripheral countries have a current account deficit and lower international reserves and experience an increase in net portfolio flows and credit expansion.

Bergant et al. (2020) investigated whether the macroprudential regulations and capital controls were effective in reducing the effects of global financial shocks on developing markets for the period of 2000-2016 using a sample of 38 emerging market economies. The results showed that macroprudential regulations significantly reduced the effect of global financial shocks on developing markets, but that a similar effect was not the case for capital controls. Considering the periods in which the countries included in their analysis implemented a floating exchange rate regime and thus retained their monetary autonomy, the authors investigated whether macroprudential regulations and capital controls allowed for a more cyclical response by monetary policy to global financial shocks. The analysis results showed that the central banks in developing countries, even after getting the anticipated inflation under control, are generally unwilling to lower policy rates when the global financial conditions tighten. One possible reason for this could be concerns that large exchange rate depreciation or large capital outflows could endanger financial stability. Macroprudential regulations mitigate these concerns and can help the monetary policy to

focus on macroeconomic stability more clearly. Empirical evidence shows that at low macroprudential regulation levels, the central banks in emerging markets tend to respond cyclically by raising the policy rates when the global financial conditions tighten, whereas at higher levels of macroprudential regulation, the monetary policy response becomes counter-cyclical and includes a reduction in policy rates when the global financial conditions tighten. The findings regarding capital controls indicated that tighter capital controls do not support the monetary policy's more cyclical reaction to the global financial conditions. According to the authors, to maximize the benefits of macroprudential measures, the policy-makers should consider using a wide range of measures instead of focusing on a narrow toolset. Imposing capital controls to limit cross-border financial transactions does not appear to be a valid alternative to adopting a robust macroprudential framework. In their study, Friedrich et al. (2020) first investigated the effect of the global financial cycle on monetary policy independence and examined the effects of capital controls, macroprudential policies, and floating exchange rates -- different policy options that countries may use to reduce their sensitivity to global financial cycle -- on monetary policy autonomy. The authors found that all three policy options examined increased monetary policy independence. They observed that while capital controls were the most effective of the three policy instruments in the entire sample, this policy was only effective in emerging market economies, not in developed countries. They also found that the positive effect of floating exchange rates was mainly valid for developed economies, and that the macroprudential policies were the only instrument equally applicable in both country groups, but that their effect was lower than the other two policy instruments. In their study covering 27 developing countries in the period 1996-2017, Batini and Durand (2021) examined the sensitivity of gross capital inflows to the global financial cycle as well as the effect of capital controls and macroprudential policies on such sensitivity. The authors reported that the capital inflows were affected by the global financial cycle, and that higher level capital controls and macroprudential policies reduced sensitivity to the global financial cycle.

6. Overall Evaluation and Conclusion

According to the trilemma hypothesis, when capital flows are free, a floating exchange rate regime will allow countries to implement independent monetary policies for local purposes. Rey (2015) found evidence of the existence of a global financial cycle in which the monetary policy of the centre countries is transmitted to the peripheral countries regardless of the applied exchange rate regime, suggesting that as long as capital flows are free in a financially integrated world, even countries that have adopted a floating exchange rate cannot implement an independent monetary policy. This transmission mechanism cannot be prevented by the flexibility of exchange rate, and transforms the trilemma hypothesis into a dilemma that forces countries to make a choice between an independent monetary policy and free capital flows.

The question of whether the trilemma hypothesis is still valid began being asked after Rey's (2015) dilemma suggestion, and many empirical studies were made on the subject. This study used descriptive analysis to examine the findings of empirical studies made on the trilemma-dilemma debate. Most of the studies that concluded that the trilemma hypothesis is still valid also noted that floating exchange rates reduce peripheral countries' sensitivity to the center country's (usually the US) interest rate by reducing the spillover effects of the center country's interest rate, resulting in greater monetary autonomy than that provided by

fixed exchange rates. Some studies reported findings indicating that local financial conditions and capital flows are more sensitive to global financial conditions in countries that adopted a fixed exchange rate than countries that adopted a floating flexible exchange rate system. They noted that exchange rate flexibility still matters in the transmission of global financial conditions to peripheral countries, and stated that this means confirmation of the trilemma hypothesis. Some of the studies that found evidence the trilemma hypothesis was still valid pointed out that factors such as increased financial openness, high foreign currency debt, and the presence of global banks would increase the peripheral countries' sensitivity to global financial conditions and the center country's monetary policies, and weaken the monetary policy independence.

