

Determinants of Financial Inclusion in Turkey

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ABSTRACT

The inclusive financial system helps all members of the economy, especially poor and unbanked people to achieve financial services easily, without any price constraints or barriers. This study aims to investigate the impacts of the shadow economy, economic growth, urbanization and inflation on financial inclusion in Turkey for the period of 1985-2015. First, The Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root tests are applied to each variable to check stationarity. Secondly, Johansen co-integration test was utilized to explore the long-term relationship among given variables and then vector error correction model (VECM) applied to determine the short and long-term coefficients. At last, Granger causality test used to check the causal relationship between financial inclusion and explanatory variables. Empirical results assert that shadow economy, economic growth, urbanization, inflation and financial inclusion are in a long-term relationship. Economic growth and urbanization have positive while shadow economy and inflation have a negative impact on financial inclusion. According to these results, various policy recommendations can be provided in order to achieve a higher level of financial inclusion. Macroeconomic variables should be observed closely by policymakers. The shadow economy is the most important factor which needs to be concentrated. Tax incentives, subsidies might decrease the level of the shadow economy in Turkey which in return can increase the level of financial inclusion. Moreover, most parts of poor and unbanked groups live in rural areas, so the government might motivate formal financial institutions which operate in rural areas to offer appropriate financial services and financial products at affordable costs. On

the other hand, as many instances, economic growth is the solution for financial inclusion.

Keywords: Financial inclusion, economic growth, shadow economy, urbanization, time series analysis, Turkey

ÖZ

Kapsayıcı finansal sistem başta yoksul ve banka erişimi olmayan insanlar olmak üzere, toplumun finansal hizmetlere fiyat engelleri olmadan kolayca ulaşmasını sağlamaktadır. Bu çalışma, 1985-2015 yılları arasında; kayıt dışı ekonomi, ekonomik büyüme, kentleşme ve enflasyonun finansal kapsayıcılığa olan etkilerini araştırmayı amaçlamaktadır. İlk olarak her bir değişken için Genişletilmiş Dickey-Fuller ve Philips-Perron birim kök testleri uygulanarak serilerdeki durağanlık kontrol edilmiştir. Sonrasında, değişkenler arasındaki uzun dönemli ilişki Johansen eş bütünleşme testi ile incelenmiş ve ardından vektör hata düzeltme modeli ile kısa ve uzun dönem katsayıları elde edilmiştir. Son olarak, finansal kapsayıcılık ve diğer açıklayıcı değişkenler arasındaki nedensel ilişkiyi ortaya çıkarmak için Granger nedensellik testi uygulanmıştır. Ampirik sonuçlar; kayıt dışı ekonomi, ekonomik büyüme, kentleşme, enflasyon ve finansal katılım değişkenlerinin uzun dönemde eş tümleşik olduğunu göstermektedir. Ekonomik büyüme ve kentleşmenin finansal katılım üzerinde pozitif etkisi görülürken, kayıt dışı ekonomi ve enflasyonun etkisi negatif olmaktadır. Bulunan sonuçlar doğrultusunda, daha yüksek seviyede finansal kapsayıcılığa ulaşabilmek için çeşitli politika seçenekleri önerilebilir. Düzenleme ve denetlemeden sorumlu kurumlar makro-ekonomik değişkenleri yakından izlemeli ve özellikle kayıt dışı ekonomi üzerine yoğunlaşmalıdırlar. Türkiye’de uygulanacak vergi teşvikleri ve sübvansiyonlar kayıt dışı ekonomi seviyesini düşürerek finansal kapsayıcılık artırılabilir. Yoksul ve banka erişimi olmayan insanların büyük bir kısmı kırsal kesimlerde yaşamaktadır ve devletin buralarda hizmet veren finansal kurumların düşük maliyetli finansal ürün sunması konusunda destek vermesi sağlanabilir. Rekabetçi bir finansal sektör bu çabaları destekleyici bir unsur olacaktır.

Diđer taraftan, birok konuda olduđu gibi, finansal kapsayıcılıđın artırılması aısından da ekonomik byüme önemli bir faktördür.

Anahtar Kelimeler: Finansal katılım, ekonomik byüme, kayıt dıřı ekonomi, kentleşme, zaman serisi analizi, Türkiye

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Chapter 1

INTRODUCTION

A well-functioning financial system is a vital factor for economic growth, achieving greater prosperity level and a stable economy. The effective financial markets and intermediaries facilitate to provide more precise and reliable information, diminish transaction costs (Denizer, Lyigun, and Owen, 2002; Fethi et al., 2013, 2015), make the trading, diversifying and hedging more easier (Khan and Senhadji, 2003), and also support to the efficient allocation of resources (Rajan and Zingales, 2003). Improvements on the financial system can support the mobilization of savings and make investments safer by identifying creditworthy borrowers (Shan, Morris and Sun, 2001; Nazlioglu et al., 2009). Moreover, the well-developed financial system is significantly and robustly correlated with physical capital accumulation and economic efficiency improvements, which in turn leads to faster current and future rates of economic growth, many studies proved and documented such nexus in the relevant literature (Bencivenga and Smith, 1991; King and Levine, 1993; Katircioglu et al., 2007; Soukhakian, 2007; Buyuksalvarci & Abdioglu, 2010; Katircioglu, 2012; Sodeyfi & Katircioglu, 2016).

