ESSAYS ON FINANCIALIZATION, INCOME INEQUALITY AND GROWTH

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ABSTRACT

ESSAYS ON FINANCIALIZATION, INCOME INEQUALITY AND GROWTH

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This thesis consists of three essays on financialization, income inequality and growth. The first essay investigates the nonlinear impact of international financial integration (IFI) on income inequality by applying data-driven panel fixed effect threshold procedure of Hansen (1999) for a large set of advanced economies (AE) and emerging market and developing economies (EMDE). We also decompose IFI as capital inflows and capital outflows. Our empirical findings reveal that the relationship between IFI and inequality is driven by both capital inflows and outflows in AE while it is determined by capital inflows in EMDE. The second essay examines whether the effect of trade openness on growth may change with the prevailing *de facto* exchange rate regimes (ERRs) in EMDE by employing the panel fixed effect threshold method. The estimation results imply that trade openness promotes growth in more rigid ERRs prevailing episodes. We also decompose trade openness as export and import to investigate the main driving force of that relation. The estimation results indicate that it is due to the joint effects of both exports and imports. The third essay assesses whether there exists a nonlinear long-run relationship between credit and economic activity, depending on the magnitude of the credit growth in Türkiye. To this end, we employ multiple threshold nonlinear

ARDL (MT-NARDL) model. The results reveal noteworthy nonlinear patterns in the data, suggesting that excessively high or low levels of credit growth might disrupt the interplay between credit and economic activity while moderate credit growth promotes the relationship.

Keywords: Financialization, Inequality, Growth, Exchange Rate Regime, Credit.

ÖZ

FİNANSALLAŞMA, GELİR EŞİTSİZLİĞİ VE BÜYÜME ÜZERİNE MAKALELER

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Bu tez finansallaşma, gelir eşitsizliği ve büyüme ilişkisini inceleyen üç makaleden oluşmaktadır. İlk makale finansal entegrasyonun gelir eşitsizliği üzerindeki doğrusal olmayan etkisini incelemektedir. Bu doğrultuda, Hansen (1999) çalışmasındaki eşik değerin içsel olarak belirlendiği panel sabit etkiler eşik değer metodolojisini gelişmiş ekonomiler (GE) ve yükselen piyasalar ve gelişmekte olan ekonomiler (YPGE) için uyguladık. Ayrıca, finansal entegrasyon göstergesini sermaye girişleri ve çıkışları şeklinde ayrıştırarak finansal entegrasyonun yönünün gelir eşitsizliği üzerindeki etkisini de analiz ettik. Tahmin sonuçları etkinin GE'de hem sermaye girişleri hem de sermaye çıkışlarından kaynaklandığını gösterirken, YPGE'de ise sadece sermaye çıkışlarından kaynaklandığını göstermektedir. İkinci makale, YPGE'de ticaret açıklığının büyüme üzerindeki etkisinin *de facto* döviz kuru rejimine (DKR) bağlı olarak nasıl şekillendiği incelemektedir. Bulgular, YPGE'de daha katı döviz kuru rejimleri altında ticaret açıklığının büyümeye olumlu katkı sağladığını göstermektedir. Üçüncü makalede, krediler ile ekonomik aktivite arasındaki doğrusal olmayan ilişkinin kredi değişimine bağlı olarak nasıl şekillendiği analiz edilmektedir. Bu doğrultuda, çoklu eşik değer doğrusal olmayan ARDL (MT-

NARDL) model kullanılarak ilişkinin hem uzun dönemde hem de kısa dönemde doğrusal olamayan yapısı incelenmektedir. Bulgularımız, Türkiye'de uzun dönemde makul seviyelerdeki kredi değişimlerinin iktisadi faaliyet üzerinde olumlu katkısı olduğunu ancak çok yüksek ve çok düşük kredi değişimlerinin ise iktisadi faaliyet üzerinde anlamlı bir etkisi olmadığını göstermektedir.

Anahtar Kelimeler: Finansallaşma, Gelir Eşitsizliği, Büyüme, Döviz Kuru Rejimleri, Kredi

To my family

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LIST OF ABBREVIATIONS

ADF	: Augmented Dickey-Fuller
AE	: Advanced Economies
ARDL	: Autoregressive Distributed Lag
BRSA	: Turkish Banking Regulations and Supervision Association
CGF	: Credit Guarantee Fund
EMDE	: Emerging Markets and Developing Economies
ERR	: Exchange Rate Regime
FD	: Financial Development
FSB	: Financial Stability Board
GDP	: Gross Domestic Product
IFI	: International Financial Integration
IMF	: International Monetary Fund
KPSS	: Kwiatkowski-Phillips-Schmidt-Shin
MT-NARDL	: Multiple Threshold Nonlinear Autoregressive Distributed Lag
NARDL	: Nonlinear Autoregressive Distributed Lag
PP	: Phillips and Perron
SMEs	: Small and Medium Sized Enterprises
TURKSTAT	: Turkish Statistical Institute
VIX	: Volatility and Risk Aversion Index

CHAPTER 1

INTRODUCTION

Recent decades many countries including both advanced countries and emerging markets and developing economies (EMDE) have opened up their both financial and real sectors to the rest of the world especially following the collapse of the Bretton Wood Era. The initial attempts came from advanced countries and it spread quickly to EMDE. Countries have deregulated their financial and real sectors via eliminating barriers in international trade, reducing transaction and information cost in capital flows (Frankel, 1972). Those attempts have been practiced both in financial sectors and real sector. Financial globalization has increased substantially with the free floating of capitals. For instance, gross capital inflows (as a % of world GDP) increased from 60% in the second half of the 1990s to 180% in 2007 (Guichard, 2017). With the financial globalization and relaxation in financial sectors, access to the credit both by individuals and firms become easier which leads to immense raise in the volume of financial deepening calculated by credit to GDP ratio. Moreover, countries have relaxed their currency policies. That is, many countries have changed their exchange rate regimes (ERRs) to more flexible ones for the aim of more sustainable growth, smooth capital flow and sustainable engagement in international trade. While more flexible exchange rate regimes allow the central bank to exercise more independent monetary policies, reduce barriers in international trade and transaction cost in capital flows, and decrease uncertainty in local currency, fixed exchange rate regimes provide a more stable economic environment mainly in international trade due to the less fluctuations in currency (Jacob, 2015). Such liberalization attempts provided economies rapid growth, immense but uncontrolled capital flow, increase in volume of trade, and so on. Countries, on the other hand, have become more vulnerable to economic turmoil and crises. Thus, globalization and liberalization era experienced two crucial crises; 1998 Asian Crisis and 2008

Global Financial Crisis. Many countries, especially developing economies, have dealt with domestic turmoil and downturns as well. Hence, it was practiced that when financial system gets too big and complicated, the risk buildup could eventually lead to financial turmoil. The researchers, then, began to analyze what are the impact of financialization on not only real side of the economy but also social side of it as well. This brief history of financial liberalization and globalization era indicates how crucial to consider every aspect of globalization process in line with the taking into account of current global conditions and most importantly the structure and dynamics of the domestic economies. Accordingly, this thesis consists of three papers that investigates the impact of financial liberalization and globalization on income inequality, trade and economic growth. In the next chapter, we explore the impact of financialization on income inequality for a large set of advanced economies and emerging market and developing economies. In Chapter 3, we examine whether the effect of trade openness on growth may change with the prevailing exchange rate regime in emerging market and developing economies (EMDE). Finally in Chapter 4, we investigate how the speed of financial deepening affects economic activity for a single country case, Türkiye.

Chapter 2 empirically investigates the relationship between financialization and income inequality. Income inequality has significantly increased within countries over recent decades. According to the International Monetary Fund (IMF, 2020), it has risen by nearly 50% in advanced economies, with levels remaining substantially high in most emerging markets and developing economies (EMDEs) since the early 1990s. Empirical research indicates that inequality is frequently linked to higher social costs, slower economic growth, poorer public health, and increased instability. As a result, concerns over inequality have become central among policy policymakers and represent a critical research area. The existing literature highlights several key determinants of inequality, including trade liberalization, financial globalization, the volume and structure of capital flows, technological advancements, institutional frameworks and governance, access to education, human capital development, financial systems, and real GDP growth. Furthermore, drawing on Guichard's (2017) findings that gross capital inflows as a percentage of world GDP rose from 60% in the latter half of the 1990s to 180% in 2007, the exploration of the

relationship between financialization and inequality has become an increasingly vital topic of inquiry.

Financial globalization has increased substantially during the recent two decades in advanced and emerging market and developing economies. This has rekindled the debate on the distributional effect of financial globalization. Financialization refers to "increasing role of financial motives, financial markets, financial actors, and financial institutions in an economy" according to Epstein (2005, p.3). Financialization is often associated with macroeconomic instability and financial crisis, both of which have adverse effects on the poor and thus contribute to inequality (Stiglitz, 2012). In Chapter 2, we consider both the domestic and international aspects of financialization. The domestic financialization is represented by financial development (Svirydzenka, 2016). For the international aspect of financialization we consider *de facto* international financial integration (Lane and Milesi-Ferretti, 2003). Furthermore, we also take into account not only capital inflows (liability flows, holding of domestic assets by foreign residents) but also capital outflows (asset flows, holding of foreign assets by domestic residents) which are often ignored by the literature. Moreover, the literature often does not consider a postulation that the relationships between inequality and its main determinants, including financial globalization proxied by international financial integration and financial development, may not be linear. Recent studies, such as those by Kim and Lin (2011), Law et al. (2014), Cihak and Sahay (2020), and Madni and Anwar (2021), offer notable exceptions in the literature. Specifically, Cihak and Sahay (2020) address the issue of nonlinearity by adopting a quadratic functional form for financial depth. However, the existing body of research has yet to thoroughly explore whether international financial integration establishes an endogenous threshold that influences its impact on income inequality. This gap extends to the primary elements of international financial integration, including capital inflows (liability flows) and outflows (asset flows). Moreover, the influence of international financial integration on inequality may vary depending on the level of financial development. Chapter 2 contributes to the literature by addressing these critical issues, utilizing a data-driven panel fixed effects threshold approach, as proposed by Hansen (1999), to examine

advanced and emerging market and developing economies over the period from 1996 to 2019.

The panel fixed effect threshold estimation methodology in Chapter 2, firstly, examine whether the relationship between international financial integration and inequality may change with the level of international financial integration. To this end, we analyze whether international financial integration tends to increase income inequality in advanced and emerging market and developing economies. Secondly, by decomposing the international financial integration into capital inflows (liabilities) and capital outflows (assets) we explore the driving mechanism of international financial integration on income inequality. Thirdly, we allow financial development as a data-driven estimated threshold for the effect of international financial integration on inequality. Finally, we illustrate whether the impact of international financial integration on income inequality may vary according to development level of the economies. Specifically, our analysis seeks to examine whether the effects of international financial integration on income inequality in advanced economies diverge from those observed in emerging markets and developing economies. This is a critical research area, as the extent and nature of financial integration, as well as its relationship with income inequality, are likely to vary across these country groups. Accordingly, we aim to underscore the importance of policymakers employing well-established policy tools that account for the specific levels and processes of financial integration in their countries, enabling them to maximize the social benefits derived from financial markets. Additionally, we emphasize the significance of understanding the direction of international financial integration, suggesting that policymakers should carefully regulate capital flows to promote healthier financial markets while minimizing any possible side effects on various income groups.

Chapter 3 investigates the impact of the prevailing exchange rate regimes on growth through international trade. This issue has gained a great attention among policy makers and researchers since the collapse of the Bretton Wood Era in 1970s. The initial empirical studies conducted unconditional analysis such as descriptive analysis to detect the relationship between exchange rate regimes and growth, albeit

they failed to find significant relationship. Hence, their findings have been criticized among the latter researchers. After 2000s researchers have started to analysis the impact of ERRs on growth for the large set of both advanced and developing economies by using panel data approaches. They provide mixed evidence on the relationship between trade and growth through prevailing exchange rate regimes. While some studies reveal that countries enhance better growth performance under the pegged or managed regimes (Moreno, 2000; Ghosh, et al., 2002; Dubas et al., 2005; Bailliu et al. 2003; De Grauwe and Schnabl, 2004; Ashour and Jong, 2018), others show that there exists a strong association between flexible exchange regimes and highest growth rates (Bailliu et al., 2001; Levy-Yeyati and Sturzenegger, 2002; Bleaney and Francisco; 2007). Huang and Malhotra (2005), on the other hand, reveals that impact of exchange rate regime on growth may not be the same in advanced economies than in developing economies. Indeed, while fixed and intermediate regime enhance growth in developing economies, flexible regimes have a positive impact on growth in advanced economies.

Chapter 3 aims to contribute to the existing literature by examining whether the effect of trade openness on growth may change with the prevailing exchange rate regime in 56 emerging market and developing economies (EMDE) during the period of 1996-2019. To examine this important issue, which is ignored by the bulk of the literature, we consider *de facto* exchange rate regime (ERR) classification suggested by Ilzetzki, Reinhart and Rogoff (2019). Literature often tackles the nonlinearity by imposing *ad hoc* sample splitting procedures that maintain exogenous thresholds (see Dubas et al., 2005). In this study, we allow the data to speak to find the value of the threshold endogenously. To achieve this, we prefer to employ panel fixed effect threshold method developed by Hansen (1999). Hansen (1999) methodology provides us to investigate the impact of different exchange rate regimes via domestic variable (trade openness) and global financial conditions (vix, volatility and risk aversion index) together. A prominent study by Rey (2015) suggests that the global financial cycle tends to move together with VIX (volatility and risk aversion index) leading to business cycle fluctuations in advanced and emerging market economies. Hence, to examine whether the growth effect of trade openness varies with the prevailing *de facto* ERR classification, we control the impact of global financial

conditions proxied by the natural logarithm of volatility and risk aversion index (VIX).

In Chapter 4, we explore whether the long-term relationship between financial deepening and economic activity in Türkiye varies depending on the speed of financial deepening measured by the rate of credit changes. The link between financial development and economic growth has been ongoing debate among scholars following recent decades. Early literature assumes a linear relationship and generally provides evidence supporting a positive long-term association. Theoretical and empirical research, as reviewed by Levine (2005), suggests that financial development fosters economic growth by eliminating barriers to external financing for firms, promoting savings, facilitating transactions, enhancing capital allocation efficiency, and increasing investor willingness to fund projects by reducing asymmetric information. However, the 2007-2008 global financial crisis highlighted that when financial systems grow excessively complex, the accumulation of risk can eventually lead to financial instability. In the aftermath of the crisis, a growing body of research has begun to investigate the potential negative consequences of excessive finance on economic growth, with many studies incorporating quadratic models and nonlinear estimation techniques. This emerging literature often examines the existence of a threshold beyond which the positive effects of financial deepening on economic growth diminish, and in some cases, financial development may begin to exert a negative influence on growth. Specifically, Arcand, Berkes and Panizza (2015), Breitenlechner, Gächter, and Sindermann (2015), and Law, Kutan, and Naseem (2018) find that the impact of private credit on economic activity and/or productivity growth has an inverted U-shape and the effect becomes negative when the credit-to-GDP ratio is around 90-100%. Cournède, Denk and Hoeller (2015) and Benczur, Karagiannis and Kvedaras (2019) estimate the turning point for the effect of private credit as 50-60% of GDP in advanced countries, substantially lower than less developed countries. Samargandi, Fidrmuc and Ghosh (2015) find that the inverted U-shaped interaction exists in the long term, but not significant in the short term.

In Chapter 4, we carry out a single country analysis for Türkiye and consider both long-run behavior and the short-run dynamics of the relationship between financial

deepening and economic activity which is generally ignored in the bulk of the existing literature that primarily employs panel data analysis with a focus on long-run behavior. Turkish experience constitutes one of the most interesting case studies where aggressive credit policies have been implemented in recent years to support economic growth. To the best of our knowledge, there is no study on Türkiye that questions the nonlinearities between credit and economic activity. More specifically, we ask whether the long-run relationship between credit and economic activity differs according to the speed of credit in Türkiye. Accordingly, we use a multiple threshold nonlinear autoregressive distributed lag (MT-NARDL) model, where long-run and short-run non-linear dynamics are modeled together. MT-NARDL model used in this study is developed by Verheyen (2013), Fedoseeva (2013), and Pal and Mitra (2015, 2016) to include multiple known thresholds, which is the extended versions of the nonlinear ARDL model of Shin, Yu and Greenwood-Nimmo (2014) with a single known threshold.

Chapter 4 contributes to the existing literature by examining the long-run and short-run dynamics of the relationship between credit and economic activity, using a nonlinear model. It adds to the understanding of the credit-GDP relationship by highlighting the nonlinear patterns in the data, suggesting that not only excessively high but also very low levels of credit growth can disrupt the intricate connection between credit and economic activity. Additionally, this study advances the methodological literature by employing NARDL analysis to explore the long-term relationship between credit and economic activity across "multiple thresholds".

Finally, Chapter 5 summarizes the main findings of the thesis, provides the concluding notes, and proposes suggestions and some alternative future works.

CHAPTER 2

FINANCIALIZATION AND INCOME INEQUALITY

Income inequality (inequality) has been growing within the countries. For instance, it has been increased by almost 50 percent in advanced economies and remains very high in most of the emerging market and developing economies (EMDE) since the early 1990s (IMF, 2020). Inequality is often associated with higher social costs, lower growth, poorer health, and higher instability (Stiglitz, 2013; Nolan and Valenzuela, 2019; Ostry et al., 2019). Consequently, concerns about inequality are not only among the top policy issues but also provide a crucially important research agenda.

The empirical literature suggests that trade openness and financial globalization (Jaumotte et al., 2013; Furceri and Ostry, 2019), the level and composition of capital flows (Jaumatte et al., 2013; Eichengreen et al., 2021), innovation and technology (Aghion et al., 2019), institutional conditions and governance (Eichengreen et al., 2021), access to education and human capital (Gregorio and Lee, 2002; Jaumotte et al., 2013; Coady and Diziol, 2018), financial development (Demirguc-Kunt and Levine, 2009; Thornton and Di Tommaso, 2020) and real GDP (Hailemariam et al., 2021; Cerra et al., 2021) are important determinants of inequality. Considering the remarks by Guichard (2017) suggesting gross capital inflows (as a percent of world GDP) increased from 60% in the second half of the 1990s to 180% in 2007, the investigation of the financialization-inequality nexus becomes a much more important issue.

Financialization refers to “increasing role of financial motives, financial markets, financial actors, and financial institutions in an economy” according to Epstein (2005, p.3). Financialization is often associated with macroeconomic instability and

financial crisis, both of which have adverse effects on the poor and thus contribute to inequality (Stiglitz, 2012). In this study, we consider both the domestic and international aspects of financialization. The domestic financialization is represented by financial development (Svirydzenka, 2016). For the international aspect of financialization we consider *de facto* international financial integration (Lane and Milesi-Ferretti, 2003). Furthermore, we also take into account not only capital inflows (liability flows) but also capital outflows (asset flows) which are often ignored by the literature.

The conventional theory maintains that the movement of capital from rich to poor countries promotes growth in poor economies. Accordingly, financial globalization leads to a decline in inequality. The structuralist view including Nurkse (1953), Myrdal (1957), and Lewis (1977), on the other hand, suggests that capital controls tend to reduce inequality by impeding the movement of domestic savings to foreign countries. The theoretical model results by Matsuyama (2004) suggest that financial globalization tends to increase inequality by binding borrowing constraints on poor countries, leading to richer economies becoming richer and poorer economies becoming poorer. Cabral et al. (2016) reports that the effect of financial globalization on inequality often operates by either foreign direct investment (FDI) or equity flows. Asteriou et al. (2014) finds that FDI flows, capital account openness, and stock market capitalization are the main driving forces of inequality.

Jaumotte et al. (2013) points out that financial globalization increases while trade globalization dampens inequality. Dorn et al. (2018) reports that the positive relationship between globalization and inequality often appears to be the case for emerging market and developing economies (EMDE). The findings by Lee et al. (2019) indicate that the effect of trade globalization on inequality is almost negligible, especially for the sample of advanced economies (Dorn et al., 2018). The cointegration-based results by Shin and Lee (2019) suggest that neither financial globalization nor financial development affects inequality. Bergh and Nilsson (2010) finds that both trade globalization and economic freedom are positively associated with inequality. Daisaka et al. (2014) states that financial imperfections amplify

inequality by decreasing the capital rental rate, which provides benefits for borrowers while causing difficulties for lenders.

The literature often does not consider a postulation that the relationships between inequality and its main determinants, including financial globalization proxied by international financial integration and financial development, may not be linear. The recent exemptions include Kim and Lin (2011), Law et al. (2014), Cihak and Sahay (2020), and Madni and Anwar (2021). Cihak and Sahay (2020) tackles the nonlinearity issue by considering a quadratic functional form for financial depth. Law et al. (2014) finds that financial development reduces inequality only after a certain threshold level of institutional quality is achieved. Kim and Lin (2011) maintains that financial development itself provides a threshold such that the benefits of it on income distribution occur only after the country reaches a certain threshold level. Madni and Anwar (2021) reports that GDP growth increases inequality if institutional quality is lower than an estimated threshold level.

The literature, however, has yet to comprehensively investigate whether international financial integration provides an endogenous threshold for the effect of international financial integration on income inequality. This may also be the case for the main components of international financial integration including capital inflows (liability flows) and outflows (asset flows). Even, the effect of international financial integration on inequality may change with the level of financial development. This paper aims to investigate all these crucially important issues by employing a data-driven panel fixed effects threshold procedure of Hansen (1999).

Our panel fixed effects threshold estimation results suggest that international financial integration provides a data-driven estimated threshold for the effect of international financial integration on income inequality. Accordingly, the inequality-increasing effect of international financial integration is much lower in financially more integrated advanced economies. In emerging markets and developing economies, we find that inequality decreases with international financial integration in less financially integrated observations while increasing in more financially integrated episodes. This appears to be driven by the joint effects of both capital

inflows (liability flows) and outflows (asset flows) in advanced economies, albeit it is determined by capital inflows in emerging markets and developing economies. We also find that financial development provides an endogenously estimated threshold for the effect of international financial integration on income inequality in emerging markets and developing economies. Our results suggest that inequality increasing effect of international financial integration is much lower in economies with more financially developed.

The plan for the rest of this paper is as follows. The following section presents a brief review of the related literature. Section 2.1 introduces the data and provides some key stylized facts. Section 2.2 presents our estimation results. In this section, we first maintain that the impact of international financial integration on inequality may vary with the level of international financial integration. We then proceed with the alternative case that financial development provides an endogenous threshold for the impact of international financial integration on inequality. Finally, Section 2.3 presents an evaluation of our main findings and provides some policy suggestions.

2.1. Literature Review on Financialization and Income Inequality

There is now a large and growing number of studies empirically investigating the causes of inequality. The literature often considers financial development (Demirguc-Kunt and Levine, 2009; Thornton and Di Tommaso, 2020), real GDP (Hailemariam et al., 2021; Cerra et al., 2021), capital inflows and international financial integration (Furceri and Ostry, 2019; Eichengreen et al., 2021), trade openness (Furceri and Ostry, 2019), education and human capital (Jaumotte et al., 2013), technology (Pi and Zhang, 2018; Aghion et al., 2019), institutional structure and governance (Eichengreen et al., 2021) as the main determinants of income inequality. Cerra et al. (2021) provides a recent survey on the drivers of inequality.

Financial development may increase the availability and use of financial services by broader segments of the population and thus may lead to narrowing inequality. In contrast to such an extensive margin impact, financial development may also operate on the intensive margin by enhancing the use of financial services by the richer

segments of the population (Demirguc-Kunt and Levine, 2009). According to the extensive margin explanation, higher financial development appears to decrease inequality, although the intensive margin argument suggests otherwise. Extensive margin explanation is consistent with the theoretical contributions by Galor and Moav (2004), stressing the positive impact of financial development on human capital accumulation leading to a decrease in inequality along with the earlier empirical contributions by Clarke et al. (2006) and Beck et al. (2007). The more recent studies, including Jaumotte et al. (2013), Thornton and Di Tommaso (2020), and Hailemariam et al. (2021), report similar findings. Cihak and Sahay (2020), on the other hand, finds that there is an inverted-U relationship between inequality and financial depth such that financial deepening is associated with lower inequality, but only up to a point, after which inequality rises.

The relationship between financial development and inequality may be conditional on institutional quality and governance (Rajan and Zingales, 2003). Law et al. (2014) finds that financial development reduces inequality only after a certain threshold level of institutional quality is achieved. Kim and Lin (2011) maintains that financial development itself provides a threshold such that the benefits of it on income distribution occur only after the country reaches a threshold level. According to De Hann and Strum (2017), banking development raises income inequality irrespective of the quality of political institutions. The results by Roine and Waldenström (2015) provide a support for the argument that stronger democracy is associated with lower top-income shares and, thus, lower inequality.

Capital flows have often been found among the main determinants of real income cycles and growth in EMDE, as suggested by the seminal contribution of Calvo et al. (1996) and recent studies, including Erdem and Özmen (2015) and Eichengreen et al. (2021). The recent two decades have witnessed a dramatic increase in capital flows and international financial integration (IFI), *de facto* financial openness, both in advanced (AE) and EMDE. Guichard (2017) reports that gross capital inflows (as a % of world GDP) increased from 60% in the second half of the 1990s to 180% in 2007. IFI, or *de facto* financial openness, is measured as the sum of international assets and liabilities over GDP (Lane and Milesi-Feretti, 2018). The literature often

maintains capital inflows as one of the basic determinants of inequality. According to Beck et al. (2007), financial openness and IFI may lead to higher growth, increase the incomes of the poor, and decrease income inequality, especially in EMDE. The more recent literature, however, often provides mixed results on the inequality impact of capital inflows. Jaumotte et al. (2013), Furceri and Ostry (2019), Erauskin and Turnovsky (2019), and Eichengreen et al. (2021) all find that inequality increases with financial globalization both in AE and EMDE. Higher *de facto* financial openness (IFI) is associated with an increase in income inequality also in developing countries (Li and Su, 2021). This appears to be the case, particularly for less democratic countries (Kim et al., 2021). According to Jaumotte et al. (2020), financial globalization appears to benefit mainly the richest 20 percent of the population. In the same vein, higher *de jure* financial openness (Chinn and Ito, 2008) leads to higher inequality by raising the share of the richest income deciles (Furceri et al., 2020; Eichengreen et al., 2021). The distributional effects of capital account liberalization may be conditional on the level of financial development. Furceri and Loungani (2018), for instance, finds that the inequality-increasing impact of higher *de jure* financial openness tends to be significantly smaller in countries with stronger levels of financial development.

Economic growth may be expected to be inclusive to bring higher welfare to the whole population and consequently decrease income inequality. This is consistent with an interpretation that "a rising tide lifts all the boats" (Stiglitz, 2015). The recent studies, however, often report the reverse. Hailemariam et al. (2021), for instance, finds that an increase in real GDP per capita leads to an increase in income inequality. Similarly, Roine et al. (2009) shows that economic growth is pro-rich and thus causes an increase in top-income inequality. This appears to be the case, especially for the episodes of above-average growth (Roine and Waldenström, 2015). According to Madni and Anwar (2021), GDP growth increases inequality if institutional quality measured by country risk of the International Country Risk Guide (ICRG) is lower than an estimated threshold level.

Better education allowing also poorer segments of the population to be engaged in higher-skill activities and consequently leads to an expectation that higher human

capital may decrease inequality. Consistent with such an interpretation, Jaumotte et al. (2013) finds that inequality decreases with higher human capital (hc) proxied by years of schooling (Feenstra et al., 2015). According to Gregorio and Lee (2002), education plays a significant role in making income distribution more even. In the same vein, Hailemariam et al. (2021) reports that educational attainment significantly reduces top-income inequality. The evidence reported by Eichengreen et al. (2021) suggests that higher educational attainment is associated with less inequality.