The studies with findings supporting the dilemma hypothesis reported that exchange rate flexibility alone is not sufficient to ensure monetary independence and presented evidence that the center country's interest rates have significant spillover effects on peripheral countries with floating exchange rate regimes and that these peripheral countries tend to follow US monetary policies. Some of these studies found that the spillover effects of center country's monetary policy applied not only to developing countries but also to developed countries. Studies confirming the validity of the dilemma hypothesis highlighted such factors as fear of floating, avoiding appreciation of the domestic currency, and the risks posed by capital flows to financial stability as possible causes directing the peripheral countries to follow the policies of the center country in their monetary policy decisions.

In addition to those studies with findings in favor of the trilemma and dilemma hypothesis, a limited number of studies found evidence confirming the presence of an asymmetric pattern between the trilemma and dilemma. Their results showed that the monetary autonomy that floating exchange rate regimes give to peripheral countries changes depending on whether the center country pursues a loose or tight monetary policy. These studies cited worries about local currency appreciation, the risk of reversal of capital flows, and fear of losing reserves as possible causes of such an asymmetric response by the peripheral countries to the center country's monetary policy. Other studies investigating the validity of the trilemma hypothesis focused more on the role of the global financial cycle. Those studies investigating the effects of the global financial cycle looked more into the impact on capital flows and domestic financial conditions. Their results showed that the global financial cycle does impact domestic financial conditions and capital flows. They also reported that the global financial cycle affected countries with higher external liabilities more.

Capital controls and macroprudential measures are chief among the policy options suggested by Rey (2015) for decreasing the sensitivity of peripheral countries to global financial cycle and increasing the monetary policy independence. In the wake of the 2008 Crisis, many developing countries adopted various capital control measures and macroprudential regulations to prevent the risks to financial stability caused by large-scale capital inflows. Following the Crisis, the risks caused by international capital flows in terms of developing countries reawakened the debates over the use of capital controls as a complementary policy instrument to cope with large and variable capital flows. Some of the empirical studies examining the subject in the context of capital controls present evidence that capital controls reduce the spillover effects of global financial conditions and US monetary policy on peripheral countries and increase monetary independence. Other such studies, albeit fewer in number, report that capital controls have limited effectiveness. A few

studies have reported that capital controls have no effect. Those studies that found that the effects of capital controls were limited pointed out that the effects of capital controls changed depending on the time, the country, and the type of measure used, and noted that they could result in negative spillover effects on other countries. Macroprudential measures are a relatively new policy instrument compared to capital controls and encompass a range of measures for ensuring financial stability. Studies examining the effects of macroprudential measures found evidence that macroprudential measures can help reduce the spillover effects of US monetary policy and help peripheral countries to maintain their monetary policy independence in the face of the global financial cycle. The studies we examined indicated that macroprudential measures are significantly effective in mitigating the negative effects of credit expansions caused by capital flows, especially to developing countries. When the results of studies addressing the effects of capital controls and macroprudential measures are evaluated together, it is possible to say that there is increasing acceptance in the literature that macroprudential measures may be a more beneficial instrument than capital controls when it comes to reducing the transmission of global financial shocks to peripheral countries, and increasing monetary policy autonomy.