Financial inclusion has a special place in having an advanced financial system. Even though financial inclusion is considered recently a hot topic and it's importance is universally accepted, still consensus about the definition of it isn't reached (Hajilee, Stringer and Metghalchi, 2017). According to Aggarwal and Klapper (2013),

financial inclusion is an ownership at formal financial institutions: credit unions, banks and etc., where financial services such as using of saving or checking accounts provide service to keep money in safe place, not in unsafe places like: with informal agents or at the home). Fungacova and Weill (2015) define this term as the use of financial services through formal financial institutions which is essential for reaching economic growth. It is a tool through which households invest in their livelihoods, controlling accounts and getting wider financial services (Kapoor, 2013). Hannig and Jansen (2010, p1) defined its purpose as “drawing the population which is out of the financial system (unbanked population) into the formal financial system to give them the opportunity to access financial services ranging from savings, payments and transfers to credit and insurance”. The definition of Chakrabarty (2010, p3) is as follows: “Financial inclusion means, assist to poor people to access financial services, helping them to get credits which suit their need and opportunities for employment”. Following the definition of Demircuc-Kunt and Klapper (2012) our study defines financial inclusion as: The inclusive financial system helps all members of the economy, especially poor people and unbanked groups to achieve financial services easily, without any price constraints or barriers.

Generally, it is accepted that the inclusive financial system enhances the level of well-being of all participants of the economy. For instances, financial inclusion helps to expand investment opportunities for financial institutions. It can decrease the level of informal sources of credits (like moneylenders). Furthermore, it facilitates the day-to-day management of finance through access to proper financial services (Sarma and Paid, 2008). Moreover, unbanked and other disadvantaged groups can use financial services which in turn results in resources being allocated efficiently and in the reduction of poverty (Fareed, Gabriel, and Reynaud, 2017; Yorulmaz, 2012).

Financial inclusion also matters for central banks because of several reasons. Mehrota and Yetman (2015) mentioned two main points through which financial inclusion can affect central bank according to their monetary and fiscal stability policies. First, households can easily have access to financial services when there is increased financial inclusion in the system and it makes it easier for them to have access to saving and borrowing aspects, this helps to reduce costs about output volatility. This can assist central banks' that aim to maintain stability among prices. Secondly, increased financial inclusion is very beneficial for an economy and stability, but too much-concentrating for providing financial services, especially credits to poor household and to unregulated part of the financial system may increase the risk of defaults which can lead negative effects on monetary and financial stability.

To enhance the level of financial inclusion countries, monetary authorities and financial institutions have made several initiatives. Governments enacted laws to provide a legal basis for this subject. One of the pioneering legislative examples, French law (1997), stated that each person has the right to have an account at formal institutions, especially bank accounts, and there shouldn't be any difficulties or barriers for individuals to open accounts. In the United States of America, the Community Reinvestment Act (1997) emphasize that banks have to concentrate to give services equally to all members of the economy. It says that the Act prohibits banks to offer services only to high-income groups in their operation area. In favor of controlling improvements in the inclusive financial system, the United Kingdom government established "Financial Inclusion Task Force" in 2005. Alongside with governments, also the monetary authorities introduced different measures. In 2006, the Reserve Bank of India started to implement "no frills" and "General Credit

Cards” measures to increase the level of financial inclusion in the country. In addition, financial institutions also have their own arrangements, for instances, the German Bankers’ Association established “Everyman” voluntary code in 1996. It established in order to meet the basic financial service transactions, without an overdraft facility.

To increase the level of inclusion, there is also a network of countries and central banks, which is “Alliance of Financial Inclusion”. This network is a top organization which consists of a group of 90 countries, mostly from developing countries who formed an alliance to accomplish a particular goal which increased the level of financial inclusion. The advantage of this platform which is owned by its members, is that all policymakers and regulators are from the alliance and they are the ones who can make it happen, who can address the challenge of financial inclusion. The Maya declaration is a statement of mutual interest regarding the improvement of the inclusive financial system which is made by the members of “Alliance for Financial Inclusion” in 2011. It emphasized that they recognize the critical importance of financial inclusion to empowering and transforming the lives of all our people, especially the poor. Moreover, they commit to delivering concrete financial inclusion outcome for the developing world to provide sustainable, cost-effective financial services for the world’s financially unserved population (Alliance of Financial Inclusion, 2011).