This paper aims to contribute to the literature by investigating the relationship between international financial integration and income inequality in advanced (AE) and emerging market and developing economies (EMDE). To examine the association between these variables, we consider the effects of real income per capita, human capital, financial development, and institutional quality and governance. In contrast to the bulk of the literature, we maintain that the effect of international financial integration on inequality may not be linear. In this vein, we suggest that the sensitivity of inequality on international financial integration may change depending on the level and composition of international financial integration. Furthermore, consistent with the intensive/extensive margin explanations, we maintain that the relationship between international financial integration and inequality may vary with the level of financial development. Based on all these arguments, we consider the potential thresholding effects of international financial integration and its main components, along with financial development, to explain the association between international financial integration and inequality. In this context, we employ panel fixed effects threshold estimation procedure by Hansen (1999).

2.2. The Data and Stylized Facts

This paper investigates the relationship between financial globalization and income inequality in 24 advanced economies[1] (AE) and 52 emerging market and developing

[1] AE sample includes Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Hong Kong, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, United Kingdom and United States.

economies[2] (EMDE) during the 1996-2019 period. Our measure of income inequality is the GINI index of pre-tax income inequality, and the data are from Standardized World Income Inequality Database (Solt, 2020). Cerra et al., (2021) provides a discussion on alternative measures of inequality. We consider international financial integration (IFI) as a measure of *de facto* financial globalization. The data for IFI are from External Wealth of Nations database provided by Lane and Milesi-Ferretti (2018). IFI is measured as the sum of gross stocks of financial assets (purchases/sales of foreign financial assets by domestic residents) and liabilities (purchases/sales of domestic financial assets by foreign residents).

To examine the relationship between financial globalization represented by IFI and income inequality, we consider the effects of real income per capita, human capital, financial development, and institutional quality and governance. The data for real income per capita are taken from World Development Indicators, World Bank. Human capital is measured as the years of schooling and returns to education, and the data are taken from Penn World Table database (Feenstra et al., 2015). Human capital data change between 1.00 and 4.35 with higher values representing more educated labor. The data for financial development are obtained from financial development index database by Svirydzenka (2016). Financial development is measured as the depth, access, and efficiency of financial markets and institutions. Financial development data vary between zero and one, with higher values representing better financial development. World Bank, Worldwide Governance Indicators database provides information for voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. In a similar vein to Kose et al. (2009), we consider the standardized version of the simple average of these six components to represent governance. Thus, our governance variable varies between zero and one, with higher values representing better governance.

[2] EMDE sample contains Argentina, Bangladesh, Bolivia, Brazil, Chile, China, Colombia, Costa Rica, Croatia, Czechia, Dominican R., Ecuador, Egypt, El Salvador, Estonia, Fiji, Honduras, Hungary, India, Indonesia, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Latvia, Lithuania, Malaysia, Mexico, Moldova, Morocco, Niger, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Romania, Russia, Slovak R., Slovenia, South Africa, South Korea, Sri Lanka, Sudan, Thailand, Turkiye, Uganda, Ukraine, Uruguay and Venezuela.

Table 2.1 presents the main descriptive statistics for our variables. The mean of income inequality (GINI) is around 47 for advanced (AE) and emerging market and developing (EMDE) economies, albeit the standard deviation and coefficient of variation are slightly higher for the EMDE sample. As compared to AE, the mean and standard deviation of real income per capita are substantially lower in EMDE. The mean of human capital (HC) is lower in EMDE than in AE, albeit the standard deviation and coefficient of variation are slightly higher for EMDE. Financial development (FD) tends to be a much higher level in AE than EMDE, whilst the standard deviation is almost the same in both country groupings. The institutional quality and governance (GOV) level is much higher and less volatile in AE. As compared to AE, international financial integration (IFI) is substantially at a much lower level and less volatile in EMDE.

Table 2.1. Main Descriptive Statistics

	GINI	Real Income per capita	HC	FD	GOV	IFI
	Whole Sample					
Mean	46.64	18287.5	2.806	0.446	0.586	326.38
SD	5.64	18807.5	0.586	0.243	0.406	552.93
CV	0.12	1.03	0.209	0.545	0.406	1.69
	Advanced Economies					
Mean	47.82	41487.5	3.202	0.721	0.855	712.66
SD	3.35	14407.3	0.368	0.131	0.095	840.71
CV	0.07	0.35	0.115	0.182	0.111	1.18
	Emerging Market and Developing Economies					
Mean	46.07	7133.7	2.615	0.314	0.457	140.66
SD	6.39	6381.6	0.575	0.160	0.168	83.71
CV	0.14	0.89	0.220	0.509	0.367	0.595

Note: SD and CV are, respectively, the standard deviation and coefficient of variation computed as the standard deviation over the mean.

Figure 2.1 shows the trajectory of income inequality over time. Until the 2000s, income inequality is almost the same in advanced (AE) and emerging market and developing economies (EMDE). However, post-2000, a divergent trend is observed: income inequality increases in AE, while it declines in EMDE for the rest of the period.

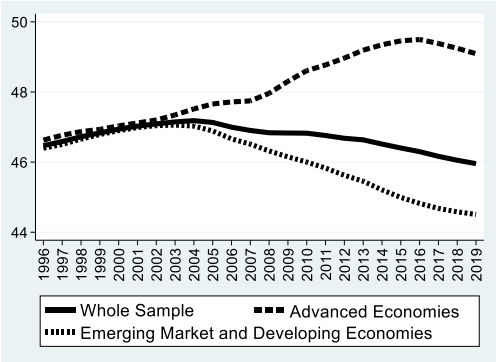

Figure 2.1. Evolution of Income Inequality

Source: Standardized World Income Inequality Database

Figure 2.2 represents the evolution of international financial integration and its main components, including asset and liability flows, all measured as a percentage of GDP. International financial integration appears to increase in both advanced and emerging market and developing economies, albeit at a much higher rate in advanced countries. Additionally, liability flows are much higher than asset flows in emerging market and developing economies, whereas there is no substantial difference between them in the sample of advanced economies.

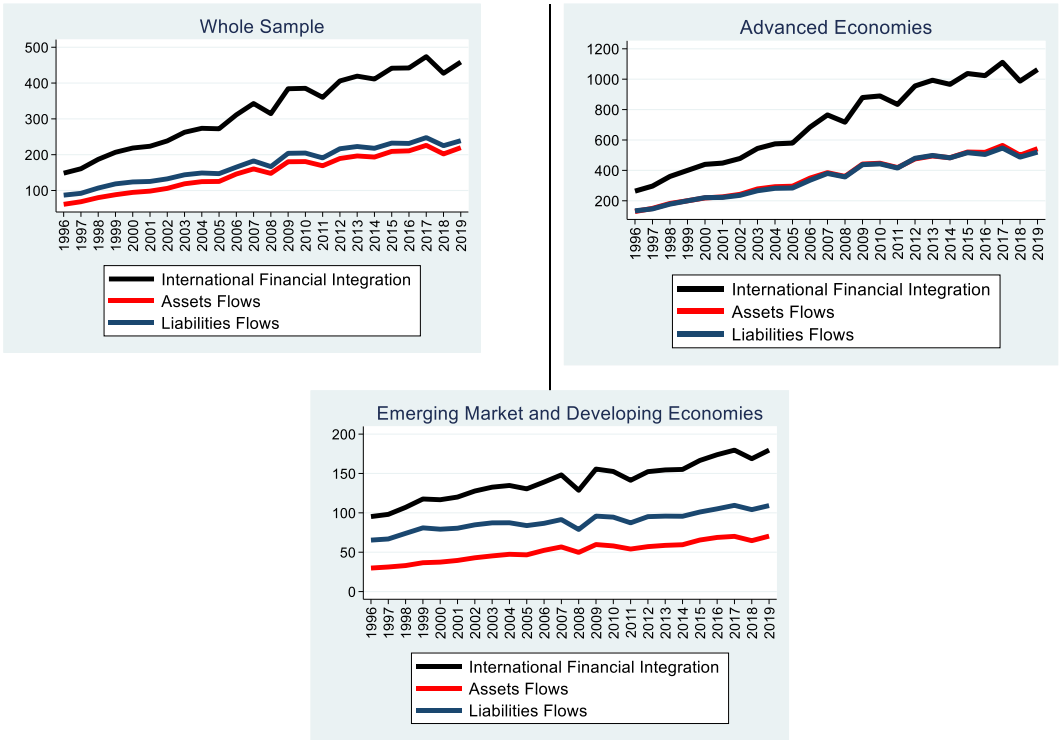

Figure 2.2. Evolution of International Financial Integration and Main Components

Source: External Wealth of Nations

Figure 2.3 shows the scatter plot of income inequality and international financial integration for the whole sample. Accordingly, there is an inverted-U shaped relationship between income inequality and international financial integration in the whole sample. This pattern suggests that income inequality first increases and then decreases with international financial integration.

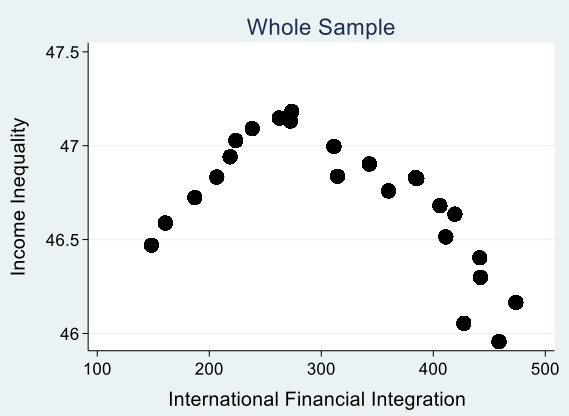

Figure 2.3. Income Inequality and International Financial Integration

Source: Standardized World Income Inequality Database, External Wealth of Nations

2.3. Financialization and Inequality: Empirical Methodology

To investigate the relationship between income inequality and international financial integration, we first consider the following equation:

$$\begin{aligned} GINI_{it} = {} & \alpha_i + \alpha_1 y_{i,t-1} + \alpha_2 HC_{it} + \alpha_3 FD_{it} + \alpha_4 GOV_{it} + \alpha_5 IFI_{it}(IFI_{it} \leq \lambda) + \\ & \alpha_6 IFI_{it}(IFI_{it} > \lambda) + u_{it} \end{aligned} \tag{2.1}$$

In equation (2.1), the subscripts i and t denote, respectively, country and time. GINI is the natural logarithm of GINI index of pre-tax income inequality from Standardized World Income Inequality Database (Solt, 2020). y is the natural logarithm of real GDP per capita in constant local currency units. Kuznets (1955) maintains that income is both the cause and consequence of income inequality. considering the potential endogeneity of real GDP, we prefer to use lagged real

income in (1). HC is human capital index proxied by years of schooling and returns to education (Feenstra et al., 2015). FD is the domestic financial development index by Svirydzenka (2016), which considers both the size and liquidity of financial institutions and markets. FD lies between zero and one, with higher values denoting better financial development. Governance (GOV) is the standardized value of the average of six main components: voice and accountability, rule of law, political stability and no violence, government effectiveness, control of corruption, and regulatory quality (Kaufmann et al., 2010). The index is between zero and one, with higher values representing better institutional quality and governance. Following Lane and Milesi-Ferretti (2003), *de facto* international financial integration (IFI) is measured as the sum of gross international liabilities and assets over GDP. The IFI data are from External Wealth of Nations database (Lane and Milesi-Ferretti, 2018).

The nonlinearity and/or threshold issues are often tackled either by utilizing some interaction specifications or *ad hoc* sample-splitting methods which suggest that the threshold is exogenous by the bulk of the literature. As an alternative to these procedures, the potential thresholding effect of international financial integration (IFI) for the sensitivity of inequality to IFI may better be investigated by using endogenously estimated methods. The literature often does not consider the postulation that the effect of financial globalization on inequality may change depending on the level and the direction (non-resident driven liability flows and resident-driven asset flows) of IFI. In this context, we consider the level of international financial integration and its main components including capital inflows (non-resident driven liability inflows) and outflows (resident-driven asset flows) scaled by GDP in current US dollars, separately, to explain the nonlinear impact on inequality. To the best of our knowledge, this is the first study that investigates whether IFI and its main components provide data-driven estimated thresholds for the effect of IFI on inequality. We examine this important issue for a balanced panel of 24 advanced and 52 emerging market and developing economies by utilizing panel fixed effects threshold method of Hansen (1999).

In (2.1), λ is the data-driven estimated threshold. The value of the threshold divides the whole sample into the low and high regimes. For instance, if IFI $\leq \lambda$, the

estimated parameter, α_5, shows the effect of international financial integration on inequality in the low regime, including less financially integrated observations. Otherwise, the estimated parameter, α_6, represents the impact of international financial integration on inequality in the high regime, including more financially integrated episodes. The low and high regimes are differentiated with different slope coefficients. If the estimated parameters α_5 and α_6 statistically equal to each other, then we suggest that there is no significant IFI threshold.

When testing the null hypothesis of no significant threshold, the parameter λ remains unidentified. To address this issue, Hansen (1999) proposes a bootstrap method to determine the asymptotic p-values of the F-test under the null hypothesis of no threshold effect. The panel threshold methodology begins by eliminating fixed effects through de-meaning the country-specific effects. The de-meaned data is then sorted in ascending order according to the threshold variable. After trimming the smallest and largest 5% of the observations, a threshold search is conducted by considering each observation as a potential candidate. For each candidate, panel least squares method is applied to the de-meaned sample, with the threshold being the one that minimizes the sum of squared residuals. Yu and Phillips (2018) shows that "both the threshold point and the threshold effect parameters are identified without the need for instrumentation" (p.50). Consequently, our estimations may be interpreted as valid even under the potential endogeneity of the thresholding variables.

2.3.1. Financialization and Inequality: IFI and Its Main Components as Thresholds

We first start with the investigation of whether international financial integration (IFI) provides data-driven estimated threshold for the effect of IFI on inequality. In this vein, we estimate eq. (1). Table 2.2 presents the panel fixed effects threshold estimation results. According to the results in Table 2.2, IFI provides data-driven estimated threshold[3] for the effect of IFI on inequality. Endogenously estimated

[3] Our preliminary results (not reported to save the space but available on request) suggested not to reject the null hypothesis that two thresholds (three regimes) are insignificant for all the specifications considered in this paper. The trimming parameter for the Hansen procedure is set to be 0.05 at both ends of the threshold variable but our results are found to be robust for different plausible values.

threshold level of IFI is around 580 in the whole sample, 695 in advanced economies and 87 in emerging market and developing economies. As compared to the main descriptive statistics provided by Table 2.1, IFI threshold level is almost the same with the mean in advanced economies, albeit slightly lower than the mean in emerging market and developing economies. The effect of IFI on inequality for the whole sample is around 0.54 in the low regime, including less financially integrated observations, while it is estimated as 0.15 in the high regime containing more financially integrated episodes. This may imply that the inequality-increasing effect of IFI is substantially much lower in economies with more financially integrated. This pattern is almost the same in advanced economies. However, IFI tends to diminish inequality in less financially integrated emerging market and developing economies while promoting inequality in more financially integrated observations.

Table 2.2. International Financial Integration (IFI) as Threshold

	(2.1.1) Whole Sample	(2.1.2) AE	(2.1.3) EMDE
Threshold IFI	580.52*	694.92**	86.70*
F_B[.]	56.87 [0.08]	55.97 [0.04]	42.20 [0.09]
$y_{i,t-1}$	0.347	2.206***	1.451***
	(0.329)	(0.679)	(0.370)
HC_{it}	-3.251***	1.077**	-6.181***
	(0.390)	(0.469)	(0.489)
FD_{it}	-2.769***	1.478	-7.444***
	(0.934)	(0.993)	(1.259)
GOV_{it}	-0.162	-3.404***	0.171
	(0.318)	(0.480)	(0.360)
IFI_{it} ($IFI_{it} \leq \lambda$)	0.540***	0.378***	-0.827***
	(0.059)	(0.045)	(0.276)
IFI_{it} ($IFI_{it} > \lambda$)	0.151***	0.076***	0.656***
	(0.014)	(0.011)	(0.117)
Constant	52.14***	22.56***	47.67***
	(2.913)	(6.426)	(3.348)
R-squared	0.121	0.385	0.248
# of Observations	1748	552	1196
# of Countries	76	24	52
F-test [p-value]	38.16[0.00]	54.55[0.00]	62.70[0.00]

Note: Standard errors in parentheses. ***, **, and * denote the significance level at 1%, 5% and 10% respectively.

The result for less financially integrated emerging market and developing economies may imply that an increase in financial integration can lead to improved access to finance for a broader segment of the population which reduces inequality. On the other hand, financial integration tends to increase inequality in more financially integrated emerging markets and developing economies since the higher segment of population may take the benefits of financial integration such as access to foreign investments and financial services. Hence, this may lead to more income polarization where the rich benefits more from global financial opportunities.

Income inequality tends to increase with higher real income per capita. This finding contrasts with a view that economic growth is inclusive and thus brings higher welfare to all sections of the economy, leading to a decrease in income inequality. Stiglitz (2016) interprets such situation as "a rising tide lifts all the boats". According to our results, "the rising tide appears to lift the large yachts, and many of the smaller boats are left dashed on the rocks" (Stiglitz 2016, p. 134). However, this does not necessarily downplay the crucial importance of growth-enhancing policies for improvements in social welfare. The effect of human capital on inequality is striking. Accordingly, human capital tends to increase inequality in advanced economies while lowering inequality in emerging market and developing economies. This finding may imply that the benefits of human capital disproportionately favor those who are already better off, thereby widening the income gap between the rich and the poor in advanced economies. In emerging market and developing economies, on the other hand, increasing access to education may provide more people with the opportunity to improve their economic situation, lifting a larger portion of the population out of poverty and reducing the income gap. An increase in financial development lowers income inequality in emerging market and developing economies and the whole sample. This empirical finding is consistent with the extensive margin explanation indicating the availability and the use of financial services by broader segments of the population leading to diminishing inequality. Better governance also tends to lower inequality in advanced economies. This may be related to an argument that better governance provides an environment where wealth and income are more evenly distributed leading to lower levels of inequality.

We also disaggregate international financial integration as assets (i.e., capital outflows) and liabilities (i.e., capital inflows) flows to better explain the driving mechanism of international financial integration on inequality. In this vein, we estimate the following equations:

$$\mathrm{GINI}_{it} = \alpha_i + \alpha_1 y_{i,t-1} + \alpha_2 \mathrm{HC}_{it} + \alpha_3 \mathrm{FD}_{it} + \alpha_4 \mathrm{GOV}_{it} + \alpha_5 \mathrm{Assets}_{it}(\mathrm{Assets}_{it} \leq \lambda) + \alpha_6 \mathrm{Assets}_{it}(\mathrm{Assets}_{it} > \lambda) + u_{it} \quad (2.2)$$

$$\mathrm{GINI}_{it} = \alpha_i + \alpha_1 y_{i,t-1} + \alpha_2 \mathrm{HC}_{it} + \alpha_3 \mathrm{FD}_{it} + \alpha_4 \mathrm{GOV}_{it} + \alpha_5 \mathrm{Liabilities}_{it}(\mathrm{Liabilities}_{it} \leq \lambda) + \alpha_6 \mathrm{Liabilities}_{it}(\mathrm{Liabilities}_{it} > \lambda) + u_{it} \quad (2.3)$$

In equations (2.2) and (2.3), λ represents, respectively, the threshold values of assets and liabilities. Table 2.3 and Table 2.4 presents the panel fixed effects threshold estimation results. According to the results in Table 2.3, asset flows provide a data-driven estimated threshold for the effect of assets (capital outflows) on inequality in advanced economies. The endogenously estimated threshold level of assets is around 330. The effect of assets on inequality is positively significant both in the low and high regimes, albeit the magnitude of the estimated coefficient is substantially much lower in the high regime including observations with more capital outflows. Liability flows (capital inflows) also provide data-driven estimated thresholds for the effect of liability flows on inequality as represented in Table 2.4. The endogenously estimated threshold level of liability flows is around 290 in the whole sample, 310 in advanced economies, and 60 in emerging market and developing economies. Accordingly, liability flows are positively associated with inequality in both regimes, albeit the inequality-increasing effect is less severe in the high regime including observations with more capital inflows. This pattern is almost the same in advanced economies. However, liability flows tend to increase inequality in the high regime of emerging market and developing economies sample. These results may imply that both asset and liability flows are associated with increasing inequality, but the severity of this

effect diminishes in economies with higher levels of these flows, particularly in advanced economies.

Table 2.3. Assets (Capital Outflows) as Threshold

VARIABLES	(2.2.1) Whole Sample	(2.2.2) AE	(2.2.3) EMDE
Threshold: Assets	138.13	331.71*	35.48
$F_B[.]$	42.85 [0.25]	51.06	12.70
		[0.08]	[0.88]
$y_{i,t-1}$	0.873**	1.635**	1.820***
	(0.339)	(0.689)	(0.380)
HC_{it}	-3.209***	1.373***	5.997***
	(0.393)	(0.470)	(0.511)
FD_{it}	-1.610*	1.781*	4.391***
	(0.918)	(0.998)	(1.296)
GOV_{it}	-0.401	3.558***	0.0282
	(0.319)	(0.484)	(0.373)
$Assets_{it}$ ($Assets_{it} \leq \lambda$)	-0.860***	0.715***	2.830***
	(0.176)	(0.0941)	(0.688)
$Assets_{it}$ ($Assets_{it} > \lambda$)	0.225***	0.154***	0.687***
Constant	46.97***	28.06***	42.20***
	(3.010)	(6.562)	(3.450)
R-squared	0.112	0.373	0.204
# of Countries	76	24	52
# of Observations	1748	552	1196
F-test [p-value]	34.88[0.00]	51.85[0.00]	48.59[0.00]

Note: Standard errors in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10% respectively.

However, in emerging market and developing economies, liability flows, especially in the high regime, tend to exacerbate inequality, most potentially due to weaker financial systems as briefly presented in Table 2.1.

Table 2.4. Liabilities (Capital Inflows) as Thresholds

VARIABLES	(2.3.1) Whole Sample	(2.3.2) AE	(2.3.3) EMDE
Threshold: Liabilities	294.55**	313.64*	63.69*
F_B[.]	82.44 [0.02]	42.46 [0.09]	37.96 [0.09]
$y_{i,t-1}$	0.347	2.164***	1.564***
	(0.325)	(0.687)	(0.364)
HC_{it}	-3.153***	1.279***	-6.031***
	(0.384)	(0.474)	(0.481)
FD_{it}	-2.893***	1.634	-6.938***
	(0.920)	(1.015)	(1.225)
GOV_{it}	-0.210	3.161***	0.0368
	(0.314)	(0.492)	(0.355)
$Liabilities_{it}$ ($Liabilities_{it} \leq \lambda$)	1.160***	0.688***	-0.552
	(0.104)	(0.097)	(0.387)
$Liabilities_{it}$ ($Liabilities_{it} > \lambda$)	0.300***	0.136***	1.120***
	(0.027)	(0.022)	(0.191)
Constant	51.70***	22.05***	45.81***
	(2.882)	(6.495)	(3.280)
R-squared	0.139	0.366	0.266
# of Countries	76	24	52
# of Observations	1748	552	1196
F-test [p-value]	44.66[0.00]	50.18[0.00]	68.64[0.00]

Note: Standard errors in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10% respectively.

2.3.2. Financialization and Inequality: Financial Development as Threshold

We now investigate whether the distributional effect of international financial integration may change with the level of financial development. According to the extensive margin explanation, financial development may lower inequality by increasing the availability and use of financial services by broader segments of the population. The literature including Jaumotte et al. (2013), Thornton and Di Tommaso (2020) and Hailemariam et al. (2021) provides an empirical support to this argument.

Under the extensive margin argument, the effect of international financial integration on inequality may not be the same in economies with low and high levels of financial development. Even financial development may provide a data-driven estimated threshold to explain the relationship between international financial integration and inequality. To this end, we estimate the following equation:

$$GINI_{it} = \alpha_i + \alpha_1 y_{i,t-1} + \alpha_2 HC_{it} + \alpha_3 FD_{it} + \alpha_4 GOV_{it} + \alpha_5 IFI_{it}(FD_{it} \leq \lambda) + \alpha_6 IFI_{it}(FD_{it} > \lambda) + u_{it} \quad (2.4)$$

In eq. (2.4), λ is the financial development (FD) threshold that divides the whole sample as the low and high regimes. The low regime includes observations with less financial development while the high regime contains more financially developed episodes. Panel fixed effects threshold estimation results of eq. (2.4) are presented in Table 2.4.

Accordingly, financial development provides a data-driven estimated threshold for the effect of international financial integration on inequality in the whole sample. The threshold level of financial development is estimated as 0.15 which is slightly lower than the mean as reported by Table 2.1. This threshold level is almost the same in the sample of emerging market and developing economies. Apparently, financial development does not constitute a data-driven estimated threshold in advanced economies. This may not be surprising because financial development is already at a higher level as briefly presented in Table 2.1. International financial integration tends to be positively associated with inequality in both regimes, albeit it is substantially much lower in the high regime including more financially developed observations.

This empirical result is consistent with the findings by Furceri and Loungani (2018) stating that inequality increasing effect of *de jure* financial openness appears to be smaller in economies with better financial development. The rest of the estimated parameters are almost the same with our earlier findings.

Table 2.5. Financial Development as Threshold

VARIABLES	(4.1) Whole Sample	(4.2) AE	(4.3) EMDE
FD Threshold	0.15***	0.61	0.15*
F_B[.]	142.91 [0.00]	25.14 [0.34]	73.90 [0.07]
$y_{i,t-1}$	0.532*	0.565	1.640***
	(0.321)	(0.757)	(0.364)
HC_{it}	-2.512***	1.708***	-5.374***
	(0.382)	(0.477)	(0.491)
FD_{it}	-0.555	3.123***	-4.630***
	(0.894)	(0.986)	(1.251)
GOV_{it}	-0.134	-3.433***	0.319
	(0.310)	(0.494)	(0.356)
IFI_{it} ($FD_{it} \leq \lambda$)	2.360***	0.0317***	2.230***
	(0.190)	(0.0118)	(0.206)
IFI_{it} ($FD_{it} > \lambda$)	0.121***	0.127***	0.520***
	(0.014)	(0.018)	(0.118)
Constant	47.50***	38.06***	42.26***
	(2.862)	(7.304)	(3.288)
R-squared	0.163	0.351	0.268
# of Countries	76	24	52
# of Observations	1748	552	1196
F-test [p-value]	54.15[0.00]	47.09[0.00]	69.29[0.00]

Note:Standard errors in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10% respectively.

2.4. Concluding Notes

Financial globalization has increased substantially during the recent two decades in advanced and emerging market and developing economies. This has rekindled the debate on the distributional effect of financial globalization. The literature provides mixed evidence on this important issue. This paper investigates the effect of *de facto* financial globalization proxied with international financial integration on income inequality in advanced and emerging market and developing economies during the 1996-2019 sample period.

Our panel fixed effect threshold estimation results suggest that the relationship between international financial integration and inequality may change with the level

of international financial integration. Accordingly, international financial integration tends to promote income inequality in advanced and emerging market and developing economies. However, the inequality-increasing effect of financial integration is less severe in more financially integrated advanced economies. International financial integration appears to lower (increase) inequality in emerging market and developing economies with less (more) financial integration. We also decompose the international financial integration into capital inflows (liabilities) and capital outflows (assets) to investigate the driving mechanism of international financial integration on income inequality. Our empirical results reveal that the effect of financial integration on inequality is driven by the joint effects of capital inflows and outflows in advanced economies, although it is mainly determined by capital inflows in emerging market and developing economies. Finally, we allow financial development as a data-driven estimated threshold for the effect of international financial integration on inequality. The findings illustrate that financial development does not constitute a data-driven estimated threshold in advanced economies since financial development is already at a higher level. In emerging market and developing economies, on the other hand, we find a data-driven estimated threshold of financial development. Accordingly, the positive relationship between international financial integration and inequality diminishes in better financially developed periods.