Although the debates over the trilemma and dilemma hypotheses are not over, it is possible to make some inferences on the subject based on the findings of the current studies. When the results of all the empirical studies examined are evaluated together, we can say that while exchange rate flexibility is still important in allowing peripheral countries to insulate themselves from global financial shocks and monetary policy changes in center countries, and thus implement a more domestic-oriented monetary policy, its role as a shock absorber is becoming weaker as the financial system becomes increasingly integrated. Global financial conditions and the monetary policies implemented by centre countries, particularly the US, are transmitted to peripheral countries through international capital flows. Therefore, unless the capital flows are completely restricted, global financial shocks and the monetary policies implemented by centre countries will be able to affect the monetary policies of peripheral countries through capital flows. But the increased integration of the global financial system today is making it increasingly difficult for peripheral countries to implement a wholly domestic-oriented monetary policy despite having a floating exchange rate regime. Completely restricting capital flows to allow monetary policy independence does not appear to be a policy option that many countries would choose today. Considering the dependence of developing countries on external financing, this situation is much harder for these countries. In this context, due to decrease of the shock absorber role of exchange rate, it is important for the peripheral countries to use more than one policy instrument to reduce the spillover effects on the domestic economy of financial shocks and changes to the centre countries' monetary policies, and to increase their own monetary policy autonomy. Indeed, the expansionary monetary policies implemented by the central banks of developed countries in the wake of the 2008 Crisis threatened the financial stability of developing countries through capital flows. This led to many countries bolstering their monetary policy approaches with capital controls and macroprudential measures, resulting in an increase in the use of such policy instruments.

References

Aizenman, J. (2018), "A Modern Reincarnation of Mundell-Fleming's Trilemma" https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3135405, (Accessed:08.08.2022).

Aizenman, J.; Chinn, M. D. and Ito, H. (2016), "Monetary Policy Spillovers and the Trilemma in the New Normal: Periphery Country Sensitivity to Core Country Conditions", *Journal of International Money and Finance,* Vol.68: 298-330.

Aizenman, J.; Chinn, M. D. and Ito, H.(2020), "Financial Spillovers and Macroprudential Policies", *NBER Working Paper*, No.24105.

Aizenman, J; Chinn, M. D. and Ito, H. (2022), "The Impacts of Crises on The Trilemma Configurations", *NBER Working Paper*, No.30406.

Anaya, P.; Hachula, M. and Offermanns, C. J. (2015), "Spillovers of US Unconventional Monetary Policy to Emerging Markets: The Role of Capital Flows", *Freie Universitat Berlin School of Business & Economics Discussion Paper*, No.35.

Anaya, P. and Hachula, M. (2016), "The Dilemma or Trilemma Debate: Empirical Evidence", *DIW Roundup: Politik im Fokus*, No.95, DIW Berlin, German Institute for Economic Research., https://www.diw.de/documents/publikationen/73/diw_01.c.532268.de/diw_roundup_95_en.pdf, (Accessed: 11.10.2022).

Barlas, Y. and Kaya, N. (2013), "Parasal Genişleme Politikalarının Gelişmekte Olan Ülke Portföy Akımları Kompozisyonuna Etkisi" *TCMB Ekonomi Notları*, S.2013-01.

Batini, N. and Durand, L. (2021), "Facing the Global Financial Cycle: What Role for Policy Responses?", *IMF Working Paper*, No.21/34: 1-63.

Bekaert, G. and Mehl, A. (2019), "On the Global Financial Market Integration "Swoosh" and the Trilemma", *Journal of International Money and Finance*, Vol.94: 227-245.

Bergant, K.; Grigoli, F.; Hansen, N. J. and Sandri, D. (2020), "Dampening Global Financial Shocks: Can Macroprudential Regulation Help (More than Capital Controls)?", *IMF Working Paper*, No.20/106.

Cerutti, E.; Claessens, S. and Laeven, L. (2015), "The Use and Effectiveness of Macroprudential Policies: New Evidence", *IMF Working Paper*, No.61.

Cerutti, E.; Claessens, S. and Rose, A. K. (2017), "How Important is the Global Financial Cycle? Evidence from Capital Flows", *BIS Working Papers*, No.661.

Cheng, R. and Rajan, R. S. (2020), "Monetary Trilemma, Dilemma, or Something in Between?", *International Finance*, Vol.23, No.2: 257-276.

Coman, A. and Lloyd, S. P. (2019), "In the Face of Spillovers: Prudential Policies in Emerging Economies", *ECB Working Paper Series*, No.2339.