Even though many policies and rules established in order to achieve improvements in financial inclusion, there are over two and half billion people in the world today that live on the margins of the financial system (Demirguc-Kunt and Klapper, 2012). Approximately half of the adults in the world do not have checking or banking

accounts which shows that a very big part of the world is cut off from financial access. Not surprisingly, the situation is worse in less developed countries compared to high-income ones. Access to financial services is very difficult and many barriers exist for an adult who lives in developing countries. Global Findex survey (2011) which has large a database consisting of 148 countries, using cross-country data it more specifically identified the reasons for the exclusion. Results indicate that around 65% of the adults, do not have accounts at formal financial institutions because they don't have enough money to use for financial products. It shows that having an account is very costly for some people in most of the world. Also it isn't important or necessary for the segment of people who have a low level of income. Moreover, the distance of banks is another issue. For instance, banks being located far away from living area is the reason for 20% of adults for not having a formal account. In Sub-Saharan Africa and Latin America, one of the barriers is the documentation (number of documents needed to open an account). In Central Asia, people don't trust to the banking sector and it is the reason for them not having accounts at formal financial institutions.

For the discussion of the financial inclusion level of Turkey, some positive and negative arguments can be put forward. On the one hand, the level of financial inclusion in Turkey is higher when compared to many of the developing countries. For instances, 58% adults have accounts at formal financial institutions in Turkey which is higher than (ECA) region, Eastern Europe and Central Asia countries where 47% of adults have formal accounts. Also, the 18% usage of deposit accounts, in Turkey, is higher than the developing economies where this rate is 12%. On the other hand, despite that the level of financial inclusion is higher compared to developing countries, the situation is not that much better when compared to higher income

economies. In high-income economies account penetration is 89% which is quite high in comparison to the rate for Turkey, which is 58%. Furthermore, in high-income countries 50% adults have ownership of credit card at formal financial institutions while in Turkey this rate is only 18%. According to IMF (Financial Access Survey, 2012), Turkey has problems with the infrastructure of bank branches. For instance, only 19 branches are available per 100,000 adults in Turkey, while in ECA region countries this amount is 29 and European Union countries is 41. ATM penetrations are also in low levels compared to EU countries, in Turkey per 100,000 adults there are 63 ATMs and in EU countries there are 90 ATMs. So, it can be concluded that although it is better in comparison to many other developing countries, Turkey has some problems with establishing an inclusive financial system in the country.

There have been many efforts and initiatives to increase the level of financial inclusion in Turkey. Many of these efforts are related with establishing microfinance institutions those that; encourages credit, micro-insurance, and other financial products for the low-income groups to decrease the level of poverty (Yorulmaz, 2012) and protect them from unexpected or catastrophic events (Conroy, 2008). Some noteworthy examples of these attempts are *the Foundation for the Support of Women's Work* (FSWW) (created in 1986), *Community Volunteers Foundation* (TOG) (formed in 2002), and the *Turkey Grameen Microfinance Programme* (TGMP) (established in 2003). One of the most recent attempts for the financial inclusion is the *Financial Access, Financial Education, Financial Consumer Protection Strategy and Action Plans* established by the central bank of Turkey in 2014. The main aim of the plan is to provide financial services to all segments of the population, especially those who are unserved and out of the financial system. It also

aims to increase the quality of financial products services in order to achieve a higher level of financial inclusion. The mentioned initiatives contribute to the resolution of the subject in Turkey but, the level of financial inclusion is still lower when compared to developed countries. Alongside with these initiatives, there is a need for macro measures in order to achieve a higher level of financial inclusion in Turkey. Therefore, the aim of this study is to use macroeconomic variables to find out determinants of the financial inclusion and to assist the enhancement of the level of inclusion.

The main objective of this study is to investigate the interaction among financial inclusion, economic growth, urbanization, inflation and shadow economy in Turkey, in order to determine main variables which can support to achieve a greater inclusive financial system in the country. To investigate determinants of the financial inclusion in Turkey for a period of 1985-2015 four econometrics methods were employed on annual data set. The unit root test was applied in order to check stationarity of given variables then using Johansen co-integration test possible long-run relationship among variables are investigated. Furthermore, vector error correction model was applied to determinate short-term and long-term coefficients and lastly Granger causality test examined the direction of causality among given variables.