In this study, we reveal that the impact of international financial integration on income inequality varies according to development level of the economies. That is, our findings illustrate that the effects of international financial integration on income inequality in advanced economies are different than those in emerging markets and developing economies. This finding is not surprising since the stage and the development level of financial integration, and so the relation with income inequality might vary in those country sets. Hence, our findings reveals that the policymakers should apply well-established policy instruments by considering their countries' financial integration level and processes so that they can optimize the social benefits of financial integration. We also explain the importance of the direction of international financial integrations. Hence, policymakers should regulate the capital

flows in order to achieve healthier financial market together with minimizing the adverse effect of it on different income level groups.

As a next step, it could also be informative to carry out the analysis for the sub-component of financial markets since the market structures of the foreign direct investment and the portfolio investment of AE and EMDE groups, and even the countries within those groups may have different dynamics, and thus the way of impact on inequality might give different results.

CHAPTER 3

EXCHANGE RATE REGİME AND GROWTH: EMPRICAL EVIDENCE FROM EMERGING MARKETS AND DEVELOPING ECONOMIES

The impact of the exchange rate arrangements on monetary policies and macroeconomic indicators has been debated among policy makers and researchers during the 1970s corresponding to the collapse of the Bretton Wood Era. Following the collapse of Bretton Wood many developing and emerging economies have changed their exchange rate regimes (ERRs) to more flexible ones to provide sustainable growth, stable capital flows and higher trade. While more flexible exchange rate regimes allow the central bank to exercise more independent monetary policies, reduce barriers in international trade and transaction cost in capital flows, and decrease uncertainty in local currency, fixed exchange rate regimes provide a more stability in international trade by reducing fluctuations in exchange rate (Jacob, 2015). While flexible exchange rate regime provides a quick response to a shock towards adjustment in exchange rate, prices and wages so that fluctuations in macroeconomic variables might be absorb faster, under fixed exchange rate regime price and wages adjustment towards the equilibrium levels might take a quite time which may lead misallocation of resources. However, Ghosh et al. (1996) states that fixed exchange rate system promotes greater trade and investment in the economy by reducing uncertainty and lowering interest rates. These benefits help offset the slower growth caused by the system's ineffective adjustment to economic shocks. Impact of exchange rate regimes on macroeconomic indicators has been empirically investigated by the bulk of the literature. Empirical literature reveals that ERRs affect international capital flows, inflation, business cycles, investment, international trade and growth. In this study, we narrow down our interest and focus on the impact of exchange rate regimes on economic growth through international trade.

The empirical literature investigating exchange rate regime-growth nexus provides rather mixed evidence. The earlier literature mainly investigates this issue by using the descriptive analysis and concludes that there is no significant effect of ERRs in explaining the relationship between trade and growth. After 2000s, the empirical literature mainly considers panel data estimation procedure. For instance, some studies reveal that growth is much higher in countries with pegged or managed regimes (Moreno, 2000; Ghosh, et al., 2002; Dubas et al., 2005; Bailliu et al. 2003; De Grauwe and Schnabl, 2004; Ashour and Jong, 2018) while some others show that it is the case for economies with flexible exchange regimes (Bailliu et al., 2001; Levy-Yeyati and Sturzenegger, 2002; Bleaney and Francisco; 2007). Huang and Malhotra (2005), on the other hand, reveals that impact of exchange rate regime on growth may not be the same in advanced than developing countries. Indeed, growth enhancing effect of ERR is observed in developing economies with fixed and intermediate regimes, while it is the case in advanced economies with flexible regimes. Ashour and Jong (2018) states that one of the main reasons of finding conflicting results is usage *de jure* (announced official) classification of exchange rate regime since *de jure* classification does not properly match with the observed data. Hence, such classification method might not catch the relation properly. Moreover, the bulk of literature often ignores the possible nonlinear effect of ERR to explain the relationship between trade and growth.

This study considers all these crucial points and aims to contribute to the existing literature by examining whether the effect of trade openness on growth may change with the prevailing exchange rate regime in 56 emerging market and developing economies (EMDE) during the period of 1996-2019. To examine this important issue, which is ignored by the bulk of the literature, we consider *de facto* exchange rate regime (ERR) classification suggested by Ilzetzki, Reinhart and Rogoff (2019). Literature often tackles the nonlinearity by imposing ad hoc sample splitting procedures that maintain exogenous thresholds (see Dubas et al., 2005). In this study, we allow the data to find the value of threshold endogenously. To achieve this, we prefer to employ panel fixed effect threshold method developed by Hansen (1999). Hansen (1999) methodology provides us to investigate the thresholding impact of ERR for the sensitivity of growth to trade. A prominent study by Rey (2015)

suggests that the global financial cycle tends to move together with VIX (volatility and risk aversion index) leading to business cycle fluctuations in advanced and emerging market economies. Hence, to examine whether the growth effect of trade openness varies with the prevailing *de facto* ERR classification, we control the impact of global financial conditions proxied by the natural logarithm of volatility and risk aversion index (VIX).

The plan for the rest of this paper is as follows. The following section represents a brief review of the related literature. Section 3.2 explains the data and provides some stylized facts. In Section 3.3 we explain our methodology and main findings and section 3.4 provides concluding remarks.

3.1. Literature Review for Impact of Exchange Rate Regimes

The influence of exchange rate arrangements on monetary policies and macroeconomic variables has been a subject of debate among researchers since the post-World War II era, notably explored by Nurske (1944) and Mundell (1961). However, this discourse gained crucial significance following the collapse of the Bretton Woods system in the 1970s. In response, numerous developing and emerging economies transitioned toward more flexible exchange rate regimes (ERRs) to foster sustainable economic growth, enhance capital flow stability, and expand trade. Flexible ERRs enable central banks to implement autonomous monetary policies, minimize transaction costs and trade barriers, and mitigate exchange rate uncertainty. Conversely, fixed exchange rate regimes primarily offer stability in international trade (Jacob, 2015).

The impact of exchange rate regimes on macroeconomic indicators has been empirically investigated by the bulk of literature. In the empirical literature, ERRs has impact mainly on international capital flows (Eichengreen et al., 2020; Özmen and Taşdemir, 2023; Lu et al., 2022; Cerutti et al., 2019), international trade (Aristotelous, 2001; Klein and Shambaugh, 2006; Chit et al., 2010; Santana-Gallego and Pérez-Rodríguez, 2019; Beck, 2020), inflation (Ebeke and Fouejieu, 2020; Ouyang et al., 2016; Lothian, 2016), and growth (Levy-Yeyati and Sturzenegger,

2002; Husain et al., 2004; Ghosh et al., 2016; Jacob, 2015). In this study, we will focus on the thresholding impact of the exchange rate regimes for the sensitivity of growth to trade. We will also disaggregate trade into its main components, exports and imports, to investigate the driving mechanism of this relationship.

Theoretically, the literature often ignores the relationship between ERRs and growth. The seminal studies by Solow (1956) and Lucas (1976) provide an exception. However, those studies investigate the relation indirectly via total factor productivity, investment, and saving channels. The immediate effect of exchange rate regime on international trade operates mainly through export of goods and services. Then, it affects countries inflation and growth variables by exchange rate pass through.

The initial studies investigating this crucial issue illustrated the impact of exchange rate regimes on growth by using descriptive studies (see Baxter and Stockman, 1989; Mundell 1995, Ghosh et al., 1997; Moreno 2000 and among others). Those studies generally use average and standard deviation of growth through different regimes and compare the results. They conclude that there is no significant impact of different exchange rate regimes on growth. At the beginning of 2000s, studies have been conducted by using linear models both for single country analysis and country groups. For instance, Levy-Yeyati and Sturzenegger (2002) use the generalized-two stage IV estimation procedure to identify the channel that exchange rate regime influences real GDP per capita growth. They conclude that growth is much lower in economies with pegged regimes. Similarly, Edwards and Levy-Yeyati (2003), Husain et al. (2004), Garofalo (2005), and among others use the same OLS methodology and find that there is no substantial effect of ERR. These studies consider that a linear relationship between ERR and growth and they often ignore the nonlinear effect of ERR. To the best of our knowledge, Dubas et al. (2005) is the first study that investigate the regime-switching effect of exchange rate regime on per capita growth. They use a set of exchange rate dummies for 180 countries for the period of 1960-2002. They use random effect panel regression and divide the equation into three regimes exogenously. The findings reveal that growth is higher by 1% in pegged regimes than the others. The findings of this study may be interpreted with an extreme caution because it exogenously determines the regimes.

The studies by De Grauwe and Schnabl, 2004; Bailliu et al., 2003 investigate the impact of exchange rate regimes on growth, trade and international capital flows during the 2000s by using linear panel data analysis. Eichengreen and Leblang (2003), on the other hand, investigates the relationship between ERR and growth by using dynamic panel and IV estimation procedure. Their empirical results suggest that growth is much higher in economies with more flexible exchange rate regimes. Their findings are criticized mainly due to two reasons: they use developed and developing countries together (sample selection bias) and consider *de jure* exchange rate regime classification (misleading measurement of exchange rate regime). More recent studies employ panel data methodologies to explain the relationship between ERR and growth. However, the literature often ignores the potential nonlinear impact of ERRs on growth. In this study, we contribute to the literature on exchange rate regime and growth by using the panel fixed effect threshold method developed by Hansen (1999) which allows exchange rate regimes to be determined endogenously. Hansen (1999) methodology provides us to investigate whether prevailing ERR provides data-driven estimated threshold for the effect of trade on growth. A prominent study by Rey (2015) suggests that the global financial cycle tends to move together with VIX (volatility and risk aversion index) leading to business cycle fluctuations in advanced and emerging market economies. An increase in VIX represents worsening global financial conditions promoting flight to quality behavior and demand for safe assets as briefly argued by Habib et al. (2020). Hence, to examine whether the growth effect of trade openness varies with the prevailing *de facto* ERR classification, we control the impact of global financial conditions proxied by the natural logarithm of volatility and risk aversion index (VIX).

3.2. The Data and Stylized Facts

This chapter aims to examine whether the effect of trade openness on growth may change with the prevailing exchange rate regime in 56 emerging market and developing economies (EMDE)[4] during the period of 1996-2019. To examine this

[4] EMDE sample includes Argentina, Bangladesh, Belarus, Bolivia, Brazil, Cameroon, Chile, China, Colombia, Costa Rica, Croatia, Czech R., Dominican R., Ecuador, Egypt, El Salvador, Estonia, Fiji, Guatemala, Honduras, Hungary, India, Indonesia, Israel, Jamaica, Jordan, Kazakhstan, Kenya,

important issue, which is ignored by the bulk of the literature, we consider *de facto* exchange rate regime (ERR) classification suggested by Ilzetzki, Reinhart and Rogoff (2019)[5]. Ashour and Jong (2018) emphasizes the importance of using *de facto* regime classification which is measured by using the observed data. They state that *de jure* (announced official) classification of exchange rate regime does not properly match with the observed data. Hence, such classification method might not catch the relation properly.

Table 3.1 presents the *de facto* ERR classification based on the fine and coarse classifications. Accordingly, ERR varies between 1 and 15 based on the fine classification and 1 and 6 based on the coarse classification. The higher values of both categories represent more flexible exchange rate regime arrangements. Ilzetkzki, Reinhart, and Rogoff (2019) remarks that ERR14 and ERR15 in the fine classification and ERR5 and ERR6 in the coarse category correspond to high inflation periods, currency crises, and lack of monetary control. Therefore, attributing ERR to these periods of macroeconomic instability may be misleading. This leads to the exclusion of ERR5 and ERR6 in the coarse category and ERR14 and ERR15 in the fine category in our analysis.

A prominent study by Rey (2015) suggests that the global financial cycle tends to move together with VIX (volatility and risk aversion index) leading to business cycle fluctuations in advanced and emerging market economies. An increase in VIX represents worsening global financial conditions promoting flight to quality behavior and demand for safe assets as briefly argued by Habib et al. (2020). To examine whether the growth effect of trade openness varies with the prevailing *de facto* ERR classification, we control the impact of global financial conditions proxied by the natural logarithm of volatility and risk aversion index (VIX).

Kyrgyzstan, Latvia, Lithuania, Malaysia, Mexico, Moldova, Morocco, Niger, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Romania, Russia, Slovakia, Slovenia, South Africa, S. Korea, Sri Lanka, Sudan, Thailand, Turkiye, Uganda, Ukraine, Uruguay and Venezuela.

[5] Empirical literature emphasizes the difference between *de facto* and *de jure*. Studies using *de jure* exchange rate regime classification (see Domac et al. 2004; Husain et al, 2004) generally find inconclusive relations. The empirical findings based on *de jure* ERR classification may be interpreted with an extreme caution because they often ignore the difference between deeds and words.

Table 3.1. Fine and Coarse ERR Classifications by Ilzetzki et al. (2019)

	Fine	**Coarse**
No separate legal tender	ERR1	
Pre-announced peg or currency board arrangement	ERR2	ERR1
Pre-announced horizontal band that is narrower than or equal to +/-2%	ERR3	Pegged
De facto peg	ERR4	
Pre-announced crawling peg	ERR5	
Pre-announced crawling band that is narrower than or equal to +/-2%	ERR6	ERR2
De facto crawling peg	ERR7	Limited
De facto crawling band that is narrower than or equal to +/-2%	ERR8	flexibility
Pre-announced crawling band that is wider than or equal to +/-2%	ERR9	
De facto crawling band that is narrower than or equal to +/-5%	ERR10	ERR3
Moving band that is narrower than or equal to +/-2%	ERR11	Managed
Managed floating	ERR12	floating
Freely floating	ERR13	ERR4 Freely floating
Freely falling	ERR14	ERR5
Dual market in which parallel market data is missing	ERR15	ERR6

The data for VIX are from Chicago Boards Options Exchange webpage. Trade openness data which is calculated as the sum of exports and imports of goods and services are taken from World Development Indicators, World Bank. We also consider the main components of trade openness in our estimations. Consistent with the growth literature, we prefer to use real per capita growth rate rather than GDP growth since the former allows to control population dynamics (Eichengreen and Leblang, 2003; Bailliu et al., 2003; Ashour and Jong, 2018). The data for real income per capita growth are taken from Penn World Table database.

Table 3.2. Main Descriptive Statistics

	ΔRGDPpc	TRADE	EXPORTS	IMPORTS	VIX
	Whole Sample				
Mean	0.028	75.225	34.579	38.812	19.335
Median	0.029	65.072	30.152	32.995	17.517
St. Dev.	0.033	38.792	20.049	19.685	5.844
CoV	1.176	0.516	0.580	0.507	0.302
	Managed ERR prevailing episodes				
Mean	0.029	79.073	35.515	41.226	19.318
Median	0.029	71.395	31.303	37.240	17.517
St. Dev.	0.034	40.939	21.112	20.804	5.807
CoV	1.181	0.518	0.594	0.505	0.301
	Floating ERR prevailing episodes				
Mean	0.027	66.402	32.455	33.330	19.374
Median	0.029	57.728	28.458	29.607	17.517
St. Dev.	0.032	31.672	17.230	15.554	5.936
CoV	1.160	0.477	0.531	0.467	0.306

Note: St. Dev. And CoV represent, respectively, standard deviation and coefficient of variation of the variables.

Table 3.2 presents the main descriptive statistics for our variables of interest. In the table, ΔRGDPpc is real income per capita growth, TRADE is trade openness (as a percent of GDP), EXPORTS is exports of goods and services (as a percent of GDP), IMPORTS is imports of goods and services (as a percent of GDP) and VIX is the natural logarithm of volatility and risk aversion index. Accordingly, the mean and median values of ΔRGDPpc are almost the same and it is around 3% in the whole sample, managed[6] and floating[7] ERR prevailing episodes. The mean of TRADE is

[6] Managed ERR prevailing episodes contain the observations which ERR is between ERR1 and ERR8 in fine category and ERR1 and ERR2 in coarse classification.

[7] Floating ERR prevailing episodes include the observations which ERR is between ERR9 and ERR13 in fine category and ERR3 and ERR4 in coarse classification.

75% in whole sample, 79% in managed ERR prevailing observations and 66% in floating ERR prevailing episodes. Apparently, mean of TRADE is much higher than median of TRADE in all classifications. The mean and median values of TRADE are slightly higher in managed than floating ERR prevailing episodes. This seems to be the case also for the main components of TRADE. The mean and median of IMPORTS appear to be slightly higher than EXPORTS. The average value of VIX is slightly higher than median.

Table 3.3. Correlation Matrix

	ΔRGDPpc	TRADE	EXPORTS	IMPORTS	VIX	ERR
ΔRGDPpc	1.00					
TRADE	0.10	1.00				
EXPORTS	0.09	0.94	1.00			
IMPORTS	0.08	0.96	0.88	1.00		
VIX	-0.22	-0.03	-0.05	-0.04	1.00	
ERR	-0.01	-0.25	-0.20	-0.28	0.02	1.00

Table 3.3 presents the simple correlation coefficient of variables of our interest. Accordingly, there is a positive correlation between ΔRGDPpc and TRADE. The positive correlation appears to be the case for the main components of TRADE. There is a negative correlation between VIX and ΔRGDPpc. The negative correlation implies that favorable global financial conditions proxied by a decrease in VIX tend to promote growth. ERR is also negatively correlated with ΔRGDPpc indicating growth is lower in more flexible ERR arrangements. Worsening global financial conditions represented by an increase in VIX tend to lower TRADE. Exchange rate regime rigidity tends to increase TRADE. This appears to be almost the same for the main components of TRADE.

Figure 3.1 shows the evolutions of mean Growth (ΔRGDPpc) and Trade Openness (TRADE) during the 1996-2019 period.

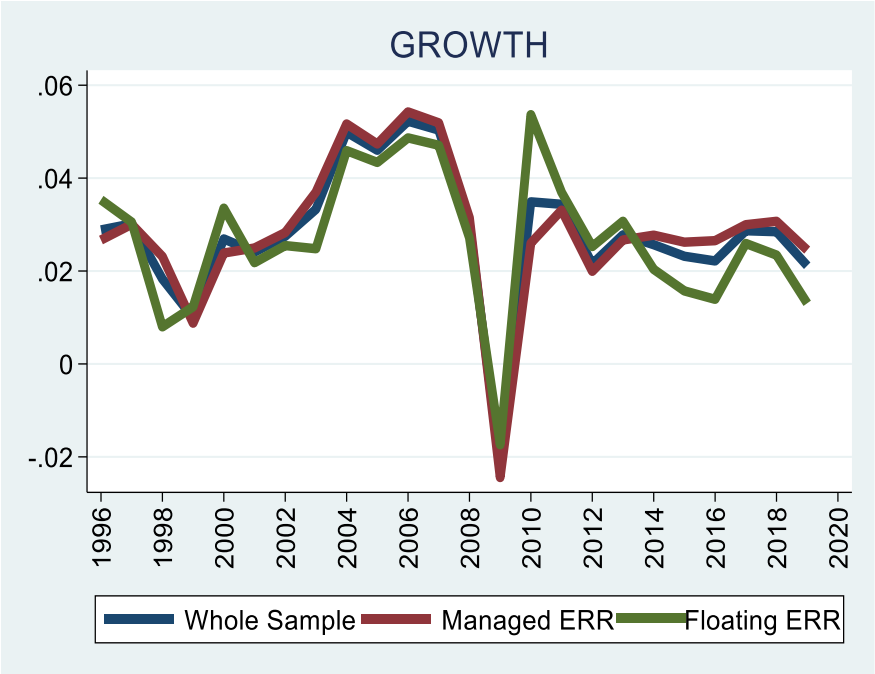

Figure 3.1. The Evolutions of Growth

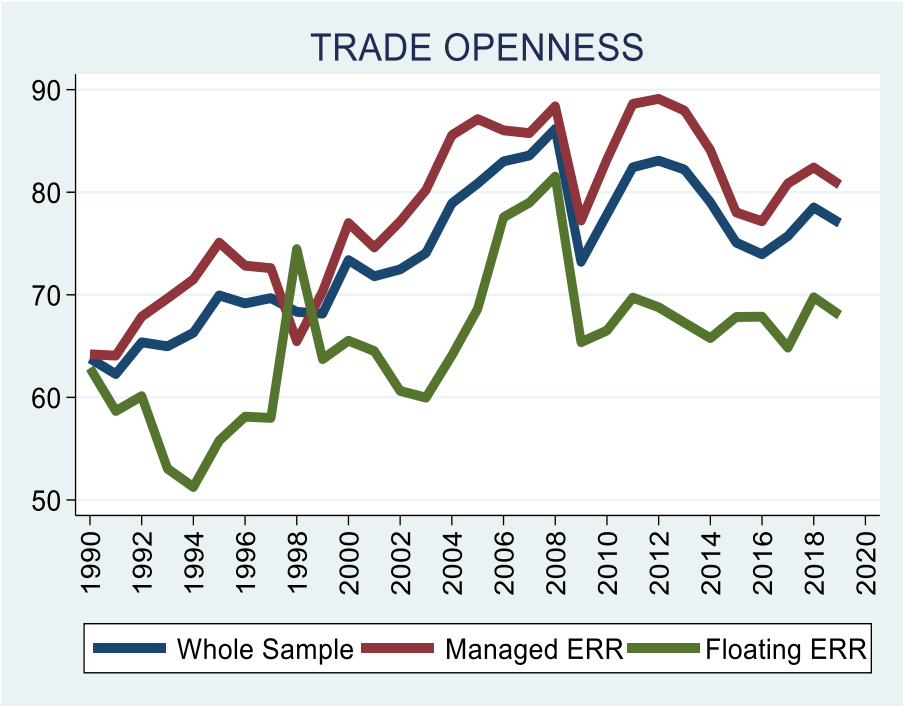

Figure 3.2. Evolution of TRADE

Accordingly, mean Growth tends to increase until the recent global financial crisis and then it returns to average during the rest of the period. Apparently, the mean of Growth is slightly higher in managed than floating ERR prevailing episodes. In

addition, stability is much more apparent in managed ERR episodes. It is also remarkable that the mean growth was slightly higher during the pre- and post-global financial crisis. The mean trade openness tends to exhibit an increasing trend excluding the global financial crisis period. The pattern for trade openness indicates that the average trade is much higher in economies with managed ERR than floating ERR. The higher average trade openness in economies with managed exchange rate regimes (ERRs) can be attributed to lower exchange rate volatility, which mitigates transaction costs and currency risk, thereby fostering greater trade integration. In line with the exchange rate stability hypothesis, managed ERRs provide a more predictable trade environment, enhancing price competitiveness and reducing uncertainty in cross-border transactions.

3.3. Empirical Methodology and Estimation Results

The bulk of the literature maintains that the sensitivity of growth to trade is invariant to the prevailing exchange rate regime (ERR). However, managed ERR mitigates exchange rate volatility, lowers transaction costs and currency risk. In addition, managed ERR reduces uncertainty on exchange rates and cross-border transactions and promotes price competitiveness. All these arguments may imply that the impact of trade openness on growth may not be the same in economies with managed ERR than floating ERR. Even, prevailing *de facto* ERR may provide data-driven estimated threshold for the effect of trade openness on growth. The literature often maintains linear relationship between growth and trade, they tend to ignore the potential nonlinear effect of ERR to explain the sensitivity of growth to trade. Literature often tackles the nonlinearity by imposing *ad hoc* sample splitting procedures that maintain exogenous thresholds (see Dubas et al., 2005). In this study, we allow the data to speak to find the value of threshold endogenously. To achieve this, we prefer to employ panel fixed effect threshold method developed by Hansen (1999).

To investigate whether the prevailing *de facto* exchange rate regime (ERR) provides a data-driven estimated threshold for the effect of trade openness on real GDP per capita growth, we estimate the following equation:

$$\Delta RGDP\_pc_{it} = \alpha_i + \alpha_1 ln(vix)_t + \alpha_2 \Delta RGDP\_pc_{i,t-1} + \begin{cases} \alpha_3 TRADE_{it} & if\ ERR_{it} \leq \lambda \\ \alpha_4 TRADE_{it} & if\ ERR_{it} > \lambda \end{cases} + u_{it} \quad (3.1)$$

In eq. (3.1), the subscripts i and t represent, respectively, countries and years. ΔRGDPpc is the logarithmic difference of real income per capita, VIX is the natural logarithm of volatility and risk aversion index, TRADE is trade openness (as a percent of GDP). By estimating this equation, we only allow the trade openness variable to be the regime dependent variable and the lagged of real GDP per capita growth, and the volatility and risk aversion index (VIX) to be the regime independent variables.

In eq. (3.1), λ is the data-driven estimated threshold level of prevailing *de facto* exchange rate regime (ERR) based on the fine classification. Here, λ divides the whole sample into low and high regimes. The low regime includes observations which prevailing ERR is less than or equal to endogenously estimated ERR threshold. The high regime, on the other hand, contains episodes which prevailing ERR is greater than data-driven estimated ERR threshold. If $\alpha_3 = \alpha_4$ in eq. (3.1), λ is statistically insignificant suggesting there is no significant thresholding effect of ERR. However, λ is unidentified under the null of there is no significant threshold. To tackle this issue, Hansen (1999) suggests a bootstrap procedure to obtain the asymptotic p-values of the F-test. Following Hansen (1999), time-invariant fixed effects are eliminated by demeaning the sample. The resulting demeaned observations are then arranged in ascending order based on the threshold variable. Ilzetkzki, Reinhart, and Rogoff (2019) remarks that ERR14 and ERR15 in the fine classification correspond to high inflation periods, currency crises, and lack of monetary control. Therefore, attributing ERR to these periods of macroeconomic instability may be misleading. Additionally, ERR1 in fine classification is associated with hard pegged regimes with monetary union. This leads to the exclusion of ERR1, ERR14 and ERR15 in the fine category in our analysis. Hence, we trimmed the lowest and highest 15% of observations to mitigate the influence of extreme values, and the remaining data points are examined as potential threshold candidates. For

each candidate, the optimal threshold value is identified by minimizing the sum of squared residuals derived from the panel least squares estimation of the demeaned sample. Given that there is a data-driven estimated ERR threshold, the parameters in Eq. (3.4) are estimated by employing panel fixed effect method. We also investigate whether prevailing ERR provides data-driven estimated threshold for the main components of trade including exports and imports. To this end, we estimate:

$$\Delta RGDP\_pc_{it} = \alpha_i + \alpha_1 ln(vix)_t + \alpha_2 \Delta RGDP\_pc_{i,t-1} + \begin{cases} \alpha_3 EXPORTS_{it} & if\ ERR_{it} \leq \lambda \\ \alpha_4 EXPORTS_{it} & if\ ERR_{it} > \lambda \end{cases} + u_{it} \quad (3.2)$$

$$\Delta RGDP\_pc_{it} = \alpha_i + \alpha_1 ln(vix)_t + \alpha_2 \Delta RGDP\_pc_{i,t-1} + \begin{cases} \alpha_3 IMPORTS_{it} & if\ ERR_{it} \leq \lambda \\ \alpha_4 IMPORTS_{it} & if\ ERR_{it} > \lambda \end{cases} + u_{it} \quad (3.3)$$

Table 3.4 presents the panel fixed effect threshold estimation results of Eq. (3.1). According to results by Eq. (3.1), prevailing *de facto* exchange rate regime (ERR) provides data-driven estimated threshold for the effect of trade on growth. The estimation results suggest that ERR10 is the endogenously estimated ERR threshold. Table 3.1 indicates that ERR10 corresponds to *de facto* crawling band that is narrower than or equal to +/-5% in fine classification and managed floating in coarse category.