Cordemans, N.; Tielens, J. and Nieuwenhuyze, V. (2019), "Are We Riding the Waves of a Global Financial Cycle in the Euro Area?", *National Bank of Belgium Economic Review*, September.

Davis, J. S. and Presno, I. (2017), "Capital Controls and Monetary Policy Autonomy in a Small Open Economy", *International Finance Discussion Papers* (Board of Governors of the Federal Reserve System), No.1190.

Davis, J. S.; Valente, G. and Wincoop, E. V. (2019), "Global Capital Flows Cycle: Impact on Gross and Net Flows", *NBER Working Paper*, No.25721.

Dees, S. and Galesi, A. (2019), "The Global Financial Cycle and US Monetary Policy in an Interconnected World", *Banque de France Working Paper*, No. 744.

Degasperi, R; Hong, S. S. and Ricco, G. (2021), "The Global Transmission of U.S. Monetary Policy", *Sciences Po OFCE Working Paper*, No. 09/2021: 1-49, http://www.ofce.sciences-po.fr/pdf/dtravail/WP2021-09.pdf , (Accessed: 15.08.2022).

Demir, I. (2019), "Monetary Policy Autonomy and International Monetary Spillovers", *FEAF (Lincoln Economics and Finance) Working Paper Series,* No.19-01.

Edwards, S. (2015), "Monetary Policy Independence Under Flexible Exchange Rates: An Ilusion?", *NBER Working Paper*, No.20893.

Farhi, E. and Werning, I. (2014), "Dilemma not Trilemma? Capital Controls and Exchange Rates with Volatile Capital Flows", *IMF Economic Review*, Vol.62, No.4: 569-605.

Feng, M. and Cheng, H. (2016), "RMB Exchange Rate Regime Reform and the Trilemma Facing LOEs", *China Finance and Economic Review*, Vol.4, No.15: 1-15.

Fleming, J.M. (1962), "Domestic Financial Policies Under Fixed and Under Floating Exchange Rates", *IMF Staff Papers*, Vol.9, No.3: 369–379.

Friedrich, C.; Guerin, P. and Leon, D. L. (2020), "Monetary Policy Independence and the Strength of the Global Financial Cycle", *Bank of Canada Staff Working Paper*, No.25.

Georgiadis G. and Zhu, F. (2019), "Monetary Policy Spillovers, Capital Controls and Exchange Rate Flexibility, and the Financial Channel of Exchange Rates", *BIS Working Paper*, No.797.

Georgiadis, G. and Mehl, A. (2015), "Trilemma, Not Dilemma: Financial Globalisation and Monetary Policy Effectiveness", *Federal Reserve Bank of Dallas Globalization and Monetary Policy Institute Working Paper*, No.222.

Gülşen, E. and Özmen, E. (2017), "Monetary Policy Trilemma, Inflation Targeting and Global Financial Crisis", *ERC (Economic Research Center) Working Papers*, No.17/14, Middle East Technical University.

Habib, M. M. and Venditti, F. (2019), "The Global Capital Flows Cycle: Structural Drivers and Transmission Channels", *ECB Working Paper Series*, No.2280.

Han, X. and Wei, S. J. (2016), "International Transmissions of Monetary Shocks: Between a Trilemma and a Dilemma", *NBER Working Paper*, No.22812.

Hofmann, B. and Takats, E. (2015), "International Monetary Spillovers", *BIS Quarterly Review*, September, 105-118.

IMF (2012), "The Liberalization and Management of Capital Flows: An Institutional View". *IMF Policy Survey Paper.*

İnsel, A. and Sungur, N. (2003), "Sermaye Akımlarının Temel Makroekonomik Göstergeler Üzerindeki Etkileri: Türkiye Örneği", 1989:III-1999:IV. *TEK Tartışma Metni*, No.2003/8, Aralık, http://www.tek.org.tr/dosyalar/serhar0303.pdf , (Erişim: 31.08.2018).

Kharroubi, E. and Zampolli, F. (2016), "Monetary Independence in a Financially Integrated World: What do Measures of Interest Rate Co-movement tell us?", *BIS Papers*, No.88.