To our best knowledge, there are a few studies which investigated the level of financial inclusion in Turkey. Majority of these studies examined the level of financial inclusion in Turkey from a microeconomic perspective. For instance, Terzi (2015) investigated the problem from SMEs perspective and emphasized the importance of SMEs to achieve a greater level of inclusion while Aysan, Dolgun and Turhan (2014) concluded that the participation banks have a significant effect on

financial inclusion. In the literature, the studies that investigate the macroeconomic determinants of financial inclusion for the case of Turkey is scarce. Yorulmaz (2012) examined the level of inclusion in Turkey from a macroeconomic perspective, for the period of 2004-2010 and concluded that human development and economic growth are the main determinants of inclusion in the country. Also, Hajilee, Stringer and Metghalchi (2017) examined the level of financial inclusion in 18 emerging economies including Turkey. They concluded that shadow economy has a significant and negative impact on financial inclusion in short and long-term. Our study investigates the macroeconomic determinants of financial inclusion to fill the gap in the literature. Also, the aim and scope of the present study is different from previous studies, those that use a macro perspective. One of the main distinctive features of our study is to use a comprehensive proxy for the shadow economy whose calculation or estimation is a very difficult process. For instances, Hajilee, Stringer and Metghalchi (2017) used “*the labor force participation rate measured by the proportion of the population ages 15-64 that is economically active*” as a proxy for the shadow economy. However, the mentioned proxy is very weak for estimation of the shadow economy. This study is using a new data set for the shadow economy which is a more robust and reliable proxy. Moreover, another contribution of this study is using macroeconomic variables which were used as determinants of financial development in literature but neglected as a determinant for financial inclusion. So, including urbanization and inflation, our study makes a more comprehensive model in order to examine main drivers of financial inclusion in Turkey.

This study is structured as follows: In chapter 2 literature review will be discussed. Data and methodology will be summarized in chapter 3, while empirical results are

given in chapter 4. Lastly, in chapter 5, concluding remarks and some policy implication will be summarized.

Chapter 2

LITERATURE REVIEW

Financial inclusion is a research area in its early stages. There aren't many studies on financial inclusion but there is a fast-growing body of literature about it (Kim, Jung-Suk Yu, and Hassan, 2017). This chapter will present the empirical literature about financial inclusion.

2.1 Level of Financial Inclusion

Financial inclusion is essential for countries from a macroeconomic perspective. It has a considerable role in achieving economic growth and improves other macroeconomic performance of a nation. Therefore, different level of financial inclusion is a vital factor for the countries to reach their targets. In the literature, some studies are heading towards the investigation of the differences in the level of financial inclusion among countries and they emphasized importance of it. Global Findex database for financial inclusion provides the statistics for more than 148 economies (Demirguc-Kunt, Klapper, Singer, and Oudheusden, 2015). Findex is the world's most extensive set of data which has come up with consistent measures of individual's use of financial services across countries. The index indicates that there are major differences among the countries regarding the level of financial inclusion. As expected, level of inclusion is greater in high-income countries when compared to developing countries. In developed countries, 94% of adults have accounts at a bank or other formal financial institutions while in developing countries just 54% of the adults have accounts. Furthermore, there is a gap between levels of financial

inclusion among developing countries as well; account penetration is 69% in East Asia and the Pacific, however, it is only 14% in the Middle East.

In literature, there are many empirical studies which document the differences of financial inclusion among countries and regions. The financial system in European and North America countries is more developed compared to the rest of the world and due to this, level of financial inclusion is more advanced than in Africa and most of the Asian countries (Wang and Guan, 2017). Sarma (2016) studied the level of financial inclusion among Asian countries and stated that these countries have a middle level of inclusion compare to other continents. However, a difference exists within Asian countries as well, for example, countries belong to Organization for Economic Co-operation and Development (OECD) has a greater level of inclusion compare to India and Pakistan. China in comparison to the other BRICS countries has a higher level of financial inclusion. The main reason for that, in China households are mostly voluntarily financial excluded, while in BRICS countries people involuntarily excluded (Funagacova and Weill, 2014). Jukan, Babajic, and Softic (2017) examined the level of financial inclusion in Western Balkan countries and indicated that compared to other developing countries, this region has a higher inclusive financial system.

In developed countries, financial services are used more than developing countries. Adults' accounts at formal financial institutions are two times more in high-income economies than adults who live in developing countries (Demirguc-Kunt and Klapper, 2012). Most segments of the population in developing countries rarely borrow money and gets insurance packages from institutions compare to high-income countries. Only 9% of adults from developing countries originated loan from

financial institutions in 2011 (while this is 14% in developed ones). Interestingly, 11% of adults reported that they borrowed money for health issues and unexpected events in last 12 months but only 20% of this segment got this money from formal institutions. It means that most of their financing comes from relatives or friends and from outside of the formal financial sector, for example, from informal savings clubs. Usage of insurance services is also not that vastly used, for instance, only 6% of farmers in last 12 months (2011) purchased insurance for rainfall or livestock. Adults who are working in farming or fishing sectors very rarely get insurance for minimizing risks their business faces.

On the other hand, the aim of using financial services is different among continents and countries. In developing countries to use of formal financial accounts is quite limited. For instance, remittance is one of the main reasons for using formal financial accounts especially for African and some Asian countries. People use it for sending or receiving money from relatives who lives and works abroad. For instance, 38% of account holders from Sub-Saharan African countries reported that they use formal accounts only for receipt of remittances (Demirguc-Kunt and Klapper, 2012). In contrast to developed countries, the adults in developing countries mostly use formal accounts for personal purposes and rarely for business purposes. Even though, to use the formal account for business purposes is around 25% in developed countries, in developing ones it is less than one-third of this number. Mostly, people use formal accounts for receive wages or payments from the government, for instance, 27% of adults from Europe and Central Asia reported that they have an account for receiving money from the workplace.