Table 3.4. Panel Fixed Effect Threshold Estimation Results (Only TRADE Variable is Regime Dependent)

VARIABLES	Eq. (3.1)	Eq. (3.2)	Eq. (3.3)
ERR Threshold	10	10	10
$F_B[.]$	11.67 [0.08]	14.28 [0.03]	9.60 [0.12]
$\Delta RGDPpc_{i,t-1}$	0.333***	0.337***	0.332***
	(0.027)	(0.027)	(0.027)
$ln(vix)_t$	-0.019***	-0.019***	-0.019***
	(0.003)	(0.003)	(0.003)

Table 3.4. (continued)

$TRADE_{it}$ ($ERR_{it} \leq \lambda$)	0.024***		

	(0.007)		
$TRADE_{it}$ ($ERR_{it} > \lambda$)	0.010		
	(0.008)		
$EXPORT_{it}$ ($ERR_{it} \leq \lambda$)		0.029**	
		(0.012)	
$EXPORT_{it}$ ($ERR_{it} > \lambda$)		-0.002	
		(0.014)	
$IMPORT_{it}$ ($ERR_{it} \leq \lambda$)			0.039***
			(0.013)
$IMPORT_{it}$ ($ERR_{it} > \lambda$)			0.014
			(0.015)
Constant	0.058***	0.066***	0.061***
	(0.011)	(0.011)	(0.011)
# of Observations	1288	1288	1288
R-squared	0.159	0.156	0.156
# of Countries	56	56	56
F-test [p-value]	0.00	0.00	0.00

Note: Standard errors in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10% respectively.

This implies that the low regime includes mainly pegged, limited flexibility and some regimes in managed floating episodes and high regime contains some regimes in managed floating and freely floating. The distinction between the low and high regimes allows us to consider the low regime as more rigid ERR prevailing episodes and high regime as more flexible ERR prevailing observations. The data-driven estimated threshold level is almost identical for the estimation results of Eq. (3.2) and Eq. (3.3). The effect of trade on growth is positive and statistically significant in the low regime while it is positive but statistically insignificant in the high regime. This implies that trade openness promotes growth in more rigid ERR prevailing episodes. There is a negative and significant relationship between VIX and growth. Considering a decrease in VIX represents greater risk appetite and a decrease in uncertainty, this result may imply that favorable global financial conditions promote growth. Consistent with the conditional income convergence argument, the estimated coefficient for lagged dependent variable is positive and significant suggesting that there is an income convergence. Accordingly, economies with lower growth rates tend to effect current income, reinforcing the idea that economies are gradually catching up to their steady-state growth paths. The estimation results in Eq.s (3.2) and (3.3) suggest that the growth enhancing effect of trade is driven by the joint

impacts of both export and import. Apparently, export and import tend to increase growth in economies with more rigid exchange rate regimes[8].

We also consider whether the effect of lagged growth may change with the prevailing exchange rate regime. This leads us to consider whether prevailing exchange rate regime provides data-driven estimated threshold for the impacts of both trade and lagged growth. Consistent with the growth literature, we also incorporate the lagged dependent variable to check whether the convergence argument is valid for our sample of emerging market and developing economies. To this end, we consider the following benchmark equation:

$$\Delta \mathrm{RGDP\_pc}_{it} = \alpha_i + \alpha_1 \mathrm{VIX}_t + \begin{cases} \alpha_2 \Delta \mathrm{RGDP\_pc}_{i,t-1} + \alpha_3 \mathrm{TRADE}_{it} & \text{if } \mathrm{ERR}_{it} \le \lambda \\ \alpha_4 \Delta \mathrm{RGDP\_pc}_{i,t-1} + \alpha_5 \mathrm{TRADE}_{it} & \text{if } \mathrm{ERR}_{it} > \lambda \end{cases} + u_{it} \quad (3.4)$$

We also estimate the same model by disaggregating trade as exports and imports. In this vein, we estimate:

$$\Delta \mathrm{RGDP\_pc}_{it} = \alpha_i + \alpha_1 VIX_t + \begin{cases} \alpha_2 \Delta \mathrm{RGDP\_pc}_{i,t-1} + \alpha_3 \mathrm{EXPORT}_{it} & \text{if } \mathrm{ERR}_{it} \le \lambda \\ \alpha_4 \Delta \mathrm{RGDP\_pc}_{i,t-1} + \alpha_5 \mathrm{EXPORT}_{it} & \text{if } \mathrm{ERR}_{it} > \lambda \end{cases} + u_{it} \quad (3.5)$$

$$\Delta \mathrm{RGDP}_{\mathrm{pc}_{it}} = \alpha_i + \alpha_1 \mathrm{VIX}_t + \begin{cases} \alpha_2 \Delta \mathrm{RGDP}_{\mathrm{pc}_{i,t-1}} + \alpha_3 \mathrm{IMPORT}_{it} & \text{if } \mathrm{ERR}_{it} \le \lambda \\ \alpha_4 \Delta \mathrm{RGDP}_{\mathrm{pc}_{i,t-1}} + \alpha_5 \mathrm{IMPORT}_{it} & \text{if } \mathrm{ERR}_{it} > \lambda \end{cases} + u_{it} \quad (3.6)$$

According to results by Eq. (3.4), prevailing *de facto* exchange rate regime (ERR) provides data-driven estimated threshold for the effects of lagged real income per capita and trade on growth. The estimation results suggest that ERR10 is the endogenously estimated ERR threshold. This finding indicates that endogenously estimated ERR threshold does not change when we allow lagged per capita growth as a regime dependent variable. Consistent with our previous results, the data-driven

[8] For the robustness check we also includes some control variables in our threshold models such as population, human capital, investment, and capital flow variables in line with the literature, yet we find insignificant impact on real per capita growth.

estimated threshold level is almost identical for the estimation results of Eq. (3.5) and Eq. (3.6) where we disaggregate trade as export and import. The effect of trade on growth is positive and statistically significant in the low regime while it is positive but statistically insignificant in the high regime. This implies that trade openness promotes growth in more rigid ERR prevailing episodes. This is due to more rigid ERRs reduce exchange rate volatility, which enhances trade predictability and investment confidence. In such regimes, lower currency risk and greater macroeconomic stability facilitate long-term trade relationships and productivity gains, aligning with the endogenous growth theory's emphasis on external sector-driven technological diffusion and efficiency improvements. Consistent with this result, estimated Eq.s (3.5) and (3.6) suggest that this is driven by the joint effects of both exports and imports. The estimated coefficient of lagged real income per capita growth is positive and statistically significant in both of the regimes, albeit it is much higher in the high regime including more flexible ERR arrangements. The positive and statistically significant coefficient of lagged real income per capita growth across both regimes suggests the presence of growth persistence, implying that past economic performance influences current growth dynamics. However, the much higher coefficient in the high regime, characterized by more flexible ERR arrangements, indicates a weaker convergence effect, as economies with greater exchange rate flexibility may experience prolonged deviations from their steady-state growth paths due to heightened macroeconomic volatility and external shocks. This aligns with the conditional convergence hypothesis, which posits that economies with stable macroeconomic environments (e.g., managed ERRs) exhibit faster convergence toward their long-run growth equilibrium, whereas those with more flexible regimes may encounter persistent divergence due to fluctuating external conditions. Consistent with the global financial cycle postulation, there is a negative and statistically significant relationship between VIX and real income per capita growth. This may imply that favorable global financial conditions proxied by a decrease in VIX tend to increase economic growth in our sample[9].

[9] We also allow all variables including global financial condition indicator, vix, to be regime dependent variables. However, we obtain very similar results as in Table 3.5. The coefficients of vix variable both in low and high regime are statistically significant and negative, but very close to each other. We prefer not to include those results in the thesis since the results provide no additional information to our previous findings.

Table 3.5. Panel Fixed Effect Threshold Estimation Results

	Eq. (3.4)	Eq. (3.5)	Eq. (3.6)
ERR Threshold	10***	10***	10***
F_B[.]	31.40 [0.01]	33.08 [0.00]	29.20 [0.00]
VIX_t	-0.020*** (0.003)	-0.019*** (0.003)	-0.020*** (0.003)
$TRADE_{it}$ ($ERR_{it} \leq \lambda$)	0.024*** (0.007)		
$TRADE_{it}$ ($ERR_{it} > \lambda$)	0.002 (0.008)		
$EXPORT_{it}$ ($ERR_{it} \leq \lambda$)		0.028** (0.012)	
$EXPORT_{it}$ ($ERR_{it} > \lambda$)		-0.017 (0.015)	
$IMPORT_{it}$ ($ERR_{it} \leq \lambda$)			0.039*** (0.013)
$IMPORT_{it}$ ($ERR_{it} > \lambda$)			-0.003 (0.016)
$\Delta RGDPpc_{i,t-1}$($ERR_{it} \leq \lambda$)	0.253*** (0.033)	0.260*** (0.033)	0.252*** (0.033)
$\Delta RGDPpc_{i,t-1}$($ERR_{it} > \lambda$)	0.503*** (0.048)	0.502*** (0.047)	0.505*** (0.048)
Constant	0.062*** (0.011)	0.069*** (0.011)	0.064*** (0.011)
# of Observations	1288	1288	1288
# of Countries	56	56	56
R-squared	0.172	0.168	0.168
F-test [p-value]	0.00	0.00	0.00

Note: Standard errors in parentheses. ***, **, and * denote the significance level at 1%, 5%, and 10% respectively.

3.4. Concluding Remarks on Exchange Rate Regimes and Growth

The influence of exchange rate regimes (ERRs) on monetary policies and macroeconomic variables has been a subject of extensive debate among policymakers and researchers, particularly following the collapse of the Bretton Woods system in the 1970s. In response to this shift, many nations, particularly those in the developing and emerging economies, transitioned toward more flexible ERRs. While much of the existing literature asserts that economic growth's sensitivity to trade remains unaffected by the prevailing ERR, managed exchange rate regimes

play a crucial role in mitigating exchange rate volatility, reducing transaction costs and currency risk, and enhancing price competitiveness. Furthermore, managed ERRs diminish uncertainty in exchange rates and cross-border transactions, potentially leading to differentiated effects of trade openness on economic growth compared to floating ERRs. Additionally, *de facto* exchange rate regimes may yield empirically derived thresholds that influence the impact of trade openness on growth. However, there remains a gap in the literature regarding the potential nonlinear relationship between these variables. Existing studies often address this nonlinearity through ad hoc sample-splitting techniques that impose exogenous thresholds, as highlighted by Dubas et al. (2005). In this study, we examine whether the effect of trade openness on growth may change with the prevailing exchange rate regime in 56 emerging market and developing economies (EMDE) during the period of 1996-2019. To this end, we employ panel fixed effect threshold method developed by Hansen (1999) where the exchange rate regime is determined endogenously, and we use *de facto* exchange rate regime (ERR) classification suggested by Ilzetzki, Reinhart and Rogoff (2019) in our analysis.

Our estimation results provide empirical evidence that *de facto* exchange rate regime (ERR) provides data-driven estimated threshold for the effects of lagged real income per capita and trade on growth. The estimation results suggest that ERR10 is the endogenously estimated ERR threshold. ERR10 corresponds to *de facto* crawling band that is narrower than or equal to +/-5% in fine classification and managed floating in coarse category. Our estimation results implies that trade openness promotes growth in more rigid ERR prevailing episodes. This is due to more rigid ERRs reduce exchange rate volatility, which enhances trade predictability and investment confidence. In such regimes, lower currency risk and greater macroeconomic stability facilitate long-term trade relationships and productivity gains, aligning with the endogenous growth theory's emphasis on external sector-driven technological diffusion and efficiency improvements. Next, we also divide trade openness as export and import in order to investigate the main driving mechanism. The estimation results indicate that it is due to the joint effects of both exports and imports. This finding differs from the existing literature since the studies indicate that the driving channel of trade openness comes from export sides.

However, as stated by Bourdet (2004) emerging market and developing economies are dependent on import of intermediate goods for their production processes and hence it has a growth-enhancing role in EMDE. Consistent with the global financial cycle postulation, there is a negative and statistically significant relationship between VIX and real income per capita growth. This may imply that favorable global financial conditions proxied by a decrease in VIX tend to increase economic growth in EMDE. To conclude, our estimation results reveal that trade openness promotes growth in more rigid ERR prevailing episodes than more flexible ERR in emerging markets and developing economies.

CHAPTER 4

THE LINK BETWEEN CREDIT AND ECONOMIC ACTIVITY: DOES IT DEPEND ON THE SPEED OF CREDIT?

Identifying possible nonlinearities in the relationship between credit and economic activity can have important policy implications and may assist in designing financial policies. Bank credit has been used as one of the main proxies for financial development in the literature. The earlier literature on the relationship between financial development and economic growth assumes linear association and generally finds evidence in favor of a positive long-run relationship. The related theoretical and empirical research, which is reviewed in Levine (2005), implies that financial development supports economic growth by removing impediments to firms' external finance; encouraging savings, easing transactions, improving efficiency by capital allocation, and raising investors' appetite to finance projects by reducing asymmetric information (King and Levine, 1993a; Bencivega, Smith and Starr, 1995; Levine and Zervos, 1996; Greenwood and Smith, 1997; Holmström and Tirole, 1998; Rousseau and Wachtel, 2000; Beck, Levine, Loayza, 2000; Levine, 2003; Demirgüç-Kunt, Laeven and Levine, 2004).

The global financial crisis of 2007-2008 had shown that when financial system gets too big and complicated, the risk buildup could eventually lead to financial turmoil. Hence, since the global crisis, an increasing number of studies began to consider the possibility that too much finance can be harmful to economic growth, and many of them started using quadratic specifications and nonlinear estimation techniques.[10] This new dimension of the literature usually explores the existence of a threshold above which the positive effect of financial deepening on economic growth

[10] See Panizza (2018) for an extensive review of this literature.

disappears. In fact, some papers find that beyond a specific threshold value, financial development negatively effects growth. Specifically, Arcand, Berkes and Panizza (2015), Breitenlechner, Gächter, and Sindermann (2015), and Law, Kutan, and Naseem (2018) find that there is an inverted-U shaped relationship between private credit and/or productivity growth and the turning point of the curve is around 90-100%. Cournède, Denk and Hoeller (2015) and Benczur, Karagiannis and Kvedaras (2019) estimate the turning point for the effect of private credit as 50-60% of GDP in advanced countries, substantially lower than less developed countries. Samargandi, Fidrmuc and Ghosh (2015) find that the inverted U-shaped interaction exists in the long term, but not significant in the short term.

In the literature, the most widely cited reason for the adverse effect financial development on economic activity is the fact that when the financial sector gets too large, the limited resources may be attributed to unproductive economic activities. Cournède, Denk and Hoeller (2015) warn that too much financial development can also end up with higher risk due to deregulation in financial markets, a bank-dominated financial system, too big and systemically risky financial institutions, and higher private sector debt without proper collateral. Gründler (2021) claims that the positive impact of financial development on economic activity is higher when countries are at the initial stages of their industrialization.

The above-mentioned literature generally uses panel data analysis and focus only on long-run behavior. In this chapter, we aim to carry out a single country analysis for Türkiye and would like to combine long-run behavior with the short-run dynamics. There are some single country analyses that model nonlinearities in the long-run credit-growth relationship which use a cointegrating framework in the context of an NARDL model. These studies detect nonlinearities in the long-run relationship for India (Shahbaz et al., 2017), for Kenya (Chen et al., 2020), for Ghana (Muazu and Imhotep, 2020), for Nigeria (Nakhli and Gaies, 2021) as well as for the Euro-zone (Tsagkanos and Siriopoulos, 2015). These studies typically use one threshold and examine the effects of negative and positive changes (asymmetry) on the long-run relationship. In this study we aim to carry out the NARDL analysis for Türkiye and extend the case to multiple thresholds.

The related literature on Türkiye, which generally uses a linear setup, finds positive long-run interaction between financial development and economic growth (for early studies, see Kar and Pentacost, 2000, Unalmis, 2002, and among many others). Gulay and Cowley (2020) provide a recent review of the related literature on Türkiye. To the best of our knowledge, there is no study on Türkiye that questions the nonlinearities in the long-term relationship between credit and economic activity.

This study asks whether the long-run relationship between credit and economic activity differs according to the speed of credit in Türkiye. Specifically, we test whether there is a nonlinear relationship between credit-to-GDP ratio and real GDP, depending on the size of the credit growth. For this purpose, we use a multiple threshold nonlinear autoregressive distributed lag (MT-NARDL) model, where long-run and short-run non-linear dynamics are modeled together. Türkiye has witnessed large swings in credit-to-GDP ratio, since the global financial crisis. Turkish experience constitutes one of the most interesting case studies where aggressive credit policies have been implemented from time to time in recent years to support economic growth.

Our findings for Türkiye show that attaining moderate levels of credit growth is important in maintaining the long-run positive interaction between credit and economic activity, and this interaction is broken during periods with excessively high or low credit growth. We show that these results are robust to selecting alternative number and combination of thresholds.

Our finding for the case of excessively high credit growth is in line with the literature. There is a strand in the literature which shows that extremely positive changes in credit can sometimes affect future economic growth adversely, obscuring the positive long-run association between credit and economic activity. When credit growth is too fast compared to real economic growth, it is shown that this can lead to financial fragilities, followed by financial crises and economic downturns (among many others, see Schularick and Taylor, 2012; Jorda et al., 2013 and Brunnermeier et al., 2012 for a survey). Our finding that excessively low credit growth leads to a weaker relationship between credit and GDP in Türkiye could be due to several

factors. First, according to De Gregorio and Guidotti (1995), the positive association between credit and economic growth could be broken during periods when financial innovation occurs outside of the banking system (i.e., when bank credits are low). We rule out this possibility since financial markets in Türkiye are historically bank-based. Secondly, Herwartz and Walle (2014) finds that greater degrees of financial openness can weaken the positive relationship between credit and economic growth. Regulations in Türkiye enabled non-financial firms to borrow more easily from abroad since 2009. Hence, especially for large firms, international markets became an alternative venue to borrow.

This study contributes to the existing literature by examining the long-run and short-run dynamics of the relationship between credit and economic activity, using a nonlinear model. It adds to the understanding of the credit-GDP relationship by highlighting the nonlinear patterns in the data, suggesting that not only excessively high but also very low levels of credit growth can disrupt the intricate connection between credit and economic activity. Additionally, the paper advances the methodological literature by employing NARDL analysis to explore the long-term relationship between credit and economic activity across "multiple thresholds." This extends beyond the current literature, which typically concentrates on a single threshold.

The rest of this paper is structured as follows. Section 4.1 provides an overview of the Turkish financial system and credit policies. Section 4.2 describes the data and model specification used in this paper. Section 4.3 presents and discusses the main findings and robustness results. Section 4.4 concludes the paper.

4.1. Turkish Financial System

4.1.1. A Snapshot

Financial system in Türkiye is mainly bank-based and the real sector is largely dependent on bank finance in Türkiye. According to the Financial Stability Board (FSB) database as illustrated in Figure 4.1, the share of banks in the total financial

system is 71% in Türkiye in 2020, while this figure is 56% for emerging markets and 34% for advanced countries on average.[11] Besides, Turkish Banking Regulation and Supervision Association's (BRSA) recent data show that the share of state-owned *banks in the total banking sector assets are around 36% and the share of state-owned banks in the total banking sector credits is around 37% at the end of 2021.*[12]

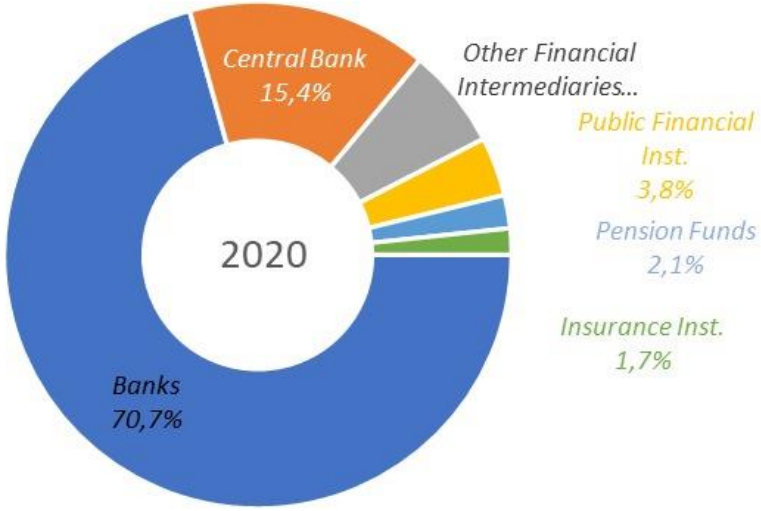

Figure 4.1. Distribution of Financial Market Assets
Source: Financial Stability Board (FSB)

The share of state-owned banks in assets and credits were around 30% and 32% in 2017, which means these figures are on a rising trend. In this period, state-owned banks were particularly more active in extending credit to small and medium sized enterprises (SMEs) and their share in SME credits has risen sharply, from 31% to 50%. Since the beginning of 2017, state-owned banks have increased the number of their SME customers by twofold, whereas the number of SME customers of other banks has stayed almost the same.

The IMF Financial Soundness Indicators database indicates that the ratio of banking sector assets to GDP is around 125% in Türkiye for the third quarter of 2021, which is also higher than many other emerging market countries. Non-bank financial system is still in its development stage.

[11] https://data.fsb.org/dashboard/Time%20Series%20View

[12] https://www.bddk.org.tr/bultenaylik/en

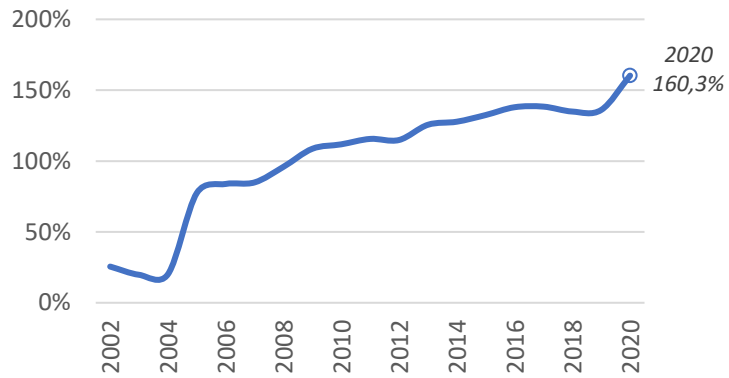

Figure 4.2. Financial Assets/GDP (%)
Source: Financial Stability Board (FSB)

According to the data of Capital Markets Board, stock market capitalization/GDP ratio is less than 20% in 2021 in Türkiye, which is among the lowest, when compared to advanced countries and major emerging markets.

4.1.2. Credit Policies in Türkiye in Recent Years

In recent years, mainly in the last five years, financial policies in Türkiye were designed to support economic growth mainly through credit extension, led by the state-owned banks. Credit usage was encouraged through accommodative monetary and macroprudential policies, public incentives, and the Credit Guarantee Fund's (CGF) Treasury-backed collateral support. The supportive macro-financial environment has led to increases in both household and corporate loans. The CGF scheme was extensively used by SMEs, which cannot easily provide collateral in other circumstances.

Accordingly, despite Covid-19, Türkiye was among the few countries to experience positive economic growth in 2020; which is mainly attributed to administrative and regulatory credit incentives and extensive liquidity support (IMF, 2021). Continuing credit support policies primarily directed towards non-financial corporations also contributed to the double-digit economic growth in 2021. Given this background, in this study, we ask whether the impact of private sector credit on economic activity changes, while credit grows faster or slower in Türkiye. In particular, we would like

to see whether the contribution disappears or reverses, beyond, below, or between certain threshold levels of the changes in credit-to-GDP ratio.

4.2. Theoretical Underpinnings, Data and Methodology

The long-run relationship between credit and economic activity is theoretically based on endogenous growth models augmented with a financial sector, as in King and Levine (1993). In these models, financial sector increases productivity in the economy by facilitating the pool of savings to fund productive investment projects, assessing and supervising the investment and production processes, and spreading and mitigating risks tied to innovative initiatives. Levine (2005) offers a comprehensive review of the theoretical literature detailing how the financial sector's services can play a role in fostering economic growth. Based on these theoretical foundations, empirical literature generally find that financial systems play an important role in fostering productivity growth and promoting economic development. Levine (2021) structures a review by encompassing diverse research methodologies, which encompass cross-country growth regressions, time-series analyses, panel techniques, in-depth country-specific studies, as well as investigations at the industry and firm levels, all of which explore the mechanisms connecting finance and growth.

The empirical literature mostly considers the long-term finance-growth relationship in order to understand the permanent interactions by excluding the business cycles caused by temporary shocks. In the recent literature that try to detect possible non-monotonic relationships, panel data models are preferred, which are mostly estimated with comprehensive country datasets.[13] Panel data models with a large country dataset typically average the data over five-year to ten-year periods to assess the interaction between financial development and long-run growth. On the other hand, nonlinearities have been mostly neglected when studying the finance-growth nexus with time series methods. In contrast, in this study, we prefer to focus on a single

[13] Nevertheless, Samargandi, Fidrmuc and Ghosh (2015) show that using a large set of countries might result in biased outcome if a group of country dominate the findings. Besides, Arcand, Berkes and Panizza (2015) show that when they use a small sample of countries in their analysis, excluding a single observation (one country) from the sample can alter their findings.

country (Türkiye) and use a model where short-run and long-run linkages are estimated together in the context of a time series model. In other words, instead of abstracting from business-cycle fluctuations by data averaging, we employ a model where short-run interactions are modeled (and hence controlled) together with long-run behavior. To the best of our knowledge, there is no study examining a nonlinear structure in this context for Türkiye. We explore nonlinear empirical evidence on the relationship between financial development and economic activity in Türkiye by estimating a multiple threshold nonlinear ARDL (MT-NARDL) model for the period 2004Q1-2021Q2. Consistent with established practices in the literature concerning the linkages between financial depth and economic growth, our regression models incorporate variables like government expenditures, inflation, and trade openness as control variables (for example, see Arcand, Berkes and Panizza, 2015). Due to the limited credit volume in Türkiye before 2004, the starting date for our analysis is determined as the first quarter of 2004. We explain the data and model details in the next few pages.

4.2.1. Data

As reported earlier, Turkish financial system is primarily bank-based. In fact, policymakers in Türkiye often use the amount of bank credit as an important interim target when they want to support or cool down the economic activity. Such policy implications are highly practiced especially recent years through accommodative monetary and macroprudential policies, public incentives, and the CGF Treasury-backed collateral support. Hence, in this study, credit to the private sector extended by banks over GDP is taken as a proxy for financial deepening.[14]

As it is common in the literature, real GDP is regarded as the economic activity indicator. Seasonally and calendar adjusted quarterly real GDP data with the base year 2009 is obtained from Turkish Statistical Institute (TURKSTAT). CG represents

[14] Although using equity market turnover as a proxy of liquidity of the system also seems plausible, as French and Roll (1986) states, more volume can also be a result of increased equity market volatility. High volume might be an indicator of a highly speculative market and sometimes show that the investors prefer short-term gain rather than holding a long-term portfolio. Besides, as stated above, stock market capitalization/GDP ratio is less than 20% in 2021 in Türkiye, which is among the lowest, when compared to advanced countries and major emerging markets..

the Credit over GDP ratio. İt is calculated as dividing total credit stock by the sum of previous four quarters nominal GDP. Monthly data of total credits are converted into quarterly data by taking the average of three months obtained from BRSA. In line with the existing literature, we use real government expenditure, inflation rate, and trade openness as the other determinants of GDP. These data are also obtained from TURKSTAT. LGC is log of the seasonally and calendar adjusted real government expenditures index with the base year 2009. INF represents inflation variable calculated by the percentage change of CPI with the base year 2003, and OPEN indicates trade openness variable calculated by sum of exports and imports of the goods and services divided by nominal GDP.