Klein, M. W. (2012), "Capital Controls: Gates versus Walls", *NBER Working Paper*, No.18526.

Klein, M. W. and Shambaugh, J. C. (2015), "Rounding the Corners of the Policy Trilemma: Sources of Monetary Policy Autonomy", *American Economic Journal: Macroeconomics*, Vol.7, No.4: 33-66.

Landi, V. N. (2017), "Capital Controls, Macroprudential Measures and Monetary Policy Interactions in an Emerging Economy", *Bank of Italy Temi di Discussione (Working Paper)*, No. 1154, December 5, https://ssrn.com/abstract=3084025 , (Accessed: 02.11.2022).

Ligonniere, S. (2017), "Trilemma, Dilemma and Global Players", *CEPII Working Paper*, No.2017/15, http://www.cepii.fr/PDF_PUB/wp/2017/wp2017-15.PDF ,(Accessde:15.08.2022).

Loipersberger F. and Matschke, J. (2022), "Financial Cycles and Domestic Policy Choices", *European Economic Review*, Vol.143, No.104034: 1-29.

Magud, N. E.; Reinhart, C. M. and Rogoff, K. S. (2018), "Capital Controls: Myth and Reality", *Annals of Economics and Finance*, Vol.19, No.1: 1-47.

Majumder, S. B. and Nag, R. N. (2020), "India Facing the Macroeconomic Policy Trade-off – is it Dilemma, Trilemma or Quadrilemma?", *Macroeconomics and Finance in Emerging Market Economies*, Vol.14, No.4: 1-21, https://www.researchgate.net/publication/342687340_India_facing_the_macroeconomic_policy_trade-off_-_is_it_dilemma_trilemma_or_quadrilemma , (Accessed: 07.11.2022).

Miranda-Agrippino, S. and Rey, H. (2015), "US Monetary Policy and the Global Financial Cycle", *NBER Working Paper,* No.21722.

Mundell, Robert A. (1963), "Capital Mobility and Stabilization Policy Under Fixed and Flexible Exchange Rates", *Canadian Journal of Economic and Political Science*, Vol.29, No.4: 475–485.

Obstfeld, M. (2015), "Trilemmas and Trade-offs: Living with Financial Globalisation", *BIS Working Papers*, No.480.

Obstfeld, M.; Ostry, J. D. and Qureshi, M. S.(2019), "A Tie That Binds: Revisiting The Trilemma in Emerging Market Economies", *The Review of Economics and Statistics*, Vol.101, No.2: 279–293.

Pasricha, G.; Falagiarda, M.; Bijsterbosch, M. and Aizenman, J. (2015), "Domestic and Multilateral Effects of Capital Controls in Emerging Markets", *ECB Working Paper Series*, No.1844.

Passari, E. and Rey, H. (2015), "Financial Flows and The International Monetary System", *NBER Working Paper*, No.21172.

Rebucci, A. and Ma, C. (2019), "Capital Controls: A Survey of the New Literature", *NBER Working Paper*, No.26558.

Rey, H. (2015), "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence", *NBER Working Paper*, No.21162.

Rey, H. (2016), "International Channels of Transmission of Monetary Policy and The Mundellian Trilemma", *NBER Working Paper*, No.21852.

TCMB (2010), *Finansal İstikrar Raporu*, Aralık.

TCMB (2011), *Enflasyon Raporu*, 2011-III.

TCMB (2015a), *Tasarruf-Yatırım Dinamikleri ve Cari İşlemler Dengesi Gelişmeleri*, Ankara.

TCMB (2015b), *Bülten*, S.40, Aralık.

Vanegas, J. D. D. (2019), "Making Hard Choices: Trilemmas and Dilemmas of Macroeconomic Policy in Latin America", *Journal Economía Chilena (The Chilean Economy)*, Central Bank of Chile, Vol.22, No.2: 22-38.

Zehri, C. (2020), "Restrictive Policy Impacts in Emerging Economies", *Cogent Economics and Finance*, Vol.8, No.1: 1-18.