2.2 Financial Inclusion and its Determinants

A substantial link exists between financial inclusion and economic growth. There is a considerable amount of literature which explained the significant and positive relationship between financial inclusion and economic growth (Beck, Demirguc-Kunt, and Levine, 2007; Damodaran, 2009; Nkwede, 2015; Roodman, 2012; Lenka and Sharma, 2017). Some studies examined the impact of financial inclusion on economic growth. To achieve economic development and poverty reduction, the inclusive financial system is an important factor. The positive association between financial inclusion and economic growth was found by Koomson and Ibrahim (2017) for the case of Ghana. They claim that financial inclusion will not only enhance growth at a firm level but also the whole economy will grow due to enhancements from tax revenues. Remittances are the main source of capital inflows in developing countries. Financial inclusion has a significant positive effect on economic growth through the impact of remittances on inclusion (Toxopeus and Lensink, 2007). Importance of remittances for development on financial growth, which in turn enhances economic growth, was also found by El Salvador (Anzoategui, Demirguc-Kunt and Peria, 2014) and by Lesotho (Tsemame and Wyk, 2015). Financial inclusion has a positive effect on economic growth, in case 55 Organization of Islamic Cooperation (OIC) countries (Kim, Yu, and Hassan, 2016). Access to financial services by an unbanked group of people, SMEs can increase the cycle of money in the system which in turn enhances the economy (Julie, 2013).

On the other hand, some studies examined the impact of economic growth on financial inclusion. The gross domestic product has a significant and positive effect on the inclusive financial system for twenty-six Asian countries (Gebrehiot and

Makina, 2015). Evans (2016) examined determinants of financial inclusion in 15 African countries. Results indicated that GDP per capita is the main factor for achieving greater inclusion in this sample of countries. Sarma (2011) investigated determinants of financial inclusion in forty-nine countries and concluded that GDP per capita is a key factor for financial inclusion. The same results were found for India, GDP is the main determinant of financial inclusion in this country (Nandru, Byram, and Rentala, 2016).

In developing countries, shadow economy or informal sector activities plays the considerable role of the overall acting economy (Farazi, 2014). Shadow economy consists of around 45-50 percent of official gross domestic product in developing countries which obviously, demonstrate the importance and the impact of the informal sector effecting the economy (Schneider, Buehn and Montenegro, 2010). The shadow economy provides a source of income for most segments of the population and it can absorb 55 percent of labor force in developing countries (ILO, 2012). That amount of high level shadow economy can have a negative effect on the economy, production of the country and it could be the reason for misallocation of resources (Dabla-Norris, Gradstein and Inchauste, 2008).

In the literature, there are plenty of studies examined the relationship between shadow economy with macroeconomic variables and financial sector. The impact of shadow economy on economic growth investigated by (Eilat and Zinnes, 2000) in transition countries where they found that shrinkage in shadow economy can boost economic growth. The existence of a shadow economy negatively impacts economic growth of nations (Loayza, 1996; Johnson, Kaufmann, Shleifer, Goldman and Weitzman, 1997). The association between corruption and shadow economy

examined by (Dreher and Schneider, 2009) and concluded that there are complements in developing countries. Moreover, the relationship among shadow economy and financial development studied by (Schneider, 1994; Blacknurm, Bose, Capasso, 2012; Capasso and Jappeli, 2013) where all concluded that there is a negative relationship.

Despite that there are many studies, to our best knowledge, there are only two empirical studies examined shadow economy and financial inclusion directly. (Farazi, 2014) investigate the association between financial inclusion and shadow economy by considering firm-level data. She emphasized that formal firms using more financial services exhibit a high level of inclusion, while informal firms don't want to use formal financial services due to some specific policy and regulatory problems. That study concludes that shadow economy has a negative relation with financial inclusion. Moreover, Stringer and Meghalchi (2017) examined impacts of economic growth and shadow economy on the financial market inclusion of eighteen emerging economies for a period of 1980-2013. They investigated short and long-term impacts of shadow economy on financial inclusion. The short-term results indicated that except two countries (Argentina and Colombia) shadow economy has a significant effect on inclusion. In most countries, shadow economy has a negative impact on financial inclusion but for some countries (Poland, Peru) it has a positive effect on inclusion at short-term. Nevertheless, the long-term association were also examined by the authors and their results showed that there was no positive impact of shadow economy on inclusion and for ten countries shadow economy has a negative significant impact on financial inclusion.