We include two additional variables which we consider quite important for the Turkish economy and the financial system since Turkish economy is largely dependent on international trade and capital flows. These two variables are the real effective exchange rate and a global liquidity indicator. LREER is natural logarithm of real effective exchange rate data based on Consumer Price Index (CPI), and it is obtained from Central Bank of the Republic of Türkiye (CBRT). Finally, INT indicates global interest rate index. A decline of this indicator is associated with an increase in global liquidity. It is calculated as such: First, quarterly averages of daily US Treasury Benchmark 10 years bond yield and daily Germany Benchmark 10 years bond yield are obtained. Then, simple average of these two series is taken to obtained quarterly data. The corresponding data is obtained from Reuters. These variables can also capture the times of global and domestic stress in financial markets. The reason why we use the average of ten-year government bond yields of the USA and Germany as a proxy for global liquidity is that long-term bond yield gives high-speed responses to global monetary policy adjustment and news. When interpreting the estimation results later, we treat LREER and INT variables as control variables, since we would like to focus on the credit-GDP relationship. Contrary to the literature, we cannot include a human capital indicator since our model is quarterly and the related data can only be found in annual frequency. Besides, we do not expect to see much short-run effects of changes in human capital. Table 4.1 summarizes the data used, its calculation and the sources of the data in detail.

Table 4.1. Data Description and Sources

Data	Description and Sources
LGDP	Log of seasonally and calendar adjusted real GDP with the base year 2009. Quarterly series obtained from TURKSTAT.
CG	Total credit stock, divided by the sum of previous four quarters nominal GDP. Monthly data of total credits are converted into quarterly data by taking the average of three months obtained from BRSA.
INF	CPI inflation. It is calculated by the percentage change of CPI with the base year 2003. Quarterly series is obtained from TURKSTAT.
INT	Global interest rate index, a decline of which is associated with an increase in global liquidity. First, quarterly averages of daily US Treasury Benchmark 10 years bond yield and daily Germany Benchmark 10 years bond yield are obtained. Then, simple average of these two series is taken. Source: Reuters.
LREER	Log of Real Effective Exchange Rate based on CPI. Source:CBRT.
OPEN	Trade openness is calculated as exports plus imports divided by GDP. Source: TURKSTAT.
LGC	Log of seasonally and calendar adjusted real Government Expenditures index with the base year 2009. Quarterly series obtained from TURKSTAT.

Table 4.2. Descriptive Statistics

Variable	# of Obs	Mean	Std	Min	Max
LGDP	70	4.86	0.25	4.42	5.27
CG	70	0.48	0.17	0.14	0.73
LGC	70	4.73	0.26	4.25	5.13
INF	70	9.27	3.03	4.25	20.19
OPEN	70	11.40	1.57	8.87	16.88
INT	70	2.29	1.35	0.07	4.59
LREER	70	4.59	0.19	4.09	4.85

Monthly credit stock obtained from BRSA is converted into quarterly frequency by averaging the last three months. Data on real GDP, real government expenditure, openness, and inflation are gathered from Turkish Statistical Institute (TURKSTAT), and the data for the real effective exchange rate is obtained from the CBRT. Finally, 10-year government bond yields are obtained from Reuters. The descriptive statistics of the variables are reported in Table 4.2. Accordingly, the Credit/GDP (CG) ratio raises to 73.4% in the third quarter of 2020 while it was only 14.0% in the first quarter of 2004. This indicates that there is a rapid increase in credit volume in recent two decades.

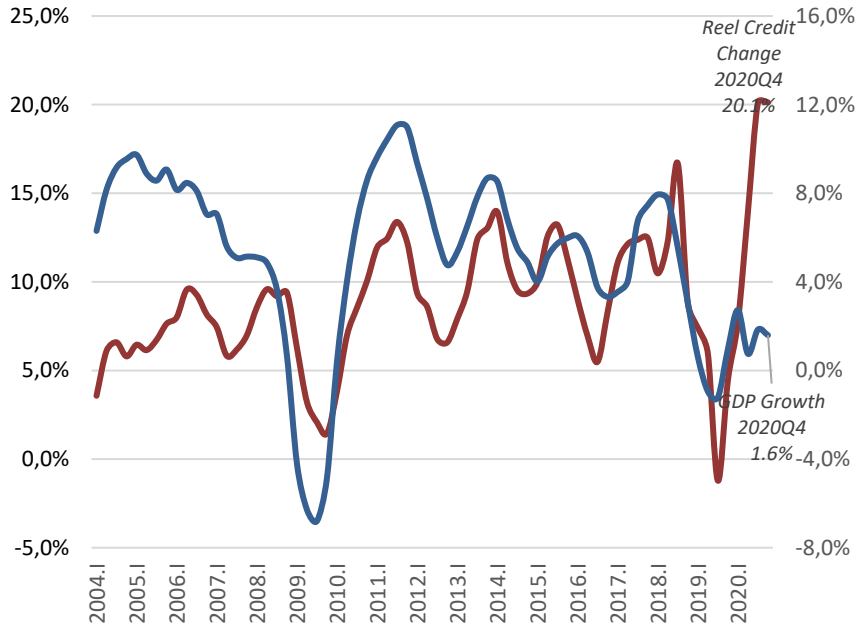

Figure 4.3. GDP Growth and Reel Credit Change (Annual, %)
Source: BRSA, TURKSTAT

Figure 4.3 illustrates the relationship between credit changes and economic activity in Türkiye. It is observed that the relationship between them has increased after the global financial crisis in 2008. In the Covid-19 period, it is observed that the historically strong increase in credits has remained well above the growth of economic activity. In Türkiye, the support of credit incentives in the Covid-19 period to the growth of the economy has been quite strong, and despite the negative major shock effect encountered, GDP has been able to grow by decoupling from the global contraction. While many G-20 countries entered a deeper recession than the global crisis in 2020, Türkiye has exhibited a positive growth performance with the support of the implemented policies and has clearly decoupled positively.

4.2.2. Methodology: MT-NARDL Model

MT-NARDL model used in this study is developed by Verheyen (2013), Fedoseeva (2013), and Pal and Mitra (2015, 2016) to include multiple known thresholds, which is the extended versions of the nonlinear ARDL model of Shin, Yu and Greenwood-Nimmo (2014) with a single known threshold.[15] In order to investigate the asymmetric interaction between finance and economic activity, we first consider the standard ARDL model proposed by Pesaran, Shin and Smith (2001) for our financial deepening model such as:

$$\begin{aligned}\Delta LGDP_t = {} & \alpha_0 + \alpha_1 LGDP_{t-1} + \alpha_2 CG_{t-1} + \alpha_3 INF_{t-1} + \alpha_4 LREER_{t-1} + \alpha_5 OPEN_{t-1} \\ & + \alpha_6 LGC_{t-1} + \alpha_7 INT_{t-1} \\ & + \sum_{i=1}^{p} \theta_{1i} \Delta LGDP_{t-i} \\ & + \sum_{i=0}^{p} \theta_{2i} \Delta CG_{t-i} + \sum_{i=0}^{p} \theta_{3i} \Delta INF_{t-i} + \sum_{i=0}^{p} \theta_{4i} \Delta LREER_{t-i} + \sum_{i=0}^{p} \theta_{5i} \Delta OPEN_{t-i} \\ & + \sum_{i=0}^{p} \theta_{6i} \Delta LGC_{t-i} + \sum_{i=0}^{p} \theta_{7i} \Delta INT_{t-i} + \varepsilon_t \end{aligned} \tag{4.1}$$

[15] See also Cho, Greenwood-Nimmo and Shin (2021) for details and possible new extensions of the methodology.

where GDP is the real gross domestic product, CG is the credit to the private sector extended by banks divided by nominal GDP, INF is the inflation rate, REER is the real effective exchange rate, OPEN is the sum of the export and import volumes divided by nominal GDP, GC is the real government expenditure and INT is the global interest rate index, ε_t is the *iid* disturbance term with zero mean and constant variance σ_ε^2, Δ is the first difference operator, and L indicates natural logarithm. The cointegration relationship is tested by using the bounds test approach of Pesaran, Shin and Smith (2001) with the null hypothesis $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = 0$.

The coefficients α_j $(j = \{1, \dots, 7\})$ of the linear ARDL model (4.1) represent symmetric long-run effects while θ_{ji} $(j = \{1, \dots, 7\})$ represent symmetric short-run effects, that is, they ignore possible existence of a nonlinear relationship. In this context, Shin, Yu and Greenwood-Nimmo (2014) propose an asymmetric (single threshold) ARDL model to capture the asymmetries in the short and long-run behavior. In doing this, they split the threshold variable into a positive partial sum and a negative partial sum by taking zero as a threshold value.

$$CG_t = CG_t^+ + CG_t^- \tag{4.2}$$

where CG_t^+ and CG_t^- are the long-run positive partial sum and the negative partial sum, respectively. We can show (4.2) also as follows;

$$\begin{aligned} CG_t^+ &= \sum_{i=1}^{t} \Delta CG_i^+ = \sum_{i=1}^{t} \max\left(\Delta CG_i, 0\right) \\ CG_t^- &= \sum_{i=1}^{t} \Delta CG_i^- = \sum_{i=1}^{t} \min\left(\Delta CG_i, 0\right) \end{aligned} \tag{4.3}$$

Using the representation in (4.3), our NARDL model becomes

$$\begin{aligned} \Delta LGDP_t = {} & \beta_0 + \beta_1 LGDP_{t-1} + \beta_2 CG_{t-1}^+ + \beta_3 CG_{t-1}^- + \beta_4 INF_{t-1} + \beta_6 OPEN_{t-1} \\ & + \beta_7 LGC_{t-1} + \beta_8 INT_{t-1} + \end{aligned}$$

$$\sum_{i=1}^{p} \lambda_{1i} \Delta LGDP_{t-i} + \sum_{i=0}^{p} \lambda_{2i} \Delta CG_{t-i}^{+} + \sum_{i=0}^{p} \lambda_{3i} \Delta CG_{t-i}^{-} + \sum_{i=0}^{p} \lambda_{5i} \Delta LREER_{t-i} + \sum_{i=0}^{p} \lambda_{6i} \Delta OPEN_{t-i} + \sum_{i=0}^{p} \lambda_{7i} \Delta LGC_{t-i} \sum_{i=0}^{p} \lambda_{8i} \Delta INT_{t-i} + \varepsilon_t \quad (4.4)$$

Model (4.4) allows us to see both short and long-run asymmetry in the relationship between financial deepening and GDP so that the response of negative or positive change of the credit on GDP will be different. Since model (4.4) is linear in all the parameters, it can be estimated by OLS.

We can test the existence of cointegration among long-run variables in (4.4) by bound testing approach with the null hypothesis $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$. The critical values are taken from Pesaran, Shin and Smith (2001) since under the null hypothesis the model is non-standard. Long-run and short-run asymmetry can be tested by using the standard Wald tests with the null of $\beta_2 = \beta_3$ and $\lambda_{21} = \lambda_{31}, \dots, \lambda_{2p} = \lambda_{3p}$ respectively. This model enables us to see the effect of negative or positive credit change on the credit-GDP relationship. However, beyond this, we would like to allow for more thresholds to see whether there are nonlinearities caused by different magnitudes of credit growth. Hence, based on Verheyen (2013), Fedoseeva (2013) and Pal and Mitra (2015, 2016) we use the MT-NARDL model to capture the effect of small to large credit changes on GDP. Based on this, we divide the credit to GDP ratio into three partial sum series as given below:

$$CG_t = CG_0 + CG_t(q1) + CG_t(q2) + CG_t(q3)$$

$$CG_t(q1) = \sum_{i=1}^{t} \Delta CG_i(q1) = \sum_{i=1}^{t} \Delta CG_i I\{\Delta CG_i \leq \tau_1\}$$

$$CG_t(q2) = \sum_{i=1}^{t} \Delta CG_i(q2) = \sum_{i=1}^{t} \Delta CG_i I\{\tau_1 < \Delta CG_i \leq \tau_2\}$$

$$CG_t(q3) = \sum_{i=1}^{t} \Delta CG_i(q3) = \sum_{i=1}^{t} \Delta CG_i I\{\Delta CG_i > \tau_2\}$$

MT-NARDL model that divide CG series into three quantiles can be specified as follows:

$$\Delta LGDP_t = \gamma_0 + \gamma_1 LGDP_{t-1} + \sum_{j=1}^{3} \gamma_{2j} CG_{t-1}(q_j) + \gamma_3 INF_{t-1} + \gamma_4 LREER_{t-1} + \gamma_5 OPEN_{t-1} + \gamma_6 LGC_{t-1} + \gamma_7 INT_{t-1} + \sum_{i=1}^{p} \delta_{1i} \Delta LGDP_{t-i} + \sum_{j=1}^{3} \sum_{i=1}^{p} \delta_{2j,i} \Delta CG(q_j)_{t-i} + \sum_{i=1}^{p} \delta_{3i} \Delta INF_{t-i} + \sum_{i=1}^{p} \delta_{4i} \Delta LREER_{t-i} + \sum_{i=1}^{p} \delta_{5i} \Delta OPEN_{t-i} + \sum_{i=1}^{p} \delta_{6i} \Delta LGC_{t-i} + \sum_{i=1}^{p} \delta_{7i} \Delta INT_{t-i} + \varepsilon_T \quad (4.5)$$

where $\mu_1 = -\gamma_{21}/\gamma_1$, $\mu_2 = -\gamma_{22}/\gamma_1$, $\mu_3 = -\gamma_{23}/\gamma_1$ are the long-run parameters of the credit-to-GDP ratio. Again, based on Pesaran, Shin and Smith (2001) we test the null of $\gamma_1 = \gamma_{21} = \gamma_{22} = \gamma_{23} = \gamma_3 = \gamma_4 = \gamma_5 = \gamma_6 = \gamma_7 = 0$ for the long-run relation. If the proposed F-test exceeds the upper bound of critical value of no cointegration, the long-run relation exists. We then test the null of $\gamma_{21} = \gamma_{22} = \gamma_{23}$ for the nonlinearity in the long-run and $\delta_{21,1} = \delta_{22,1} = \delta_{23,1}, \dots, \delta_{21,p} = \delta_{22,p} = \delta_{23,p}$ for the nonlinearity in the short-run respectively. The rejection of the null hypotheses at the appropriate significance level means that the magnitude of the credit will result in different effects on GDP either in the long-run or short-run.

As Pal and Mitra (2016) and others point out, MT-NARDL methodology has various advantages. First, while the standard ARDL model assumes a linear relation between the variables, MT-NARDL model allows shifts in the relationship according to the changes in a variable. Second, this methodology allows us to use both *I(0)* and *I(1)* variables using the bounds test of Pesaran, Shin and Smith (2001). That is, model variables can be stationary in level or first difference form. This is in contrast to the Johansen and Engle-Granger approaches, which require all variables to be *I(1)*. The model, however, does not allow to use of any *I(2)* variables. Therefore, as an initial step, we apply unit root tests, in order to ensure that none of the variables are *I(2)*. Third, due to the fully dynamic structure of the model in Eq. (4.5), this methodology eliminates the endogeneity and serial correlation problems. Finally, Shin, Yu and Greenwood-Nimmo (2014) indicates that this methodology has good size and power

even in small samples. However, unfortunately, this model does not allow to estimate the number and the levels of the thresholds endogenously with the other model parameters.

4.3. Empirical Results

Our empirical analysis starts with the application of the conventional unit root tests; Augmented Dickey-Fuller test (ADF) proposed by Dickey and Fuller (1979), Phillips-Perron test (PP) proposed by Phillips and Perron (1988), and Kwiatkowski-Phillips-Schmidt-Shin test (KPSS) proposed by Kwiatkowski et al. (1992) in order to determine the order of integration of each variable. The results of the unit root tests both in levels and first differences, together with the corresponding critical values, are reported in Table 4.3. According to the reported results for the ADF and PP tests, we fail to reject the null hypothesis of a unit root for all the variables in level forms, but reject the null hypothesis in the first difference forms at 1% significance level, indicating that all variables are stationary in first difference forms. We obtain the same result by applying the KPSS unit root test procedure. That is, the null hypothesis of stationarity is rejected for all variables in levels, but not rejected in first differences. Hence, by applying three conventional unit root tests, we conclude that the variables are *I(1)*, and none of the variables are *I(2)*. We are able to apply ARDL, NARDL, and MT-NARDL models.

Table 4.3. Standard Unit Root Tests in Levels and First Differences

	Levels				*First Differences*			
Variable	*# Lags*	*ADF*	*PP*	*KPSS*	*# Lags*	*ADF*	*PP*	*KPSS*
LGDP	0	-0.72	-0.69	1.10***	0	-10.38***	-10.38***	0.05
CG	1	-2.09	-2.74	1.08***	0	-6.02***	-5.63***	0.50
LGC	2	-1.19	-0.85	1.10***	1	-9.23***	-26.88***	0.26
INF	1	-2.69	-2.11	0.60**	3	-7.27***	-6.26***	0.16
OPEN	0	-2.39	-2.11	0.83***	0	-11.23***	-13.57***	0.27
INT	2	-0.70	-0.82	1.04***	1	-7.21***	-6.73***	0.06
LREER	0	-0.23	-0.07	0.26***	0	-9.57***	-10.28***	0.04
Critical Values								
%1		-3.53	-3.53	0.74		-3.53	-3.53	0.74
%5		-2.91	-2.91	0.46		-2.91	-2.91	0.46

Notes: The lag order for ADF unit root tests are chosen using the SIC with a maximum autoregressive order of 4. ***, **, and * denote rejection of the null hypothesis at 1%, 5%, and 10% significance levels, respectively. PP and KPSS tests are based on the Newey West automatic Bandwith using Bartlett Kernel.

Existing studies generally focus on the long-run relationship among financial development and GDP growth, and often ignore the short run dynamics. One aim in doing this is to eliminate the effect of temporary shocks on financial cycles and analyze the permanent linkages. This is one of the reasons why the related literature mostly prefers to analyze finance-growth nexus in panel data framework. Contrary to the existing literature we aim to carry out the analysis in time series framework, since focusing on a specific country provides us to see country-specific dynamics and mechanisms.

After finding the integration order of the variables, next step is to estimate the linear ARDL model in order to test linearity in the relationship between our financial development proxy and GDP both in the short and long-run. The first column of Table 4.4 demonstrates ARDL model results. By testing the existence of cointegration among variables we use the bounds test approach of Pesaran et al. (2001). Accordingly, the bounds test result for ARDL model indicates that we fail to reject no cointegration hypothesis implying that there is no long-run relationship between credit and GDP in the linear setup. Assuming a linear relation, however, is too restrictive, i.e., ignoring possible nonlinearity may cause misleading and seriously biased results if the underlying finance-growth relationship follows a nonlinear path. Hence, we apply nonlinear ARDL and MT-NARDL models in order to capture possible nonlinear dynamics between credit and GDP. In this context, we report the results of the NARDL model and MT-NARDL models in the second, third and fourth columns of Table 4.4 respectively.

According to the bounds test results for NARDL model we reject the no cointegration null hypothesis at 1% significance level indicating that we observe a strong long-run relation between credits and GDP in a setup with one threshold. Next, testing long-run asymmetry with Wald test, we fail to reject the symmetric long-run relationship hypothesis as reported in the second column of Table 4.4. In fact, the long-run coefficients for the negative and positive credit changes are quite close and statistically indifferent. The reason behind this might be that NARDL model with just one threshold might not be enough to adequately capture the nonlinearities. As we mentioned above, the main factor behind the nonlinearity,

might be the magnitude of the change of credit, which however is not included in the NARDL model. Hence, in the next step we apply MT-NARDL model proposed by Verheyen (2013) and Pal and Mitra (2015, 2016), where the long-run interaction between credit and GDP depends on the magnitude of the change in credit.

Table 4.4. ARDL, NARDL, and Multiple Threshold NARDL Models Results (LHS variable is ΔLGDP, credit measure CG is credit to GDP)

	ARDL	***NARDL (One Threshold)***	***Two Threshold NARDL***	***Three Threshold NARDL***
			Quantile:	*Quantile:*
Long-run Coefficients			*30/70*	*25/50/75*
Constant	0.86*	2.73***	4.34***	2.51***
LGDP(-1)	0.08	0.24***	0.38***	0.18***
CG(-1)	**0.14**			
CG_N(-1)		**0.62*** **		
CG_P(-1)		**0.47*** **		
CG_Q1(-1)			**0.21**	**-0.15**
CG_Q2(-1)			**1.65*** **	**1.13*** **
CG_Q3(-1)			**-0.01**	**0.72*** **
CG_Q4(-1)				**-0.07**
INF(-1)	-0.001	-0.002	-0.003*	0.001
OPEN(-1)	0.002	0.01**	0.02**	-0.003
LGC(-1)	-0.08	-0.22***	-0.39***	-0.30***
INT(-1)	-0.01	-0.01*	-0.02***	-0.02***
LREER(-1)	-0.04	-0.16**	-0.22***	-0.07
Short-run Coefficients				
ΔLGDP(-1)	-0.33***	-0.35***	-0.45***	-0.49 ***
ΔLGDP(-2)				
ΔLGDP(-3)		-0.19**		-0.17 *
ΔLGDP(-4)			0.23**	
ΔCG	-0.41**		-0.36**	-0.46 ***
ΔCG(-1)	0.47**		0.41**	0.61 ***
ΔCG(-2)		-0.42**		
ΔCG(-3)				
ΔCG(-4)				
ΔINF			-0.004**	
ΔINF(-1)	-0.01**	-0.01***	-0.006***	-0.01 ***
ΔINF(-2)				
ΔINF(-3)				
ΔINF(-4)				
ΔOPEN	0.02***	0.02***	0.02***	0.02 ***

Table 4.4. (continued)

ΔOPEN(-1)	0.01**	0.01***	0.01**	0.02***
ΔOPEN(-2)				0.05*
ΔOPEN(-3)				0.05*
ΔOPEN(-4)			-0.006**	
ΔLGC				
ΔLGC(-1)			0.17**	0.12*
ΔLGC(-2)				
ΔLGC(-3)				
ΔLGC(-4)				
ΔINT			0.01*	
ΔINT(-1)		0.04***	0.05***	0.05***
ΔINT(-2)			0.04***	0.02*
ΔINT(-3)		0.05***	0.03***	0.03***
ΔINT(-4)			0.03***	0.02**
ΔLREER				
ΔLREER(-1)	0.31***	0.41***	0.43***	0.35***
ΔLREER(-2)		0.15**	0.23***	0.11**
ΔLREER(-3)		0.11**	0.07*	
ΔLREER(-4)		0.13***		
Diagnostics				
$AdjR^2$	0.55	0.75	0.81	0.77
Bounds Test	1.30	7.54***	6.00***	4.68***
LR Asymmetry		0.99	9.49***	3.69***
Serial Correlation	0.97	0.24	0.70	0.64

Notes: Bounds test refers to the test for cointegration proposed by Pesaran et al. (2001) and LR asymmetry indicates Wald test for long run asymmetry. Serial correlation shows the p-value of the correlation of the residuals by LR test.***, **, and * denote the significance level at 1%, 5% and 10% respectively.

4.3.1. Main Results

Third column of Table 4.4 presents the three quantiles (or two thresholds) model where the quantiles are 30% and 70% so that in each quantile there are enough observations.[16,17] According to the bounds test and LR asymmetry Wald test, we

[16] For the estimation results in the fourth column in Table 3, the coefficient of CG_Q1(-1) is the coefficient of credit-to-GDP in the long-run cointegrated relationship, where the change in credit-to-GDP is at the bottom 30% (extremely low credit growth). The coefficient of CG_Q3(-1) is the coefficient of credit-to-GDP in the long-run cointegrated relationship, where the change in credit-to-GDP is at the top 30% (extremely high credit growth). The coefficient of CG_Q2(-1) is the coefficient of credit-to-GDP in the long-run cointegrated relationship, where the change in credit-to-GDP is in the medium quantile (reasonable credit growth). For the fifth column, extreme cases are CG_Q1(-1) and CG_Q4(-1), where CG_Q2(-1) and CG_Q3(-1) are the medium cases.

[17] Given the relatively low credit volume in Türkiye prior to 2004 and the potential for biased results when including this data, we have opted to initiate our analysis from the first quarter of 2004.

reject the null hypothesis of both no cointegration and long-run symmetry at 1% significance level. That is, nonlinearity in the long-run relationship between credit and GDP is found to be quite strong. According to the long-run coefficients of the credit quantiles, the middle quantile's coefficient is positive and statistically significant at 1% significance level while the coefficients of the lowest and highest quantiles are statistically insignificant. This finding proposes that regardless of the direction, extremely low and high changes in credit lead to insignificant interaction between credit and GDP. On the other hand, during times of relatively moderate changes in credit, we detect highly significant relationship between credit and GDP.

For the short-run parameters, we prefer a parsimonious specification, with the maximum lag-length of 4, and the existence of possible autocorrelation is tested in each step. The autocorrelation test results together with other diagnostics results are represented for each model in Table 4.4. In the short-run, we observe that the immediate effect of credits on GDP is negative but it quickly turns to positive one period later.[18] In fact, we do not attempt to interpret the short-run parameters, the parameters of the control variables in particular, since our focus is on the long-run credit-GDP interaction. In the long-run, trade openness affects GDP positively while inflation, government expenditure, global interest rate, and real effective exchange rate have negative impacts on GDP.

In an alternative estimation, we obtain quite similar results for the four quantiles (three thresholds) case, presented in the last column of Table 4.4. That is, the credit-GDP relationship is statistically insignificant for the lowest (below 25%) and the highest (above 75%) quantiles, while for the second (25-50%) and the third (50-

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Consequently, our dataset contains a relatively limited number of observations (70 observations in total). To mitigate the risk of data snooping, we determine the optimal lag lengths using both the ARDL bounds testing approach outlined by Pesaran et al. (2001) and the Schwarz information criterion. We consider a maximum lag length of four, considering that our data is quarterly. Subsequently, in pursuit of brevity, we exclude variables that are statistically insignificant in the short-term regression models. As a result, for the two-threshold NARDL model, we estimate a total of 28 parameters in the baseline estimation.

[18] We also include thresholds/quantiles in the short-run and our results are robust to including asymmetry in the short-run coefficients; but we fail to reject the symmetricity in these. For brevity, the results are not presented here, but available upon request.

75%) quantiles we observe that coefficient of the credit is positively and statistically significant at the 1% significant level.

4.3.2. Additional Estimations for Robustness Checks

4.3.2.1. Alternative Credit Metric

The credit-to-GDP ratio is a frequently used metric in academic literature. Given that nominal credit tends to display higher volatility than nominal GDP, the fluctuations in the credit-to-GDP ratio are primarily driven by changes in the numerator. As a substitute for this measure, we calculate the natural logarithm of real loans and replicate the analysis in Table 4.5 using this alternative metric.[19] As shown in Table 4.5, our results maintain a high degree of consistency when using this alternative measure, particularly for the two-threshold scenario. In the case of the three-threshold model, it's worth noting that the parameter for the third quantile becomes statistically insignificant, whereas the parameter for the second quantile retains its strong significance at 1% level. Consequently, our primary finding remains unaltered: maintaining moderate credit growth remains crucial for preserving the significant and positive relationship between financial activity and economic performance.

Table 4.5. ARDL, NARDL, and Multiple Threshold NARDL Models Results with the Alternative Credit Metric (LHS variable is ΔLGDP, credit measure L(RealCredit) is the logarithm of real credit to the private sector)

	ARDL	***NARDL (One Threshold)***	***Two Threshold NARDL***	***Three Threshold NARDL***
Long-run Coefficients			*Quantile: 30/70*	*Quantile: 25/50/75*
Constant	0.91**	2.09***	1.87***	1.70
LGDP(-1)	0.10	0.18**	0.29***	0.40**
L(RealCredit)(-1)	**0.12****			

[19] When calculating real loans, our approach involved two initial steps: firstly, dividing Turkish lira loans by the Turkish Consumer Price Index (CPI), and secondly, dividing foreign exchange loans (expressed in USD terms) by U.S. inflation. Subsequently, we combined these two results, considering the weights as of the initial date.

Table 4.5. (continued)

L(RealCredit)_N(-1)		**0.26**		
L(RealCredit)_P(-1)		**0.12****		
L(RealCredit)_Q1(-1)			**0.21**	**-0.70**
L(RealCredit)_Q2(-1)			**1.69*****	**3.26*****
L(RealCredit)_Q3(-1)			**-0.01**	**0.40**
L(RealCredit)_Q4(-1)				**0.17**
INF(-1)	-0.001	0.002	-0.004*	-0.009
OPEN(-1)	-0.003	-0.002	0.009**	0.04***
LGC(-1)	-0.01	-0.14*	-0.12*	-0.44***
INT(-1)	-0.001	-0.03***	-0.008	0.02
LREER(-1)	-0.11*	-0.12*	-0.02	0.34**
Short-run Coefficients				
ΔLGDP(-1)	-0.32***	-0.47***	-0.41***	-0.39**
ΔLGDP(-2)				
ΔLGDP(-3)				0.39**
ΔLGDP(-4)				
Δ L(RealCredit)				
Δ L(RealCredit) (-1)	0.39**			
Δ L(RealCredit) (-2)				
Δ L(RealCredit) (-3)				
Δ L(RealCredit) (-4)				
ΔINF				
ΔINF(-1)		-0.006***	-0.006***	
ΔINF(-2)				
ΔINF(-3)				
ΔINF(-4)				
ΔOPEN	0.02***	0.02***	0.02***	0.03***
ΔOPEN(-1)	0.01**	0.02***		
ΔOPEN(-2)				-0.02**
ΔOPEN(-3)				-0.01*
ΔOPEN(-4)				-0.01**
ΔLGC				
ΔLGC(-1)				0.29*
ΔLGC(-2)				
ΔLGC(-3)				
ΔLGC(-4)				
ΔINT				0.03*
ΔINT(-1)		0.03***		
ΔINT(-2)				0.03*
ΔINT(-3)		0.05***	0.03***	0.05***
ΔINT(-4)				0.006**
ΔLREER				0.19***
ΔLREER(-1)	0.22***	0.30***	0.22***	
ΔLREER(-2)				

Table 4.5. (continued)

ΔLREER(-3)				
ΔLREER(-4)				
Diagnostics				
Adj. R^2	*0.49*	*0.61*	*0.62*	*0.77*
Bounds Test	*1.9*	*3.88****	*3.55* ***	*4.68****
LR Asymmetry		*0.80*	*5.65* ***	*3.69****
Serial Correlation	*0.99*	*0.75*	*0.88*	*0.64*

Notes: Bounds test refers to the test for cointegration proposed by Pesaran et al. (2001) and LR asymmetry indicates Wald test for long run asymmetry. Serial correlation shows the p-value of the correlation of the residuals by LR test. ***, **, and * denote the significance level at 1%, 5% and 10% respectively.

4.3.2.2. Alternative Quantiles/Threshold Values

We explore alternative combinations of quantiles/thresholds. Table 4.6 summarizes the coefficients of alternative quantiles (or alternative threshold values) of credits for three quantiles case together with diagnostic results so that we are able to see whether the credit-GDP interaction differs if we modify the lower and upper quantiles. Accordingly, we observe that regardless of the choice of the quantiles, the middle quantile is positive and statistically significant while the remaining quantiles are statistically insignificant. Additionally, when widening the middle quantile (meaning that increasing the range of the gradual credit change part) we observe that its coefficient is still statistically significant but decreasing. That is, the supporting effect of credit on GDP is weakening when the size of the change of credit increases in the middle quantile. The last raw of each panel in Table 4.5 also indicates that long-run nonlinearities disappear when we narrow the size of the lower and upper quantiles such that the number of observations for those quantiles are not enough to detect strong results.

Similarly, we summarize the coefficients of the credit for various cases of small and large credit changes for four quantiles together with diagnostics results in Table 6. Again, the results are quite similar to that of Table 5. That is, regardless of the choice of quantiles, the coefficients of the credits in middle regimes generally are positive, larger and statistically more significant. On the other hand, long-run nonlinearities disappear when we narrow the size of the lower and upper quantiles too much, due to the same reason as we aforementioned.

Table 4.6. Summary of the Alternative Three Quantile (Two Threshold) NARDL Models

		Credit to GDP coefficients			Diagnostics			
Quantile	Threshold Values (ΔCG)	CG_Q1(-1)	CG_Q2(-1)	CG_Q3(-1)	$Adj.R^2$	Bound Test	LR Asym.	Serial Corr.
20/65	-0.13/1.40	0.05	1.77***	0.05	0.81	7.18***	9.78***	0.60
20/70	-0.13/1.45	0.18	1.60***	-0.05	0.81	5.84***	11.27***	0.66
20/75	-0.13/1.60	0.10	0.91***	0.06	0.78	5.43***	3.66**	0.25
20/80	-0.13/1.73	0.13	0.34**	0.23	0.75	4.63***	0.31	0.56
25/65	0.14/1.40	-0.03	1.98***	0.08	0.81	7.13***	12.22***	0.96
25/70	0.14/1.45	0.19	1.64***	-0.03	0.81	5.91***	12.43***	0.71
25/75	0.14/1.60	0.09	0.94***	0.06	0.78	4.68***	3.69**	0.27
25/80	0.14/1.73	0.13	0.34**	0.23	0.75	4.64***	0.33	0.56
30/65	0.41/1.40	-0.003	1.94***	0.12	0.81	7.11	12.40***	0.97
30/70	0.41/1.45	0.21	1.65***	-0.01	0.81	6.00***	9.49***	0.70
30/75	0.41/1.60	-0.07	0.66***	0.01	0.77	5.23***	3.33**	0.71
30/80	0.41/1.73	0.12	0.36**	0.23	0.75	4.66***	0.37	0.55
35/65	0.62/1.40	0.13	1.82***	0.07	0.81	7.16***	11.47***	0.80
35/70	0.62/1.45	0.27*	1.70***	-0.01	0.81	6.05***	13.96***	0.67
35/75	0.62/1.60	-0.05	0.67***	0.01	0.76	5.17***	2.62*	0.74
35/80	0.62/1.73	0.14	0.35**	0.23	0.75	4.61***	0.29	0.55

Notes: This table indicates the coefficients of the credit to GDP for the various quantile and threshold values. ***, **, and * denote the significance level at 1%, 5%, and 10% respectively.

Table 4.7. Summary of the Alternative Four Quantile (Three Threshold) NARDL Models

		Credit to GDP coefficients				Diagnostics			
Quantile	Threshold Values (ΔCG)	CG_Q1(-1)	CG_Q2(-1)	CG_Q3(-1)	CG_Q4(-1)	$Adj.R^2$	Bound Test	LR Asym.	Serial Corr.
20/50/70	-0.13/0.99/1.45	-0.35 **	2.16 ***	1.51 ***	-0.37 **	0.81	8.10 ***	5.06***	0.91
20/50/75	-0.13/0.99/1.60	-0.14	1.02 ***	0.70 **	-0.07	0.77	4.59 ***	1.78	0.61
20/50/80	-0.13/0.99/1.73	0.75 ***	1.08 **	-0.09	0.29*	0.77	5.88 ***	1.84	0.22
25/50/70	0.14/0.99/1.45	-0.34 **	2.32 ***	1.53 ***	-0.36 **	0.82	8.26 ***	6.17***	0.92
25/50/75	0.14/0.99/1.60	-0.15	1.13 ***	0.72 ***	-0.07	0.77	4.68 ***	3.69***	0.64
25/50/80	0.14/0.99/1.73	0.74 ***	1.11 **	-0.09	0.29 *	0.77	5.90 ***	1.91	0.23

Notes: This table indicates the coefficients of the credit to GDP for the various quantile and threshold values. ***, **, and * denote the significance level at 1%, 5%, and 10% respectively.

4.3.3. How Do Our Results Compare with the Literature?

Our finding of nonlinearities in the finance-growth nexus depending on certain thresholds can be found in several papers. Rioja and Valev (2004), who examine data from 74 countries in three distinct groups find that, in the countries with low levels of financial development, further advancement in financial markets does not have a meaningful effect on GDP growth. For regions with higher levels of financial development, the interaction is significantly positive, similar to the most of the literature summarized above. Shahbaz, Nasir and Lahiani (2020) estimate a three-regime MT-NARDL model for 10 advanced countries. The findings reveal the existence of nonlinear cointegration among variables. Although the form of nonlinearity can differ according to the country, in the upper regime, financial development leads to an adverse effect in Finland. In the lower regime, financial development hampers GDP growth in the US, Malaysia, and Singapore. Countries experience positive interaction between finance and economic activity in the middle regime. Ruiz (2018) estimates a dynamic threshold model with more than 100 countries and finds that countries below a certain threshold of financial development have lower growth rates. For Sub-Saharan countries, Ibrahim and Alagidede (2018) find that financial development is positively and significantly linked to economic activity when financial and real sectors grow above a certain threshold.

4.4. Conclusions, Implications and Further Work

Türkiye is an interesting case study where credit volume has been quite volatile in recent years. In this study, we ask whether the long-run impact of credit on economic activity differs according to the magnitude of the change in credit. Since we focus on a single country, a suitable time series model is selected by which we could examine nonlinearities in the long-term interactions and control the short-term interactions simultaneously. Specifically, we test whether there is a long-run nonlinear relationship between the credit-to-GDP ratio and real GDP in Türkiye, using a multiple threshold nonlinear ARDL (MT-NARDL) model for the period 2004Q1-2021Q2.

Our findings reveal that there are nonlinearities in the long-run credit-GDP relationship, where the significance and the size of this relationship depend on the level of the change in credit. We find that moderate credit growth rather than excessively high or low credit growth is effective in maintaining the significant and positive interaction between finance and economic activity. Our results are robust to selecting alternative number and combination of thresholds.

These findings imply that policymakers should try to prevent large movements in credit to the private sector. For example, it could be more beneficial to spread the public credit supports over time, instead of providing them in bulks. This is in line with a stylized literature, which finds that rapid credit growth is associated with misallocation of resources away from productive sectors and hence lower growth performance in the future (Mendoza and Terrones, 2008; Benigno and Forno, 2014). In fact, since the global financial crisis, a credit boom in an economy is seen as a leading indicator of financial instability. Our results also suggest that extremely low credit growth as well disrupts the credit-GDP relationship, further implying that high volatility in credit growth in either direction should be prevented. While excessive credit growth can be destabilizing, an overly restrictive credit environment can also pose significant challenges to economic growth and stability. While high levels of debt can be problematic, extremely low credit growth may make it difficult for heavily indebted individuals and businesses to refinance or restructure their debts, potentially leading to financial distress. Prolonged periods of very low credit growth can also weaken the financial health of banks, potentially leading to banking sector instability. Balancing credit availability with responsible lending practices is a key consideration for policymakers and financial institutions.

This study focuses on data specific to Türkiye, which may limit the generalizability of the findings to other countries or contexts. As the next step, it would be interesting to carry out a similar analysis for other emerging markets. It is important to note that the relationship between economic growth and credit is complex and can be influenced by various factors, such as financial regulations, monetary policy, and the overall health of the financial sector. We acknowledge that the Turkish case is marked by a distinct macro-financial policy framework recently, and every emerging

market has its own unique characteristics, hence finding compatible results in the next step would be surprising and intriguing. Finally, it could also be informative to extend the case by carrying out the analysis for sub-components of the credit stock, household loans and corporate loans in particular.

CHAPTER 5

CONCLUSION

In this thesis we aim to explore the nonlinear relationship between financialization, income inequality and growth. To this end, we conduct three essays and obtain following concluding notes and suggestions.

Chapter 2 investigates the effect of *de facto* financial globalization proxied with international financial integration on income inequality in advanced and emerging market and developing economies during the 1996-2019 sample period by applying data-driven panel fixed effect threshold procedure proposed by Hansen (1999). Our estimation results illustrate that the relationship between international financial integration and inequality may change with the level of international financial integration. Accordingly, international financial integration tends to promote income inequality in advanced and emerging market and developing economies. However, the inequality-increasing effect of financial integration is less severe in more financially integrated advanced economies. International financial integration appears to lower (increase) inequality in emerging market and developing economies with less (more) financial integration. We also decompose the international financial integration into capital inflows (liabilities) and capital outflows (assets) to investigate the driving mechanism of international financial integration on income inequality. Our empirical results reveal that the effect of financial integration on inequality is driven by the joint effects of both capital inflows and outflows in advanced economies, although it is mainly determined by capital inflows in emerging market and developing economies. Finally, we allow financial development as a data-driven estimated threshold for the effect of international financial integration on inequality. The findings illustrate that financial development does not constitute a data-driven estimated threshold in advanced economies since financial development is already at

a higher level. In emerging market and developing economies, on the other hand, we find empirical evidence supporting a data-driven estimated threshold of financial development. Accordingly, the positive relationship between international financial integration and inequality diminishes in better financially developed periods.

In Chapter 2 we also reveal that the impact of international financial integration on income inequality varies according to development levels of the economies. That is, our findings illustrate that the effects of international financial integration on income inequality in advanced economies are different than those in emerging market and developing economies. This finding is not surprising since the stage and development level of financial integration, and so the relation with income inequality might vary in those country sets. Hence, this reveals the importance of constructing well-established policy instruments by policymakers considering their financial integration level and processes. We also explain the importance of the direction of international financial integrations. Hence, policymakers should regulate the capital flows in order to achieve healthier financial market together with minimizing the adverse effect of it on different income level groups.

For future studies, could be informative to carry out the analysis for the sub-component of financial markets since the market structures of the foreign direct investment and the portfolio investment of AE and EMDE groups, and even the countries within those groups may have different dynamics, and thus the way of impact on inequality might give different results.

In Chapter 3 we examine whether the effect of trade openness on growth may change with the prevailing *de facto* exchange rate regime in 56 emerging market and developing economies (EMDE) during the period of 1996-2019 by employing the panel fixed effect threshold method which provides us to estimate exchange rate regime threshold endogenously. To investigate this important issue, which is ignored by the bulk of the literature, we consider *de facto* exchange rate regime (ERR) classification suggested by Ilzetzki, Reinhart and Rogoff (2019). Our estimation results reveal that *de facto* exchange rate regime (ERR) provides data-driven estimated threshold for the effect of trade on growth. The estimation results suggest

that ERR10 is the endogenously estimated ERR threshold. ERR10 corresponds to *de facto* crawling band that is narrower than or equal to +/-5% in fine classification and managed floating in coarse category. Our estimation results imply that trade openness promotes growth in more rigid ERR prevailing episodes. This is due to more rigid ERRs reduce exchange rate volatility, which enhances trade predictability and investment confidence. In such regimes, lower currency risk and greater macroeconomic stability facilitate long-term trade relationships and productivity gains, aligning with the endogenous growth theory's emphasis on external sector-driven technological diffusion and efficiency improvements. Next, we also divide trade openness as export and import in order to investigate the main driving force of that relation. The estimation results indicate that it is due to the joint effects of both exports and imports. This finding differs from the existing literature since the studies indicate that the driving channel of trade openness comes from export sides. However, as stated by Bourdet (2004) emerging market and developing economies are highly dependent on import of intermediate goods for their production processes. We also find that consistent with the global financial cycle postulation, there is a negative and statistically significant relationship between VIX and real income per capita growth. This may imply that favorable global financial conditions proxied by a decrease in VIX tend to increase economic growth in EMDE. To conclude, our estimation results reveal that trade openness promotes growth in more rigid ERR prevailing episodes than more flexible ERR in emerging market and developing economies. We also find that there is no substantial difference between in more rigid and flexible exchange rate regimes in explaining the effect of global financial conditions on growth.

In Chapter 4 we explore whether the long-run impact of credit on economic activity differs according to the magnitude of the change in credit in Türkiye for the period 2004Q1-2021Q2. To this end, we apply a multiple threshold nonlinear ARDL (MT-NARDL) model developed by Verheyen (2013), Fedoseeva (2013), and Pal and Mitra (2015, 2016) to include multiple known thresholds. This model allows us to model long-run and short-run non-linear dynamics together. Our findings reveal that there are nonlinearities in the long-run credit-GDP relationship, where the significance and the size of this relationship depend on the level of the change in

credit. We find that moderate credit growth rather than excessively high or low credit growth is effective in maintaining the significant and positive interaction between financial deepening and economic activity. Our results are robust to selecting alternative number and combination of thresholds.

The findings in Chapter 4 imply that policymakers should try to prevent large movements in credit to the private sector. For example, it could be more beneficial to spread the public credit support over time, instead of providing them in bulks. This is in line with a stylized literature, which finds that rapid credit growth is associated with misallocation of resources away from productive sectors and hence lower growth performance in the future (Mendoza and Terrones, 2008; Benigno and Forno, 2014). In fact, since the global financial crisis, a credit boom in an economy is seen as a leading indicator of financial instability. Our results also suggest that extremely low credit growth as well disrupts the credit-GDP relationship, further implying that high volatility in credit growth in either direction should be prevented. While excessive credit growth can be destabilizing, an overly restrictive credit environment can also pose significant challenges to economic growth and stability. While high levels of debt can be problematic, extremely low credit growth may make it difficult for heavily indebted individuals and businesses to refinance or restructure their debts, potentially leading to financial distress. Prolonged periods of very low credit growth can also weaken the financial health of banks, potentially leading to banking sector instability. Balancing credit availability with responsible lending practices is a key consideration for policymakers and financial institutions.

Chapter 4 focuses on data specific to Türkiye, which may limit the generalizability of the findings to other countries or contexts. As the next step, it would be interesting to carry out a similar analysis for other emerging markets. It is essential to recognize that the relationship between economic growth and credit is inherently complex, shaped by multiple factors, including financial regulations, monetary policy, and the overall stability of the financial sector. The Turkish case, in particular, has been influenced by a distinct macro-financial policy framework in recent years. Given that each emerging economy exhibits unique structural and policy characteristics, obtaining comparable results across different contexts would be both unexpected and

intellectually stimulating. Furthermore, future research could provide deeper insights by disaggregating the credit stock and examining its sub-components, particularly household and corporate loans.

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APPENDICES

A. CURRICULUM VITAE

PERSONAL INFORMATION

ABDULLAH GÜLCÜ

[redacted]

E-mail: [redacted]

EDUCATION

- Ph. D. in Economics, Middle East Technical University, 2025
- M.Sc. in Economics, Middle East Technical University, 2017

  (with high honor)
- B.Sc. in Economics, Middle East Technical University, Türkiye, 2014

  (with high honor)

EXPERIENCE

- **Research Assistant**, Department of Economics, Faculty of Political Sciences, Ankara University, April 2024 – Present
  - **Lecturer**: Mathematics for Economics I, IKT1007 (Fall 2024)

    Mathematics for Economics II, IKT1018 (Spring 2025)
- **Specialist**, Finance Office of the Presidency of the Republic of Türkiye, Financial Strategies and Analysis Department, August 2022-April 2024

- **Analyst**, Finance Office of the Presidency of the Republic of Türkiye, Financial Strategies, and Analysis Department, August 2021-July 2022
- **Distance Education Department Coordinator**, Department of Economics, METU, August 2020-July 2021
- **Assistant Coordinator**, Department of Economics, METU, August 2020-July 2021
- **Research Assistant**, Department of Economics, METU, November 2014 – July 2021
- **Teaching Assistant**, Department of Economics, Bilkent University, September 2014- September 2015.

RESEARCH INTERESTS

- Applied Econometrics
- Nonlinear Time Series Analysis
- Financial Economics
- Macroeconomics
- International Economics

GRANTS AND AWARDS

- METU Graduate Course Performance Award, 2017 *(Completing M.Sc courses with the highest CGPA)*

SSCI PUBLICATION

- Abdullah Gulcu & Dilem Yildirim (2019). Smooth breaks and nonlinear mean reversion in real interest parity: Evidence from East Asian countries, ***The Journal of International Trade & Economic Development***, 28(6), 668-685. DOI: 10.1080/09638199.2019.1582083

CONFERENCE PRESENTATIONS

- ERF 31st Annual Conference, Cairo, Egypt, 27-29 April 2025. (Forthcoming)
- 45th MEEA/ASSA Annual Meeting, San Francisco, CA, USA, 3-8 January 2025.

- VIII. International Conference on Economics-Turkish Economic Association (ICE-TEA), Cappadocia, Türkiye, 1-4 September 2022.
- VI. International Conference on Economics-Turkish Economic Association (ICE-TEA), Antalya, Türkiye, 1-3 November 2018.
- The XIX Conference on International Economics and VII Meeting on International Economics, Vila-Real (Castellon), Spain, 28 and 29 June 2018.

SKILLS

- Proficiency/Experience in the programs:
    - Eviews and Microsoft Office: Proficiency
    - STATA and R: Experience
- Languages: English (fluent), Turkish (native), Kurdish (native), Arabic (elementary), German (elementary)

OTHER PROFESSIONAL EXPERIENCES

- **REFEREEING**: Economic Policy and Analysis (September 2023)
- **LANGUAGE EDITOR**: Ankara University SBF Journal (May 2024 – Present)

REFERENCES

Prof. Dr. ERDAL ÖZMEN

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B. TURKISH SUMMARY / TÜRKÇE ÖZET

Bretton Wood Dönemi'nin 1970'li yılların ortalarında sona ermesiyle hem gelişmiş ülkeler hem de yükselen piyasalar ve gelişmekte olan ekonomiler dahil olmak üzere birçok ülke hem finans sektörlerini hem de reel sektörlerini dünyanın geri kalanına açtı. İlk girişimler gelişmiş ülkelerden geldi ve hızla diğer ülkelere yayıldı. Ülkeler, uluslararası ticaretteki engelleri ortadan kaldırarak, sermaye akışlarındaki işlem ve bilgi maliyetini azaltarak finans ve reel sektörlerini serbestleştirdiler (Frankel, 1972). Sermaye akımlarının serbest dolaşımıyla finansal küreselleşme önemli ölçüde arttı. Örneğin, brüt sermaye girişleri (dünya GSYİH'sine % oranı) 1990'ların ikinci yarısında 60%'dan 2007'de 180%'e çıktı (Guichard, 2017). Finansal küreselleşme ve finansal sektörlerdeki gevşemeyle hem bireylerin hem de firmaların krediye erişimi kolaylaştı ve bu da Kredi/GSYİH oranıyla hesaplanan finansal derinleşme hacminde muazzam bir artışa yol açtı. Ayrıca, ülkeler bu süreçte para politikalarını da hızla gevşettiler. Birçok ülke daha sürdürülebilir büyüme, sorunsuz sermaye akışı ve uluslararası ticarete daha etkin rol oynama gibi amaçlarla daha esnek döviz kuru rejimlerine geçmeye başladılar.

Daha esnek döviz kuru rejimleri, merkez bankalarının daha bağımsız para politikaları uygulamasına, uluslararası ticaretteki engelleri azaltma, sermaye akışlarındaki işlem maliyetlerini azaltma ve yerel para birimindeki belirsizliğin önüne geçmeye olanak tanırken, sabit döviz kuru rejimleri, dövizdeki daha az dalgalanma nedeniyle özellikle uluslararası ticarette daha istikrarlı bir ekonomik ortam sağlar (Jacob, 2015). Diğer bir ifade ile, farklı döviz kuru rejimleri içerisinde ülke ekonomisi için hem avantaj hem de dezavantaj barındırmaktadır. Bu tür serbestleştirme girişimleri ekonomilere hızlı bir büyüme, muazzam ancak kontrolsüz sermaye akışı, ticaret hacminde artış vb. gibi olanaklar sağlarken, ülkeler ekonomik çalkantılara ve krizlere karşı daha savunmasız hale geldi. Böylece, küreselleşme ve serbestleştirme dönemi iki önemli kriz yaşadı; 1998 Asya Krizi ve 2008 Küresel Finans Krizi. Küresel boyutta etkilerini hissettiren bu krizlerin yanında birçok ülke, özellikle gelişmekte

olan ekonomiler, iç çalkantılarla ve gerilemelerle de uğraştı. Bu nedenle, finansal sistem çok büyük ve karmaşık hale geldiğinde, biriken risklerin sonunda finansal çalkantılara yol açabileceği gözlemlendi. Bu gelişmelerden dolayı, araştırmacılar küreselleşme ve finansallaşmanın ekonomiler üzerindeki etkilerini detaylı bir şekilde araştırmaya başladır. Yapılan ampirik araştırmalar sadece reel sektör üzerindeki etkilere bakmakla yetinmeyip, küreselleşmenin ülkelerin sosyal boyuttaki değişim ve dönüşümünü kapsamaktadır. Bu doğrultuda bu tez, küreselleşme ve serbestleşmenin hem reel sektör hem de sosyal boyutta ekonomileri nasıl etkilediğini üç ampirik yürüterek analiz etmeyi amaçlamaktadır. İlk makale (2.Bölüm), hem gelişmiş ülkeler grubu için hem de yükselen ve gelişmekte olan ekonomiler grubu için finansallaşmanın gelir eşitsizliği üzerindeki etkisini araştırmaktadır. İkinci makale (3. Bölüm), ticaret açıklığının büyüme üzerindeki etkisinin yükselen piyasa ve gelişmekte olan ekonomilerde (EMDE) geçerli döviz kuru rejimiyle değişip değişmeyeceğini incelemektedir. Son olarak, üçüncü makale (4. Bölüm) Türkiye'de finansal derinleşme ile ekonomik faaliyet arasında doğrusal olmayan bir ilişki olup olmadığını araştırmaktadır.

Tezin ilk makalesi yukarıda da belirtildiği üzere finansallaşmanın farklı ülke grupları için gelir eşitsizliği üzerindeki etkisini araştırmaktadır. 1980'lerin başından itibaren finansal piyasaların serbestleşmesi ve küreselleşmenin ivmelenmesiyle birlikte gelir eşitsizliği (eşitsizlik) ülkeler içinde hızla artış göstermektedir. Örneğin, eşitsizlik 1990'ların başından beri gelişmiş ekonomilerde neredeyse 50% oranında artmış ve yükselen piyasalar ve gelişmekte olan ekonomilerin çoğunda da çok yüksek kalmaya devam etmiştir (IMF, 2020). Eşitsizlik akademik yazında genellikle daha yüksek sosyal maliyetler, daha düşük büyüme, daha kötü sağlık koşulları ve daha yüksek istikrarsızlık ile ilişkilendirilmektedir (Stiglitz, 2013; Nolan ve Valenzuela, 2019; Ostry ve diğerleri, 2019). Sonuç olarak, eşitsizlik konusundaki endişeler yalnızca en önemli politika konuları arasında yer almakla kalmayıp aynı zamanda hayati öneme sahip bir araştırma gündemi de sunmaktadır.