The level of urbanization in developing countries is one of the vital factors for financial inclusion. Household who are living in urban areas have a consistent source of income and most segment of them are willing to use their sources to open formal financial accounts while in rural areas people don't have regular cash flows and a large segment of this group don't use formal financial services. Bhandari (2009) investigate the relationship between financial inclusion and level of urbanization in India for 1980-2007 and concluded that higher level of urbanization positively impacts financial inclusion in the country. The same results found by (Pal and Pal, 2012) in India, but they additionally mentioned that in policies in recent years directed to enhance the level of financial inclusion is more effective in rural areas compared to urban areas. The relationship between financial inclusion and urbanization investigated by Cull, Demirguc-Kunt and Morduch (2012) where they consider 102 countries but excluded high income Asian and European countries, in order to only examined poor and underdeveloped countries. They found that there is a weak and positive correlation between urbanization and financial inclusion. Socio-economic variables' impacts on financial inclusion examined by (Sarma and Pais, 2011) where they used GDP as main determinants of inclusion alongside urbanization. They found the positive and significant impact of urbanization on financial inclusion.

In the literature, there are few studies (Mehrota and Yetman, 2015, Lapukeni, 2015) directly investigating the relationship between financial inclusion and inflation. Nevertheless, there are many articles (Boyd, Levine and Smith, 2001; Rousseau and Wachtel, 2001; Rousseau and Yilmazkuday, 2009; Bittencourt, 2011) studied the relationship between the financial sector and inflation. There is a negative and significant association among mentioned variables for 98 countries (Boyd, Levine

and Smith, 2001). The relation investigated by (Bittencourt, 2011) for the period of 1985-2004 in Brazil. The author concluded that inflation is harmful to financial sector. All mentioned articles indirectly show the negative impact of inflation on financial inclusion. Moreover, articles which directly investigated the relationship also found a negative association. For instance, Lapukeni (2015) examined the impact of inflation on financial inclusion and concluded that inflation is deleterious for inclusion. Anand and Prasad (2012) argue that financial exclusion is high in rural and agriculture-dependent areas, where food products are the main source of income and also the consumption for them. So, when inflation is high, consumption expenditure increases for the same good of baskets which decreases the amount of wealth and due to this, households don't have enough resources for using financial services. So, there is a negative association between inflation and financial inclusion.

2.3 Literature Review on Turkey

There is a little work have been done until today on the issue of financial inclusion on Turkey. Yorulmaz (2012) examined the relationship between financial inclusion human and economic development in Turkey for the years 2004-2010. He concluded that GDP per capita and human development are the main factors to determine financial inclusion of Turkey. The level of financial inclusion is compared in this study, among EU member countries and Turkey. According to results, EU member countries have a higher level of financial inclusion than Turkey.

Terzi (2015) examined the level of financial inclusion in Turkey, from the perspective of small and medium-sized enterprises. SMEs don't have big barriers to access for financial services in Turkey while the biggest problem for SMEs is to find

a customer, highly qualified staff, and managers. She concluded that SMEs plays a crucial role in the economy of Turkey and improvement in SMEs financial inclusion will enhance the whole economy of Turkey.

The participation banks and their supporting role for financial inclusion in Turkey was studied by Aysan, Dolgun and Turhan (2014). They stated that participation banks play an essential role for the banking sector of Turkey and they increase the level of inclusion in the country by expanding the scope for financial inclusion for those who are unbanked or are involuntary financially excluded and stayed away from conventional banks due to barriers and mainly because of religious sensitivity.

In Table 1, a literature review of previous studies on financial inclusion is provided.

Table 1. Review of The Literature

<i>Paper</i>	<i>Countries</i>	<i>Period</i>	<i>Variables</i>	<i>Methodology</i>	<i>Results</i>
Allen, Carletti, Senbet, and Qian (2014)	African and other developing countries	2007-2011	Population, population density, natural resources, GDP per capita, growth, inflation, institutional development index, manufacturing/GDP, secondary/primary school enrolment	Cross-sectional regression model	Bank branch penetration has low effect on African countries while mobile banking is important factor for increasing FI and also GDP growth is the main driver of FI
Allen, Demirguc-Kunt, Klapper, Soledad, and Peria (2016)	World	2011-2014	Income-poorest 20%, income-second 20%, income-third 20%, income fourth 20%, secondary education, educational level, employment, marital status, documentation requirements, age, age-squared, rural	Probit	Stability in political environment, higher income accounts can increase level of FI
Anzoategui, Demirguc-Kunt, and Peria (2014)	El Salvador	1996-2002	Education, remittances, age, number of adults, share of dependents, share of females	First stage, Second stage random, fixed effect regression	Remittances have significant and positive effect on FI
Camara and Tuesta (2014)	82 developed and less-developed countries	2011-2014	Account at formal institution, savings, loans, distance, affordability, documents, trust, ATMs, branch per population, GDP, education, age	Two-stage principal component analysis	Concluded importance of the supply of formal financial services than a number of users. GDP and education main variables for achieving growth in FI
Corrado and Corrado (2015)	18 Eastern European and 5 Western European countries	2008-2010	Economic crisis shocks, education, salary, employment category, internet access, gender, age, marital status, banking, the euro area	Bivariate probit	Bank inclusion and credit level increases level of FI
Demirguc-Kunt, Klapper, and Singer (2013)	Developing countries	(2013)	Gender, GDP per capita Control variables: level education, rural residence, marital status, being sole adult in the household, employment status	Probit	If there are barriers to woman it can decrease level of FI

Evans (2016)	15 Africa countries	2005-2014	GDP per capita, deposit interest rates, money supply (% of GDP), credit to the private sector (% of GDP), number of internet users, secure internet servers and adult literacy rate	Dynamic panel data approach	GDP, liquid liabilities, financial literacy, internet access and Islamic banking has a significant and positive effect on the level of FI. While domestic credits by financial sector, interest rates, and inflation have insignificant effect on FI
Funagacova and Weill (2014)	China	2011-2014	Female, age, income-poorest 20%, income-second 20%, income-third 20%, income fourth 20%, secondary education, tertiary education	OLS SLM	China has a high level of FI compare to other BRICS countries. Being male, higher education and being older are main drivers for higher level of FI
Gatnar (2013)	Poland	(2011)	Formally banked adults, adults with credit by regulated institution, payments and remittances, enterprises with credit by regulated institution, credit information, point of service, financial capability, financial consumer protection, branches per 10000 adults, number of ATMs per 10000adults, number of deposit accounts/loans per 1000 adults	Multidimensional computation model	Working-age adults are the main factor for access to services like credit, savings, insurance which lead to increase FI. Position of Poland in the aspect of FI is unfavorable compared to other European countries
Gebrehiwot and Makina (2015)	26 Asian countries	2004-2013	Commercial bank branches per 100000 adults, GDP per capita in constant terms (2005), credits, depositors with commercial banks, mobile phone infrastructure, rural population	GMM dynamic panel	Lagged value of FI has a positive effect on FI. Moreover, GDP and mobile infrastructure have significant relation with FI while rural population has negative relationship with FI

Hajilee, Stringer, and Metghalchi (2017)	18 economies	Emerging	1980-2013	Shadow economy, economic development	growth, human	Non-linear co-integration approach	Shadow economy has a significant effect on FI on long and short-run. An economic growth main indicator of FI.
Hiwatari and Tan (2014)	The Philippines		(2012)	Number of banks accounts per 100 adult population, number of banking offices per 100 adult population, number of ATMs per 1000 adult, number of alternative financial service providers per 1000 adult population, outstanding loans, and deposits as proportion of the region's GDP, GDP per capita		IV	Most regions in the Philippines have a low level of FI. Only six of the regions have a high level of FI. GDP, urbanization, literacy levels has significant positive effect on FI
Jukan, Babajic, and Softic (2017)	Western Countries	Balkan	2011-2014	Formal account penetration, savings, borrowing		Chi-square test of independence	None of these countries has a strategy for FI. Formal account and savings main determinants of FI for western countries
Khalily (2016)	Bangladesh		2006-2016	Financial knowledge, regional characteristics, control for regional heterogeneity, individual characteristics: education and age		Logit	Financial literacy has positive effect on FI
Kodan and Chhikara (2013)	Some Indian States		2007-2011	Number of deposit accounts per 1000 population, number of credit accounts per 1000 population, population per bank office, number of ATM per million population, depth, availability,		step-wise regression	Depth, availability, and usages are main determinants of FI for given sample.
Koomson and Ibrahim (2017)	Ghana		(2013)	Source of credit, remittance, employment, number of the year's enterprise operating, working hours, rural, male, age, revenue from agricultural		IV	Improvement in agricultural sector leads to increase in FI which ends enhancement in economic growth

Kumar (2013)	India	1995-2008	Population density income per capita, deposits, credits, factory/population, employment/population	Panel effects dynamic GMM	fixed and panel	Branch network has a significant effect on FI. Factories and employment are main drivers of FI.
Sarma (2016)	Asian countries	2004-2013	Bank penetration: deposit accounts per 1000 adults, number of registered "mobile money accounts" per 1000 adults, number of Bank outlets per 1000 population, usage, share of foreign banks in total banking assets, non-performing loans and capital asset ratio	Multidimensional approach		Some countries have a very low level of FI while others like (Japan, Malaysia) have a very high level of FI. NPA and FI have a negative relationship. Share of foreign banks and CAR found statistically insignificant
Martinez, Hidalgo, and Tuesta (2013)	Mexico	(2012)	Age, characteristics of the household to which the person belongs, educational level, occupation, savings and remittances, capacity for dealing with exogenous shocks, income, the size of the town or city where the individuals live	Probit		The main barrier in Mexico for access to formal financial services is lack of income and significant determinants are employment level and income.
Mindra, Moya, Zuze, and Kodongo (2017)	Uganda	2011-2014	Gender, marital status, community lived in, employment category, educational level, income, financial self-efficacy	Regression and structural equation model		Financial self-efficacy is the main significant indicator of FI.
Mohamed, Muturi, and Samantar (2017)	Somalia	(2014)	Level of income per month, bank account ownership, savings level, transaction cost, distance of bank branches, literacy level	Pearson's correlation		High income causes to increase savings through which enhance FI and also less distance between banks are the main driver for FI.
Naceur, Barajas, and Massara (2015)	OIC countries	(2013)	Branches, credit to firms, credit to small firms, borrowing from formal financial institutions, using banks to finance investment, GDP per capita, legal rights, credit information	Fixed effect		Income per capita is an important factor for FI. Islamic banking doesn't have any significant effect on FI