Ampirik literatür, ticaret açıklığı ve finansal küreselleşmenin, sermaye akışlarının düzeyi ve bileşiminin, inovasyon ve teknolojinin, kurumsal koşullar ve yönetişimin, eğitime ve beşerî sermayeye erişimin, finansal gelişmişliğin ve reel GSYİH'nin

eşitsizliğin önemli belirleyicileri olduğunu ileri sürmektedir. Guichard (2017) brüt sermaye girişlerinin (dünya GSYİH'sinin yüzdesi olarak) 1990'ların ikinci yarısında 60%'dan 2007'de 180%'e yükseldiğini öne süren açıklamaları dikkate alındığında, finansallaşma-eşitsizlik bağlantısının araştırılması çok daha önemli bir konu haline gelmektedir.

Epstein (2005, s.3) göre finansallaşma, "bir ekonomide finansal güdülerin, finansal piyasaların, finansal aktörlerin ve finansal kurumların artan rolü" anlamına gelmektedir. Finansallaşma genellikle makroekonomik istikrarsızlık ve finansal krizle ilişkilendirilir; bunların her ikisi de yoksulluk üzerinde olumsuz etkilere sahiptir ve böylece eşitsizliğe katkıda bulunur (Stiglitz, 2012). Bu çalışma, finansallaşmanın hem yerel faktörler (domestic factors) hem de uluslararası yönlerini ele alarak eşitsizlik üzerine etkisini araştırmaktadır. Svirydzenka (2016) çalışmasında yerel finansallaşma, finansal gelişmişlik düzeyi ile temsil edilmektedir. Finansallaşmanın uluslararası yönü için *de facto* uluslararası finansal entegrasyon göstergesi (Lane ve Milesi-Ferretti, 2003) kullanılmaktadır. Ayrıca, literatürde sıklıkla göz ardı edilen sermaye girişleri (liability flows, yükümlülük akışları) ve sermaye çıkışlarının (asset flows, varlık akışları) gelir eşitsizliği üzerine etkisi ayrı ayrı analiz edilerek sermaye akışlarının yönünün gelir eşitsizliği üzerinde nasıl bir etki oluşturduğu da incelenmektedir.

Finansal gelişmişlik, genişletilmiş marj (extensive margin) yaklaşımına göre toplumun daha geniş kesimleri tarafından finansal hizmetlere erişimi kolaylaştırarak finansal hizmetlerin kullanımını artırabilir ve böylece eşitsizliğin azalmasına katkı sağlayabilir. Öte yandan, genişletilmiş marj etkisinin aksine, yoğun marj (intensive margin) yaklaşımına göre finansal gelişmişlik, finansal hizmetlerin toplumun zengin kesimleri tarafından kullanımını artırarak eşitsizliğin derinleşmesine neden olabilir (Demirguc-Kunt ve Levine, 2009). Genişletilmiş marj yaklaşımı, Galor ve Moav (2004) çalışmasının teorik katkılarıyla tutarlı olduğu gözlemlenmiştir. Ayrıca, finansal gelişmişliğin beşerî sermaye birikimi üzerindeki olumlu etkisinin eşitsizliğin azalmasına katkı sağladığı, Clarke vd. (2006) ile Beck vd. (2007) gibi ampirik çalışmalarla da desteklenmiştir. Jaumotte vd. (2013), Thornton ve Di Tommaso (2020) ve Hailemariam vd. (2021) dahil olmak üzere daha güncel çalışmalar benzer

bulgular bildirmektedir. Öte yandan Cihak ve Sahay (2020), eşitsizlik ile finansal derinlik arasında ters U ilişkisi olduğunu, finansal derinleşmenin daha düşük eşitsizlikle ilişkili olduğunu, ancak bunun yalnızca bir noktaya kadar geçerli olduğunu, ardından eşitsizliğin arttığını tespit etmiştir. Rajan ve Zingales (2003) finansal gelişmişlik ile eşitsizlik arasındaki ilişkinin kurumsal kalite ve yönetişime bağlı olabileceğini vurgulamıştır. Law vd. (2014) de finansal gelişmişliğin eşitsizliği ancak kurumsal kalitenin belirli bir eşiğe ulaştıktan sonra azalttığını bulmuştur. Daha güncel çalışmalar da benzer bulgular saptamaktadır.

Sermaye akımlarının eşitsizlik üzerindeki etkisinin incelendiği akademik yazına bakıldığında farkı bulgular elde edildiği saptanmaktadır. Geleneksel teori, sermayenin zengin ülkelerden fakir ülkelere hareketinin fakir ekonomilerde büyümeyi desteklediğini savunur. Buna göre, finansal küreselleşme eşitsizliğin azalmasına yol açar. Nurkse (1953), Myrdal (1957) ve Lewis (1977) gibi yapısalcı görüş ise sermaye kontrollerinin yurtiçi tasarrufların yabancı ülkelere hareketini engelleyerek eşitsizliği azaltma eğiliminde olduğunu öne sürer. Öte yandan, Matsuyama (2004) çalışmasının teorik model bulguları, finansal küreselleşmenin fakir ülkelere borçlanma kısıtlamaları getirerek eşitsizliği artırma eğiliminde olduğunu, daha zengin ekonomilerin daha zengin, daha fakir ekonomilerin ise daha fakir olmasına yol açtığını öne sürer. Cabral vd. (2016), finansal küreselleşmenin eşitsizlik üzerindeki etkisinin genellikle doğrudan yabancı yatırım (FDI) veya sermaye akışları yoluyla işlediğini bildirmektedir. Asteriou vd. (2014), doğrudan yabancı yatırım akışlarının, sermaye hesabı açıklığının ve borsa kapitalizasyonunun eşitsizliğin ana itici güçleri olduğunu bulmuştur. Jaumotte vd. (2013) finansal açıklığın eşitsizliği arttırırken, uluslararası ticaret açıklığının ise azalttığını belirtmektedir. Dorn vd. (2018), küreselleşme ile eşitsizlik arasındaki pozitif ilişkinin genellikle yükselen piyasalar ve gelişmekte olan ekonomiler için geçerli olduğunu bildirmektedir. Lee vd. (2019) çalışmasındaki bulgular ise uluslararası ticaret açıklığının eşitsizlik üzerindeki etkisinin, özellikle gelişmiş ekonomiler örneği için, neredeyse ihmal edilebilir düzeyde olduğunu göstermektedir. Daisaka vd. (2014), finansal sistemdeki kusurların sermaye kiralama oranını azaltarak eşitsizliği artırdığını, bunun da borç alanlara fayda sağlarken borç verenlere zorluk çıkardığını belirtmektedir.

Literatürde, uluslararası finansal entegrasyon ve finansal gelişmişlik düzeyinin eşitsizlik ile temel belirleyicileri arasındaki ilişkilerin doğrusal olmayabileceği varsayımı az sayıdaki güncel akademik çalışmalar dışında sıklıkla göz ardı edilmiştir. Örneğin, Cihak ve Sahay (2020), finansal derinlik için ikinci dereceden fonksiyonel formu dikkate alarak eşitsizlik üzerine etkisinin doğrusal olmayabileceği sorununu ele almaktadır. Law vd. (2014), finansal gelişmişliğin eşitsizliği ancak belirli bir kurumsal kalite eşiğine ulaşıldıktan sonra azalttığını bulmuştur. Madni ve Anwar (2021), kurumsal kalitenin tahmini bir eşik seviyesinden düşük olması durumunda GSYİH büyümesinin eşitsizliği artırdığını bildirmektedir. Ancak literatürde, uluslararası finansal entegrasyonun eşitsizlik üzerine etkisi endojen eşik (endogenous threshold) yöntemi ile inceleyen kapsamlı bir çalışma bulunmamaktadır. Benzer şekilde, sermaye girişleri ve çıkışları da dahil olmak üzere uluslararası finansal entegrasyonun ana bileşenlerinin ve finansal gelişmişlik düzeyinin de gelir eşitsizliğine etkisi eşik değer analizleriyle ortaya konulabilir. Bu doğrultuda, ikinci bölümde Hansen (1999) çalışmasındaki sabit etkiler panel eşik değer prosedürü kullanılarak yukarıda bahsettiğimiz finansallaşma yönlerinin eşitsizliğe etkisi araştırılacaktır.

Hansen (1999) sabit etkiler panel eşik değer yöntemini modelimize entegre ettiğimiz analizimizin aşamaları şu şekildedir. Öncelikle, finansal entegrasyon göstergesini eşik değer değişkeni olarak belirledik. Veri tarafından endojen olarak finansal entegrasyon göstergesinin eşik seviyesini bulup, modeli düşük finansal entegrasyon rejimi ve yüksek entegrasyon rejimi olarak ayırmasını amaçladık. Ancak, eşik değer parametresinin anlamlı bir eşik değer olamadığını test edeceğimiz boş hipotezimizde eşik değer parametresi tanımlanamaz. Bu sorunu çözmek amacıyla Hansen (1999), eşik değerin olmadığı varsayımı altındaki boş hipotezi F testinin asimptotik p-değerlerini belirlemek için bootstrap yöntemi uygulamaktadır. Panel eşik değeri metodolojisi, ülkeye özgü etkilerin değerini düşürüp (de-meaned) sabit etkileri ortadan kaldırarak başlar. Değeri düşürülen veriler daha sonra eşik değişkenine göre artan düzende sıralanır. Gözlemlerin en küçük ve en büyük 5%'i kırpıldıktan sonra, her gözlem potansiyel bir aday olarak kabul edilerek bir eşik araması yapılır. Her aday için, değeri düşürülen örneğe panel en küçük kareler yöntemi uygulanır ve en küçük kareler toplamını en aza indiren değer eşik değer olarak belirlenir. Yu ve

Phillips (2018), "bu yöntemle hem eşik noktasının hem de eşik etkisi parametrelerinin enstrüman değişkene gerek kalmadan belirlendiğini" ortaya koymuştur. Sonuç olarak, tahminlerimiz eşik değer değişkenlerinin potansiyel endojenliği altında bile geçerli olduğunu göstermektedir.

Bu çalışma, 1996-2019 döneminde 24 gelişmiş ekonomide (AE) ve 52 yükselen piyasa ve gelişmekte olan ekonomide (EMDE) finansal küreselleşme ile gelir eşitsizliği arasındaki ilişkiyi araştırmaktadır. Gelir eşitsizliği ölçütü, GINI endeksinin vergi öncesi gelir eşitsizliği verisi kullanılmış olup ve veriler Standardize Dünya Gelir Eşitsizliği Veritabanı'ndan (Standardized World Income Inequality Database) (Solt, 2020) alınmıştır. Finansal küreselleşmenin bir ölçütü olarak *de facto* uluslararası finansal entegrasyon (IFI) verisi, Lane ve Milesi-Ferretti (2018) tarafından sağlanan External Wealth of Nations veritabanından elde edilmiştir. İlgili veri, brüt finansal varlık stoklarının (yerel yatırımcılar tarafından yabancı finansal varlıkların alım/satımı) ve yükümlülüklerin (yabancı yatırımcılar tarafından yerel finansal varlıkların alım/satımı) toplamı olarak ölçülmektedir. IFI ile temsil edilen finansal küreselleşme ile gelir eşitsizliği arasındaki ilişkiyi incelemek için, kişi başına düşen reel gelir, beşerî sermaye, finansal gelişmişlik ve kurumsal kalite ve yönetişimin etkilerini dikkate almaktayız. Kişi başına düşen reel gelir verileri Dünya Bankası'nın Dünya Kalkınma Göstergeleri (World Development Indicators, World Bank) veritabanından alınmıştır. Beşerî sermaye, okullaşma yılı ve eğitime dönüşler olarak ölçülmüştür ve veriler Penn Dünya Tablosu (Penn World Table) veritabanından alınmıştır. Finansal gelişmişlik verileri Svirydzenka (2016) tarafından hazırlanan finansal gelişmişlik endeksi veritabanından elde edilmiştir. Finansal gelişmişlik, finansal piyasaların ve kurumların derinliği, erişimi ve verimliliği baz alınarak ölçülmektedir. World Bank, Worldwide Governance Indicators veritabanı, söz hakkı ve hesap verebilirlik, siyasi istikrar ve şiddetin yokluğu, hükümet etkinliği, düzenleyici kurumların kalitesi, hukukun üstünlüğü ve yolsuzluğun kontrolü olmak üzere altı kategoriden oluşmaktadır. Kose vd. (2009) ve benzer çalışmalar, bu altı bileşenin basit ortalamasının standartlaştırılmış versiyonunu yönetişim (governance) göstergesi olarak kullanmaktadır. Benzer şekilde, bu çalışmada yönetişim göstergesini bu şekilde kullanmaktadır. Yönetişim değişkeni, sıfır ile bir arasında değişmekte ve daha yüksek değerler daha iyi yönetişimi temsil etmektedir.

Hansen (1999) tarafından geliştirilmiş panel sabit etkiler eşik değer yöntemini uyguladığımızı tahmin bulgularımızı şu şekilde özetleyebiliriz. İlk olarak, bulgularımız uluslararası finansal entegrasyon ile eşitsizlik arasındaki ilişkinin uluslararası finansal entegrasyon düzeyine göre değişebileceğini göstermektedir. Buna göre, uluslararası finansal entegrasyon düzeyinin hem gelişmiş ülkelerde hem de yükselen piyasalar ve gelişmekte olan ekonomilerde gelir eşitsizliğini artırma eğiliminde olduğu görülmektedir. Ancak, finansal entegrasyonun eşitsizliği artırıcı etkisi finansal entegrasyon seviyesinin daha yüksek olduğu gelişmiş ülkelerde daha az olduğu saptanmıştır. Ayrıca, finansal entegrasyon seviyesinin düşük (yüksek) olduğu dönemlerde uluslararası finansal entegrasyon değişkeninin yükselen piyasalar ve gelişmekte olan ekonomilerde gelir eşitsizliğini düşürdüğü (artırdığı) bulgularına ulaşılmıştır.

İkinci bölümde ayrıca, uluslararası finansal entegrasyonun gelir eşitsizliği üzerindeki itici mekanizmasını araştırmak için uluslararası finansal entegrasyon göstergesini sermaye girişleri (yükümlülükler) ve sermaye çıkışları (varlıklar) olarak ayrıştırıp analiz ettik. Ampirik sonuçlarımız, finansal entegrasyonun eşitsizlik üzerindeki etkisinin gelişmiş ekonomilerde sermaye girişleri ve çıkışlarının ortak etkileriyle gerçekleştirdiğini gösterirken, yükselen piyasalar ve gelişmekte olan ekonomilerde ise bu etkinin sermaye girişleri tarafından belirlendiğini ortaya koymaktadır.

İkinci bölümde ayrıca uluslararası finansal entegrasyonun eşitsizlik üzerindeki etkisi için finansal gelişmişlik göstergesi kullanılarak veri tarafından endojen olarak belirlenen bir finansal gelişmişlik eşik değeri olup olmadığı da analiz edilmiştir. Ampirik bulgularımız, finansal gelişmişlik göstergesinin gelişmiş ekonomilerde veri odaklı tahmini bir eşik oluşturmadığını göstermektedir. Gelişmiş ülkelerde finansal gelişmişlik düzeyi tarihsel süreçte zaten çok yüksek olduğu için bulgularımızda eşik değer bulunmaması beklenen bir sonuçtu. Öte yandan, yükselen piyasalar ve gelişmekte olan ekonomilerde, veri odaklı tahmini bir finansal gelişmişlik eşiğini destekleyen ampirik kanıtlar gözlemledik. Buna göre, bu ülke grubunda uluslararası finansal entegrasyon ile eşitsizlik arasındaki pozitif ilişki, finansal gelişmişlik düzeyinin yüksek olduğu dönemlerde azaldığı bulgusuna ulaşılmıştır.

Son olarak bu bölümde, uluslararası finansal entegrasyonun gelir eşitsizliği üzerindeki etkisinin, ele aldığımız ülke grubuna göre değiştiğini ortaya koymaktayız. Diğer bir ifadeyle bulgularımız, uluslararası finansal entegrasyonun gelişmiş ekonomilerde gelir eşitsizliği üzerindeki etkilerinin, yükselen piyasalar ve gelişmekte olan ekonomilerdeki etkilerden farklı olduğunu göstermektedir. Bu bulgu şaşırtıcı değildir, çünkü finansal entegrasyonun aşaması, gelişmişlik düzeyi ve dolayısıyla gelir eşitsizliği ile ilişkisi bu ülke gruplarında farklılık gösterebilir. Dolayısıyla, politika yapıcıların ülkelerinin finansal entegrasyon düzeyini ve süreçlerini dikkate alarak yerleşik politika araçlarını uygulamalarının önemini ortaya koymaktadır, böylece finansal piyasaların sosyal boyuttaki faydalarını optimize edebilirler. Ayrıca, bu çalışma uluslararası finansal entegrasyonların yönünün önemini de açıklamaktadır. Dolayısıyla, politika yapıcılar, farklı gelir düzeyi grupları üzerindeki olumsuz etkileri en aza indirmenin yanı sıra daha sağlıklı bir finansal piyasa elde etmek için sermaye akışlarını bu noktaları da dikkate alarak düzenlemelidir.

Bu tez çalışmasının 3.Bölümünde, döviz kuru rejimlerinin etkisinin ticaret açıklığı üzerinden büyümeyi nasıl etkilediği yükselen piyasalar ve gelişmekte olan ekonomiler özelinde incelenmektedir. Döviz kuru düzenlemelerinin para politikaları ve makroekonomik göstergeler üzerindeki etkisi, özellikle 1970'lerde Bretton Wood Dönemi'nin çöküşünden bu yana politika yapıcılar ve araştırmacılar arasında tartışılmaktadır; çünkü bundan önce gelişmiş ülkeler ve gelişmekte olan ülkeler de dahil olmak üzere çoğu ülke sabit döviz kuru rejimlerini kullanıyordu. Bretton Wood Dönemi'nin çöküşüyle birlikte birçok ülke, özellikle gelişmekte olan ülkeler ve yükselen ekonomiler, daha sürdürülebilir büyüme, düzenli sermaye akışı ve uluslararası ticaretteki payını artırmak amacıyla döviz kuru rejimlerini değiştirerek daha esnek döviz kuru rejimlerine geçiş yaptılar. Daha esnek döviz kuru rejimleri, merkez bankalarının daha bağımsız para politikaları uygulamasına, uluslararası ticaretteki engelleri ve sermaye akışlarındaki işlem maliyetlerinin azaltılmasına ve yerel para birimlerindeki belirsizliğin azalmasına olanak tanırken, sabit döviz kuru rejimleri, para birimindeki daha az dalgalanma nedeniyle özellikle uluslararası ticarette daha istikrarlı bir ekonomik ortam sağlamaktadır (Jacob, 2015). Döviz kuru rejimlerinin ülkelerin ekonomik göstergeleri üzerindeki etkisi, literatürün büyük bir bölümünde ampirik olarak araştırılmıştır. Ampirik literatür, döviz kuru rejimlerinin

uluslararası sermaye akışları, enflasyon, iş döngüleri, uluslararası ticaret ve büyüme üzerinde etkisi olduğunu ortaya koymaktadır.

Teorik olarak, döviz kuru rejimleri ile büyüme arasındaki ilişkiyi araştıran Solow (1956) ve Lucas (1976) büyüme modelleri dışında çok az çalışma vardır. Ancak, bu çalışmalar ilişkiyi toplam faktör verimliliği, yatırım ve tasarruf kanalları üzerinden dolaylı olarak araştırmaktadır. Dolayısıyla, olası ilişkiler için teorik olarak net bir kanıt bulunmamaktadır. Döviz kuru rejiminin belirlenmesi makroekonomik göstergelerde hayati kanallardan birine sahiptir. Yani, döviz kuru rejimi, esas olarak mal ve hizmet ihracatı yoluyla uluslararası ticaret hacmi üzerinde ilk etapta etkiye sahiptir. Daha sonra, döviz kuru geçişi yoluyla ülkelerin enflasyon ve büyüme değişkenlerini etkiler. Döviz kuru rejimlerinin büyüme ve ticaret üzerindeki etkisine ilişkin teorik kanıt eksikliği nedeniyle, sonraki dönemlerde farklı döviz kuru rejimlerinin ekonomilerin makroekonomik göstergelerini ve finansal piyasalarını etkileyip etkilemediğini ortaya koymak amacıyla ampirik çalışmalar yürütülmüştür.

Bu kritik konuyu araştıran ilk çalışmalar, döviz kuru rejimlerinin büyüme üzerindeki etkisini betimleyici göstergeler kullanarak göstermiştir (bkz. Baxter ve Stockman, 1989; Mundell 1995, Ghosh vd., 1997; Moreno 2000 ve diğerleri). Bu çalışmalar genellikle farklı rejimler için büyüme verisinin ortalamasını ve standart sapmasını kullanmakta ve sonuçları karşılaştırmaktadır. Ancak, bu ilk ampirik çalışmalar farklı döviz kuru rejimlerinin büyüme üzerinde anlamlı bir etkisi olmadığı sonucuna varmaktadırlar. Ekonometrik analiz eksikliği ile problemli analiz yöntemleri kullanılması nedeniyle ilk çalışmaların bulguları eleştirilmekte ve bulgular kabul görmemektedir. 2000'li yılların başında hem ülke özelinde hem de ülke grupları için doğrusal modeller kullanılarak çalışmalar yürütülmüştür. Örneğin, Levy-Yeyati ve Sturzenegger (2002), döviz kuru rejiminin kişi başına düşen reel GSYİH büyümesini hangi kanaldan etkilediğini belirlemek için genelleştirilmiş iki aşamalı IV tahmin prosedürünü kullanmış ve sabit döviz kuru rejimlerinin büyüme üzerinde olumsuz bir etkiye sahip olduğu sonucuna varmıştır. Benzer şekilde, Edwards ve Levy-Yeyati (2003), Husain vd. (2004), Garofalo (2005) ve diğerleri aynı OLS metodolojisini kullanarak döviz kuru rejimlerinin büyüme üzerinde kayda değer bir etkisi olamadığı sonucuna ulaşmışlardır. Ancak, geçerli ve güvenilir enstrüman değişken kullanma

konusundaki problemler, yanlış metodoloji ve/veya hatalı döviz kuru rejimi klasifikasyonu gibi nedenlerden ötürü ilk ampirik çalışmalar döviz kuru rejimi ile büyüme arasındaki ilişkiyi doğru analiz etmekte problemler yaşamıştır. Ancak, bu tür analizlerin temel sorunu, ilişkiyi tanımlamak için doğrusal modeller kullanmaları ve dolayısıyla aralarındaki olası doğrusal olmayan ilişkileri göz ardı etmeleridir. Dubas vd. (2005), döviz kuru rejiminin rejim değiştirme etkisinin kişi başına düşen reel GSYİH üzerindeki etkisini analiz eden öncü çalışmalardan biridir. Bu doğrultuda çalışma, 1960-2002 dönemi için 180 ülke için bir dizi döviz kuru kukla değişkeni kullanarak rassal etkiler panel regresyonunu yöntemini uygulamışlar. Modeli kurarken dışsal (exogenous) olarak üç rejime bölerek rejimlerin etkisini analiz etmişlerdir. Bulgular, görece daha sabit rejimler altında ülkelerin esnek döviz kuru rejimlerine göre 1% daha hızlı büyüme sağladığını ortaya koymaktadır. Bu çalışma, rejim değiştirme regresyonunu kullanarak literatüre büyük bir katkı sağlamaktadır, ancak sonuçlar dışsal olarak belirlenen rejimler nedeniyle yanıltıcı olabilmektedir. De Grauwe ve Schnabl, 2004; Bailliu vd. 2003; ve diğerleri gibi birçok çalışma doğrusal panel veri analizi yöntemini kullanarak döviz kuru rejimlerinin büyüme, ticaret ve uluslararası sermaye akımları üzerindeki etkisini araştırmaktadır. Öte yandan Eichengreen ve Leblang (2003), dinamik panel ve IV tahmin prosedürünü kullanarak ilişkiyi ortaya koymaktadır. Kişi başına düşen büyüme oranı ve *de jure* döviz kuru sınıflandırmasını kullanarak, daha esnek döviz kuru rejimlerinin daha hızlı büyüme ile ilişkili olduğunu bulmuşlardır. Ancak çalışmanın bulguları temelde iki nedenden ötürü eleştirilmektedir: (i) gelişmiş ve gelişmekte olan ülkeleri birlikte kullanmak (örneklem seçimi yanlılığı) ve *de jure* döviz kuru rejimi sınıflandırması kullanmak (döviz kuru rejiminin yanıltıcı ölçümü). Daha yakın tarihli çalışmalar, döviz kuru rejimlerinin panel veri metodolojilerini kullanarak büyümeyi hangi kanallardan etkilediğine odaklanıyor. Ancak ilgili literatür, döviz kuru rejimlerinin büyüme üzerindeki olası doğrusal olmayan etkisini göz ardı etmektedir.

Bu çalışma, döviz kuru rejimi ve büyüme alanındaki mevcut literatüre, döviz kuru rejimlerinin içsel olarak belirlenmesine olanak tanıyan Hansen (1999) tarafından geliştirilen panel sabit etki eşik değer yöntemini kullanarak katkıda bulunmaktadır. Hansen (1999) metodolojisi, farklı döviz kuru rejimlerinin etkisini yerel değişkenler (ticaret açıklığı) ve küresel finansal koşullar (VIX, oynaklık ve riskten kaçınma

endeksi) aracılığıyla birlikte araştırmamıza olanak sağlamaktadır. Rey (2015) küresel finansal döngünün VIX (oynaklık ve riskten kaçınma endeksi) ile birlikte hareket etme eğiliminde olduğunu ve gelişmiş ve gelişmekte olan piyasa ekonomilerinde iş döngüsü dalgalanmalarına yol açtığını öne sürmektedir. Habib vd. (2020) çalışmasında da vurgulandığı üzere vix göstergesindeki artış, kötüleşen finansal koşulları ve buna bağlı olarak güvenli varlıklara yönelim anlamına gelmektedir. Dolayısıyla, ticaret açıklığının büyümeye etkisinin *de facto* döviz kuru rejimi sınıflandırmasıyla değişip değişmediğini incelemek için, oynaklık ve riskten kaçınma endeksinin (VIX) doğal logaritmasıyla temsil edilen küresel finansal koşulların etkisini modele kontrol değişkeni olarak koyduk.

Bu bölümde döviz kuru rejimi göstergesi olarak Ilzetzki, Reinhart ve Rogoff (2019) tarafından geliştirilen *de facto* döviz kuru rejimi sınıflandırmasını kullandık. Bu sınıflandırma, fine ve coarse sınıflandırması olmak üzere iki şekilde oluşturulmaktadır. Buna göre, döviz kuru rejimi fine sınıflandırmasında 1-15 arasında olmak üzere 15 gruba ayrılırken coarse sınıflandırmasında 1-6 arasında olmak üzere 6 gruba ayrılmaktadır. Her iki sınıflandırma kategorisinde de yüksek gruplardaki döviz kuru rejimleri daha esnek döviz kuru rejimlerini temsil etmektedir. Ilzetkzki, Reinhart ve Rogoff (2019), fine kategorisindeki ERR14 ve ERR15 ile coarse kategorisindeki ERR5 ve ERR6'nın yüksek enflasyon dönemlerine, döviz krizlerine ve parasal kontrol eksikliğine karşılık geldiğini belirtmektedir. Bu nedenle, ERR'yi bu makroekonomik istikrarsızlık dönemlerine bağlamak yanıltıcı olabilir. Bu çalışmamızda, döviz kuru rejimi göstergesi olarak fine sınıflandırmasını kullandık ve ERR14 ile ERR15'i bulguların sapmasını önlemek amacıyla modelde kapsam dışı bırakacak şekilde düzeltme (trimming) yaptık. Ayrıca, ticaret açıklığının büyüme etkisinin geçerli *de facto* ERR sınıflandırmasına göre değişip değişmediğini incelemek için, oynaklık ve riskten kaçınma endeksinin (VIX) doğal logaritmasıyla temsil edilen küresel finansal koşulların etkisini kontrol ettik. VIX verileri Chicago Boards Options Exchange web sayfasından alınmıştır. Mal ve hizmetlerin ihracatı ve ithalatının toplamının GSYİH'ye yüzde oranı olarak hesaplanan ticaret açıklığı verileri Dünya Bankası, Dünya Kalkınma Göstergeleri (World Bank, World Development Indicators) veritabanından alınmıştır. Tahminlerimizde ayrıca ticaret açıklığının ana bileşenleri olan ihracat (mal ve hizmet ihracatının GSYİH'ye yüzde

oranı) ve ithalatı (mal ve hizmet ithalatının GSYİH'ye yüzde oranı) da dikkate alarak analizlerimizi gerçekleştirdik. Literatürle uyumlu olarak, nüfus dinamiklerini kontrol etmeyi sağladığı için GSYİH büyümesi yerine reel kişi başına düşen büyüme oranını kullanmayı tercih ediyoruz (Eichengreen ve Leblang, 2003; Bailliu ve diğerleri, 2003; Ashour ve Jong, 2018). Reel kişi başına düşen gelir büyümesi verileri Penn World Table veritabanından alınmıştır.

Literatürün büyük kısmı, büyümenin ticaret açıklığına duyarlılığının geçerli döviz kuru rejimine (ERR) göre değişmediğini savunmaktadır. Ancak, yönetilen kur rejimleri (managed exchange rate regimes) döviz kuru oynaklığını hafiflettiği, işlem maliyetlerini ve döviz riskini düşürdüğü bilinmektedir. Ayrıca, yönetilen döviz kuru rejimleri, döviz kurları ve sınır ötesi işlemlerdeki belirsizliği azaltmakta ve fiyat rekabetini teşvik etmektedir. Tüm bu argümanlar, ticaret açıklığının büyüme üzerindeki etkisinin, yönetilen döviz kuru rejimlerini uygulayan ekonomilerde esnek döviz kuru rejimleri uygulayan ekonomilerden farklı olabileceğini göstermektedir. Hatta, geçerli *de facto* döviz kuru rejimi, ticaret açıklığının büyüme üzerindeki etkisine ilişkin veri odaklı tahmini eşik sağlayabilir. İlgili literatüre bakıldığında, olası doğrusal olmayan ilişkiyi ele alan çalışma eksikliği olduğu gözlenmektedir. Dolayısıyla, literatürdeki bu kliği doldurmak ve böylece literatüre katkı sağlamak amacıyla Hansen (1999) tarafından geliştirilen panel sabit etkili eşik yöntemini kullanarak döviz kuru rejiminin model içinde endojen olarak belirlenmesine olanak sağladık. Böylece, yükselen piyasalar ve gelişmekte olan ekonomilerde ticaret açıklığının farklı döviz kuru rejimlerinde büyüme üzerine etkisinin nasıl olduğunu analiz etme olanağına eriştik. Bu kapsamda, gecikmeli reel büyüme değişkeni ile ticaret açıklığı değişkeninin döviz kuru rejiminin eşik değerine göre değişmesine izin verirken küresel finansal koşullar göstergesi olarak belirlediğimiz vix değişkeninin ise eşik değere göre değişmesine izin vermedik. Model bulgularımız geçerli *de facto* döviz kuru rejiminin gecikmeli reel gelir ile ticaret açıklığının reel büyüme üzerinde veri odaklı istatistiki olarak anlamlı eşik değer oluşturduğunu gösterdi Bir başka ifadeyle, tahmin sonuçları ERR10'un endojen olarak tahmin edilen ERR eşiği olduğunu göstermektedir. Ilzetkzki, Reinhart ve Rogoff (2019) çalışmasında ERR10 fine sınıflandırmasında "+/-5% veya daha az olarak dalgalanmasına izin verilen sürünen sabit kur rejimine (crawling band)" denk gelmektedir. Bu, eşik değerin

altındaki alt modeldeki döviz kuru rejimlerinin sabit döviz kuru, sınırlı esnek döviz kuru ve yönetilen dalgalı döviz kuru rejimlerini kapsadığı, eşik değerin üstündeki modelde ise döviz kuru rejimlerinin bazı yönetilen döviz kuru rejimleri ile esnek döviz kuru rejimlerini kapsadığını göstermektedir. Dolayısıyla, düşük ve yüksek rejimler arasındaki ayrım, alt rejimde daha katı döviz kuru rejimleri ve üst rejimde ise daha esnek döviz kuru rejimlerinin hâkim olduğu gözlem dönemlerini kapsadığı söylenebilir. Ayrıca, ticaret açıklığı yerine kullandığımız ihracatın GSYİH'ye oranı ve ithalatın GSYİH'ye oranı göstergeleri içinde eşik değer döviz kuru rejimi aynı çıkmıştır. Model bulgularına göre, alt rejimde ticaretin büyümeye etkisi pozitif ve istatistiksel olarak anlamlı iken, üst rejimde pozitif ancak istatistiksel olarak anlamsızdır. Bu, ticaret açıklığının daha katı ERR'lerin hâkim olduğu dönemlerde büyümeyi desteklediği anlamına gelir. Bunun nedeni, daha katı ERR'lerin döviz kuru oynaklığını azaltması ve bu da ticaret öngörülebilirliğini ve yatırım güvenini artırmasıdır. Bu tür rejimlerde, daha düşük döviz riski ve daha fazla makroekonomik istikrar, uzun vadeli ticaret ilişkilerini ve üretkenlik kazanımlarını kolaylaştırır ve bu, endojen büyüme teorisinin dış sektör kaynaklı teknolojik yayılma ve verimlilik iyileştirmelerine vurgu yapmasıyla uyumludur. Ayrıca, ticaret açıklığının büyümeye doğrusal olmayan bu etkisinin hem ihracatın hem de ithalatın ortak etkilerinden kaynaklandığını gösterdik. Kişi başına düşen reel gelirin gecikmeli büyümesinin tahmini katsayısı, her iki rejimde de pozitif ve istatistiksel olarak anlamlıdır, ancak daha esnek ERR düzenlemeleri içeren üst rejimde çok daha yüksektir. Her iki rejimde de pozitif ve istatistiksel olarak anlamlı olan kişi başına düşen reel gelirin gecikmeli büyümesi katsayısı, büyüme sürekliliğinin varlığını göstermektedir ve bu da geçmiş ekonomik performansın mevcut büyüme dinamiklerini etkilediği anlamına gelmektedir. Ancak, daha esnek ERR düzenlemeleriyle karakterize edilen üst rejimdeki daha yüksek katsayı, daha zayıf bir yakınsama etkisine işaret eder, çünkü döviz kuru esnekliği daha yüksek olan ekonomiler, artan makroekonomik oynaklık ve dış şoklar nedeniyle sabit durum büyüme (steady-state growth) yollarından uzun süreli sapmalar yaşayabilir. Bu, istikrarlı makroekonomik ortamlara sahip ekonomilerin (örneğin, yönetilen ERR'ler) uzun vadeli büyüme dengelerine doğru daha hızlı yakınsama sergilediğini, daha esnek rejimlere sahip olanların ise dalgalanan dış koşullar nedeniyle kalıcı bir ayrışmayla karşılaşabileceğini varsayan koşullu yakınsama hipoteziyle uyumludur. Küresel finansal döngü varsayımıyla

tutarlı olarak, VIX ile kişi başına düşen reel gelir büyümesi arasında negatif ve istatistiksel olarak anlamlı bir ilişki vardır. Bu, VIX'teki bir azalmayla temsil edilen olumlu küresel finansal koşulların, örneğimizdeki ekonomik büyümeyi artırma eğiliminde olduğu anlamına gelmektedir.

Çalışmanın 4.Bölümde, Türkiye'de finansal derinleşme ile ekonomik faaliyet arasında doğrusal olmayan bir ilişki olup olmadığı araştırılmaktadır. Türkiye'deki finansal sistem ağırlıklı olarak banka tabanlıdır ve reel sektör Türkiye'de büyük ölçüde banka finansmanına bağımlıdır. Finansal İstikrar Kurulu (FSB) veri tabanına göre, Türkiye'de bankaların toplam finansal sistemdeki payı 2020 yılında 71% iken, bu rakam gelişmekte olan piyasalarda ortalama 56%, gelişmiş ülkelerde ise 34%'tür. Ayrıca, Türkiye Bankacılık Düzenleme ve Denetleme Kurumu'nun (BDDK) son verilerine göre, kamu bankalarının toplam bankacılık sektörü aktiflerindeki payı yaklaşık 36%, toplam bankacılık sektörü kredilerindeki payı ise 2021 yılı sonunda yaklaşık 37%'dir. Kamu bankalarının aktiflerdeki ve kredilerdeki payı 2017 yılında sırasıyla 30% ve 32% civarındaydı, bu da bu rakamların artış eğiliminde olduğu anlamına geliyor. Bu dönemde, devlet bankaları özellikle küçük ve orta ölçekli işletmelere (KOBİ'ler) kredi vermede daha aktifti ve KOBİ kredilerindeki payları 31%'den 50%'ye keskin bir şekilde yükseldi. 2017'nin başından bu yana, devlet bankaları KOBİ müşterilerinin sayısını iki katına çıkarırken, diğer bankaların KOBİ müşterilerinin sayısı neredeyse aynı kaldı. IMF Financial Soundness Indicators veri tabanı, Türkiye'de bankacılık sektörü varlıklarının GSYİH'ye oranının 2021'in üçüncü çeyreğinde yaklaşık 125% olduğunu ve bunun da diğer birçok gelişmekte olan piyasa ekonomisinden daha yüksek olduğunu gösteriyor. Banka dışı finansal sistem hala gelişme aşamasında. Sermaye Piyasaları Kurulu verilerine göre, Türkiye'de borsa kapitalizasyonu/GSYİH oranı 2021'de 20%'nin altında olup, gelişmiş ülkeler ve büyük gelişmekte olan piyasalarla karşılaştırıldığında en düşük seviyelerden biridir. Son yıllarda, özellikle son beş yılda, Türkiye'deki finansal politikalar, esas olarak devlet bankalarının öncülüğünde kredi genişlemesi yoluyla ekonomik büyümeyi desteklemek üzere tasarlandı. Kredi kullanımı, destekleyici parasal ve makroekonomik ihtiyati politikalar, kamu teşvikleri ve Kredi Garanti Fonu'nun (KGF) Hazine destekli teminat desteği yoluyla teşvik edildi. Destekleyici makro-finansal ortam hem hane halkı hem de kurumsal kredilerde artışlara yol açtı.

KGF planı, diğer koşullarda kolayca teminat sağlayamayan KOBİ'ler tarafından yaygın olarak kullanıldı. Buna göre, Kovid-19'a rağmen Türkiye, 2020'de pozitif ekonomik büyüme yaşayan birkaç ülke arasındaydı; bu, esas olarak idari ve düzenleyici kredi teşviklerine ve kapsamlı likidite desteğine atfedilmektedir (IMF, 2021). Öncelikle finansal olmayan şirketlere yönelik devam eden kredi destek politikaları da 2021'deki çift haneli ekonomik büyümeye katkıda bulundu. Bu arka plan göz önüne alındığında, bu çalışmada, Türkiye'de özel sektör kredisinin ekonomik aktivite üzerindeki etkisinin, kredilerdeki değişime bağlı olarak nasıl değiştiğini araştırmaktayız. Özellikle, katkının, kredi-GSYİH oranındaki değişikliklerin belirli eşik seviyelerinin ötesinde, altında veya arasında ortadan kalktığını veya tersine döndüğünü görmek istiyoruz. Kredi ve ekonomik faaliyet arasındaki uzun vadeli ilişki teorik olarak King ve Levine (1993)'de olduğu gibi finansal sektörle zenginleştirilmiş içsel büyüme modellerine dayanmaktadır. Bu modellerde finansal sektör, üretken yatırım projelerini finanse etmek için tasarruf havuzunu kolaylaştırarak, yatırım ve üretim süreçlerini değerlendirerek ve denetleyerek ve yenilikçi girişimlere bağlı riskleri yayarak ve azaltarak ekonomideki üretkenliği artırır. Levine (2005), finansal sektörün hizmetlerinin ekonomik büyümeyi teşvik etmede nasıl bir rol oynayabileceğini ayrıntılarıyla anlatan teorik literatürün kapsamlı bir incelemesini sunar. Bu teorik temellere dayanarak, ampirik literatür genellikle finansal sistemlerin üretkenlik büyümesini teşvik etmede ve ekonomik kalkınmayı desteklemede önemli bir rol oynadığını bulmaktadır.

Ampirik literatür, geçici şokların neden olduğu iş döngülerini hariç tutarak kalıcı etkileşimleri anlamak için çoğunlukla uzun vadeli finans-büyüme ilişkisini ele alır. Olası monoton olmayan ilişkileri tespit etmeye çalışan son literatürde, çoğunlukla kapsamlı ülke gruplarını kapsayan panel veri modelleri tercih edilmektedir. Büyük bir ülke veri kümesine sahip panel veri modelleri, finansal gelişme ve uzun vadeli büyüme arasındaki etkileşimi değerlendirmek için genellikle verileri beş yıllık ila on yıllık dönemler boyunca ortalama alır. Öte yandan, zaman serisi yöntemleriyle finans-büyüme ilişkisinin olası doğrusal olmayan yapısı genellikle ihmal edilmiştir. Buna karşılık, bu çalışmada tek bir ülkeye (Türkiye) odaklanmayı ve kısa vadeli ve uzun vadeli bağlantıların bir zaman serisi modeli bağlamında birlikte tahmin edildiği bir model kullanmayı tercih ediyoruz. Başka bir deyişle, veri ortalamasıyla iş

döngülerinin dalgalanmalarından soyutlama yapmak yerine, kısa vadeli etkileşimlerin uzun vadeli davranışla birlikte modellendiği (ve dolayısıyla kontrol edildiği) bir model kullanıyoruz. Bildiğimiz kadarıyla, Türkiye için bu bağlamda doğrusal olmayan bir yapıyı inceleyen bir çalışma yoktur. Bu nedenle, bu çalışmada 2004Q1-2021Q2 dönemi için çok eşikli doğrusal olmayan ARDL (MT-NARDL) modeli tahmin ederek Türkiye'de finansal gelişme ve ekonomik aktivite arasındaki ilişkiye dair doğrusal olmayan ampirik kanıtları araştırmaktayız. Finansal derinlik ve ekonomik büyüme arasındaki bağlantılara ilişkin literatürdeki yerleşik uygulamalarla tutarlı olarak, regresyon modellerimiz hükümet harcamaları, enflasyon ve ticaret açıklığı gibi değişkenleri kontrol değişkenleri olarak dahil etmektedir (Örneğin, bkz. Arcand, Berkes ve Panizza, 2015). Türkiye'de 2004'ten önce sınırlı kredi hacmi nedeniyle, analizimizin başlangıç tarihi 2004'ün ilk çeyreği olarak belirlenmiştir.

Yukarıda da bahsettiğimiz üzere, Türk finans sistemi öncelikli olarak banka tabanlıdır. Aslında, Türkiye'deki politika yapıcılar ekonomik aktiviteyi desteklemek istediklerinde genellikle banka kredisi miktarını önemli bir ara hedef olarak kullanırlar. Bu nedenle, finansal derinleşme göstergesi olarak bankaların özel sektöre verdiği kredilerin GSYİH'ye oranı göstergesi kullanılmıştır. Literatürde yaygın olduğu gibi, reel GSYİH ekonomik aktivite göstergesi olarak kabul edilir. Mevcut literatüre uygun olarak, GSYİH'nin diğer belirleyicileri olarak reel kamu harcamalarını, enflasyon oranını ve ticaret açıklığını kullanıyoruz. Türk ekonomisi büyük ölçüde uluslararası ticarete ve sermaye akışlarına bağımlı olduğundan, Türk ekonomisi ve finansal sistem için oldukça önemli olduğunu düşündüğümüz iki ek değişkeni dahil ediyoruz. Bu iki değişken, reel efektif döviz kuru ve küresel likidite göstergesidir. Bu değişkenler ayrıca finans piyasalarındaki küresel ve yerel stres zamanlarını da yakalayabilir. Uzun vadeli tahvil getirisi küresel para politikası ayarlamalarına ve haberlere yüksek hızlı tepkiler verdiğinden, küresel likidite için bir temsilci olarak ABD ve Almanya'nın on yıllık devlet tahvili getirilerinin ortalamasını kullanıyoruz. Tahmin sonuçlarını daha sonra yorumlarken, kredi-GSYİH ilişkisine odaklanmak istediğimiz için bunları kontrol değişkenleri olarak ele alıyoruz. Literatürün aksine, modelimiz çeyreklik verilerden oluştuğu ve beşerî sermaye verisi yıllık verilerden oluştuğu için beşerî sermaye göstergesini değişken olarak modelimize ekleyemiyoruz.

Bu çalışmada kullanılan MT-NARDL modeli, birden fazla bilinen eşik değeri içerecek şekilde Verheyen (2013), Fedoseeva (2013) ve Pal ve Mitra (2015, 2016) tarafından geliştirilmiş olup, Shin, Yu ve Greenwood-Nimmo (2014) tarafından geliştirilen tek eşik değerli doğrusal olmayan ARDL modelinin genişletilmiş halidir. Pal ve Mitra (2016) ve diğerlerinin de belirttiği gibi, MT-NARDL metodolojisinin çeşitli avantajları vardır. Birincisi, standart ARDL modeli değişkenler arasında doğrusal bir ilişki olduğunu varsayarken, MT-NARDL modeli bir değişkendeki değişikliklere göre ilişkide kaymalara izin verir. İkincisi, bu metodoloji Pesaran, Shin ve Smith (2001) sınır testini kullanarak hem *I(0)* hem de *I(1)* değişkenlerini kullanmamıza izin verir. Yani, model değişkenleri düzey veya birinci fark formunda durağan olabilir. Bu, tüm değişkenlerin *I(1)* olmasını gerektiren Johansen ve Engle-Granger yaklaşımlarının aksinedir. Ancak model herhangi bir *I(2)* değişkeninin kullanılmasına izin vermez. Bu nedenle, ilk adım olarak, değişkenlerin hiçbirinin *I(2)* olmadığından emin olmak için birim kök testleri uyguladık. Üçüncüsü, modelin tamamen dinamik yapıda olması nedeniyle, bu metodoloji endojenlik (içsellik) ve seri korelasyon sorunlarını ortadan kaldırmaktadır. Son olarak, bu metodoloji küçük örneklemlerde bile iyi bir boyuta ve güce sahiptir. Ancak ne yazık ki bu model, eşik değerlerinin sayısını ve düzeylerini diğer model parametreleriyle içsel olarak tahmin etmeye izin vermemektedir.

Bu bölümde, analizlerimiz ilk olarak birim kök testleri yaparak değişkenlerin entegrasyon değerini belirmekle başlamaktadır. Uyguladığımız farklı konvansiyonel birim kök testlerinin hepsi aynı sonuca ulaşarak, tüm değişkenlerimizin seviye düzeyinde durağan değilken birinci dereceden farkı alındığında durağan olduğunu göstermektedir. Dolayısıyla tüm değişkenlerimizin entegrasyon seviyesi, I(1), olduğu için ARDL, NARDL, ve MT-NARDL modellerini uygulayabiliriz. Değişkenlerin entegrasyon sırasını bulduktan sonraki aşamada hem kısa hem de uzun vadede finansal gelişim ile GSYİH arasındaki ilişkideki doğrusallığı test etmek için doğrusal ARDL modelini tahmin etmekteyiz. Buna göre, ARDL modeli için sınır testi sonucu, doğrusal kurulumda kredi ile GSYİH arasında uzun vadeli bir ilişki olmadığı anlamına gelen eş bütünleşme hipotezini reddetmediğimizi göstermektedir. Bununla birlikte, doğrusal bir ilişki varsaymak çok kısıtlayıcıdır, yani olası doğrusal olmayan yapıyı göz ardı etmek, temeldeki finans-büyüme ilişkisi doğrusal olmayan bir yol

izliyorsa yanıltıcı ve ciddi şekilde önyargılı sonuçlara neden olabilir. Bu nedenle bir sonraki aşamada, kredi ile GSYİH arasındaki olası doğrusal olmayan dinamikleri yakalamak için doğrusal olmayan ARDL ve MT-NARDL modellerini uyguladık. NARDL modeli için sınır testi sonuçlarına göre, 1% düzeyinde eş bütünleşme yok boş hipotezini reddettik; bu da tek eşik değerli modelde krediler ve GSYİH arasında güçlü bir uzun vadeli ilişki gözlemlediğimizi göstermektedir. Wald testi ile uzun vadeli ilişki hipotezini reddetmekte başarısız oluyoruz. Aslında, negatif ve pozitif kredi değişimleri için uzun vadeli katsayılar oldukça yakın ve istatistiksel olarak anlamsız çıkmaktadır. Bunun arkasındaki sebep, sadece bir eşikli NARDL modelinin doğrusal olmayan yapıyı yakalamakta yeterli olmayabileceği olabilir. Yukarıda belirttiğimiz gibi, doğrusal olmayan yapının arkasındaki ana faktör, kredi değişiminin büyüklüğü olabilir; ancak bu, NARDL modeline dahil edilmemiştir. Bu nedenle, bir sonraki adımda Verheyen (2013) ve Pal ve Mitra (2015, 2016) tarafından önerilen MT-NARDL modelini uyguluyoruz; burada kredi ile GSYİH arasındaki uzun vadeli etkileşim, kredideki değişimin büyüklüğüne bağlıdır. MT-NARDL modelini öncelikle iki eşik değer (30%-70%) için analiz ettik. Buna göre hem uzun dönem ilişki olduğunu hem de ilişkinin asimetrik olduğunu gözlemledik. Yani, kredi ve GSYİH arasındaki uzun vadeli ilişkideki doğrusal olmayan yapının oldukça güçlü olduğu bulunmuştur. Bulgularımız, yönden bağımsız olarak, kredideki son derece düşük ve yüksek değişikliklerin kredi ile GSYİH arasında önemsiz bir etkileşime yol açtığını öne sürmektedir. Öte yandan, kredide nispeten ılımlı değişikliklerin olduğu zamanlarda, kredi ile GSYİH arasında oldukça önemli bir ilişki tespit ediyoruz. Sağlamlık testi için bir sonraki aşamada Kredi/GSYİH rasyosu yerine enflasyon ve döviz kurundan arındırılmış reel kredi göstergesini kullandık ve sonuçlar çok benzer çıktı. Buna göre, reel kredi değişiminin ılımlı düzeyde arttığı dönemlerde büyümeye etkisi uzun vadede pozitif ve anlamlı iken, kredi değişimlerinin negatif ve/veya çok hızlı arttığı dönemlerde büyümeye uzun vadede etkisinin istatistiksel olarak anlamsız çıktığı görülmektedir.

Finans-büyüme ilişkisindeki belirli eşiklere bağlı doğrusal olmayan yapıya ilişkin bulgularımız birkaç makaledeki bulgularla örtüşmektedir. Örneğin, üç ayrı grupta 74 ülkeden veri inceleyen Rioja ve Valev (2004), düşük finansal gelişme düzeyine sahip ülkelerde finansal piyasalarda daha fazla ilerlemenin GSYİH büyümesi üzerinde

anlamlı bir etkisi olmadığını bulmuştur. Daha yüksek finansal gelişmişlik düzeyine sahip bölgeler için etkileşim, yukarıda özetlenen literatürün çoğuna benzer şekilde önemli ölçüde pozitiftir. Shahbaz, Nasir ve Lahiani (2020), 10 gelişmiş ülke için üç rejimli bir MT-NARDL modeli tahmin etmektedir. Bulgular, değişkenler arasında doğrusal olmayan eşbütünleşmenin varlığını ortaya koymaktadır. Doğrusal olmayan yapının biçimi ülkeye göre farklılık gösterebilse de üst rejimde finansal gelişmişlik Finlandiya'da olumsuz bir etkiye yol açmaktadır. Alt rejimde finansal gelişmişlik, ABD, Malezya ve Singapur'da GSYİH büyümesini engellemektedir. Ülkeler, orta rejimde finans ve ekonomik faaliyet arasında olumlu bir etkileşim deneyimlemektedir. Ruiz (2018), 100'den fazla ülkeyle dinamik bir eşik modeli tahmin etmekte ve belirli bir finansal gelişmişlik eşiğinin altındaki ülkelerin daha düşük büyüme oranlarına sahip olduğunu bulmuştur. Sahra Altı ülkeleri için, Ibrahim ve Alagidede (2018), finansal ve reel sektörler belirli bir eşiğin üzerine çıktığında finansal gelişmişlik seviyesinin ekonomik aktiviteyle pozitif ve önemli ölçüde bağlantılı olduğunu göstermektedir.

Finansal derinliğin büyüme üzerindeki doğrusal olmayan etkisini incelediğimiz 4.Bölümdeki bulgularımız, uzun vadeli kredi-GSYİH ilişkisinde doğrusal olmayan bir yapının olduğunu ve bu ilişkinin öneminin ve büyüklüğünün kredideki değişim düzeyine bağlı olduğunu ortaya koymaktadır. Finans ve ekonomik faaliyet arasındaki önemli ve pozitif etkileşimi sürdürmede aşırı yüksek veya düşük kredi büyümesinden ziyade ılımlı kredi büyümesinin etkili olduğunu gösterdik. Ayrıca, alternatif kredi göstergesi kullandığımızda ve/veya farklı eşik değerler denediğimizde de sonuçlarımızın tutarlı olduğunu gösterdik. Bu bulgular, politika yapıcıların özel sektöre yönelik büyük kredi hareketlerini önlemeye çalışmaları gerektiğini ima etmektedir. Örneğin, kamu kredi desteklerini toplu olarak sağlamak yerine, zaman içine yaymak daha faydalı olabilir. Bu, hızlı kredi büyümesinin kaynakların üretken sektörlerden yanlış tahsis edilmesiyle ve dolayısıyla gelecekte daha düşük büyüme performansıyla ilişkili olduğunu bulan stilize bir literatürle uyumludur (Mendoza ve Terrones, 2008; Benigno ve Forno, 2014). Aslında, küresel mali krizden bu yana, bir ekonomideki kredi patlaması, finansal istikrarsızlığın önde gelen bir göstergesi olarak görülmektedir. Sonuçlarımız ayrıca, son derece düşük kredi büyümesinin de kredi-GSYİH ilişkisini bozduğunu, bunun da kredi büyümesinde her iki yöndeki

yüksek oynaklığın önlenmesi gerektiğini ima ettiğini ileri sürmektedir. Aşırı kredi büyümesi istikrarsızlaştırıcı olabilse de aşırı kısıtlayıcı bir kredi ortamı da ekonomik büyüme ve istikrar için önemli zorluklar yaratabilir. Yüksek borç seviyeleri sorunlu olabilirken, aşırı düşük kredi büyümesi, ağır borçlu bireylerin ve işletmelerin borçlarını yeniden finanse etmelerini veya yeniden yapılandırmalarını zorlaştırabilir ve potansiyel olarak finansal sıkıntıya yol açabilir. Uzun süreli çok düşük kredi büyümesi ayrıca bankaların finansal sağlığını zayıflatabilir ve potansiyel olarak bankacılık sektöründe istikrarsızlığa yol açabilir. Kredi kullanılabilirliğini sorumlu kredi verme uygulamalarıyla dengelemek, politika yapıcılar ve finansal kurumlar için önem arz etmektedir.

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