Nandru, Anand and Rentala (2016)	India	(2015)	Age, gender, income level, education, employment status	Binary logistic regression	Income level and education level are main determinants of FI
Noelia and David (2014)	Peru	(2011)	Rural, gender, marital status, literacy, worker without wage, the self-employed worker, age, age-squared, education, household expenditure, poor household, homeownership, expenditure per capita, income-poorest 20%, income-second 20%, income-third 20%, income fourth 20%,	Probit	Weak groups like Women, young and people living not urban areas have difficulties to access financial services. Loans, education, and income are significant factors for FI
Sarma and Pais (2011)	49 countries	(2008)	Socioeconomic variables: GDP per capita, % of literate people aged 15 years and above, % of unemployed people in the total labor force, % of the total population living in rural areas, Gini coefficients. Infrastructure variables: Paved road per square, telephone subscription per 1000 population, daily newspaper per 1000 population, computer, radio and internet users per 1000 population. Banking variables: non-performing assets, capital asset ratio, share of foreign banks, share of the government in the total banking sector, interest rate	Multidimensional computation model	GDP is the main determinants of FI. Human development and FI strongly and positively correlated. Education employment and rural population are important factors for FI. Inverse relationship between bank variables and FI
Soumare, Tchan, and Kengne (2016)	18 Central and West Africa countries	2011-2014	Account, saving, borrowing, frequency, female education age, age-squared, income quintile, rural, employment status, marital status, confidence in financial institutions, household size	Pearson Chi-Squared test	Education, age, income and full-time employed are main determinants of FI in these countries.
Toxopeus and Lensink (2007)	Developing countries	2001-2005	Remittance inflow per capita, governance index, population density, GDP, GDP per capita, communication infrastructure, transportation infrastructure, concentration ratio, credit information index, share of assets in government-owned banks, restrictions on bank activities, requirements for entry into banking	OLS and MED	Remittances are very important factor for FI

Tsemame and Wyk (2015)	Lesotho	(2015)	Mobile money, remittances, income, employment category, educational level	Regression and structural equation model	Mobile money key element in Lesotho nowadays and one of the main indicators which have positive effect on FI
Tuesta, Sorensen, Haring, and Camara (2015)	Argentina	2011-2014	Bank branches, ATMs, savings, borrowings, use of mobile, age, education level, income	Probit	Level of education, income, and age are important for the level of FI in Argentina. Mentioned variables determinates whether person has financial accounts, like accounts, credit, and debit cards
Uddin and Islam (2017)	Bangladesh	2005-2014	Bank size, cost to income ratio, interest rate on deposits, interest rates on loan, inflation rate, literacy rate, age dependency ratio	Panel effects and dynamic GMM	Bank size, interest rates have a direct impact on FI. Age dependency ratio has negative relation with FI while literacy has positive
Ulwodi and Muriu (2017)	Sub-Saharan Africa	2011-2014	Education, gender, age, debit card, remittances, income, government transfers, saved, borrowed	Modified conceptual framework model	Individuals who have low-level income has negative effect on FI because less bank account opened when income at low levels
Wang and Guan (2016)	126 countries	2011-2014	GDP per capita, Gini coefficient (degree of income inequality), unemployment of the total labor force index of economic freedom, poverty	OLS SLM SEM	North American and European countries have high FI compare to Africa and most Asian countries. Income, education, and GDP are main drivers of FI

Yorulmaz (2012)	Turkey	2004-2010	GDP per capita, unemployment rate, rural population, rural population-square, GINI coefficient, human development index	Multidimensional computation model	There is a strong and positive correlation between FI and human development index. GDP and HDI are main drivers of FI. There is a negative relationship between GINI coefficient, unemployment and FI.
Zins and Weill (2016)	37 countries	2011-2014	Female, age, age-squared, income-poorest 20%, income-second 20% income-third 20%, income fourth 20%, secondary education ,tertiary education	Probit	Income level, being man and education main determinants of FI
Zulfiqar, Chaudhary, and Aslam (2016)	Pakistan	2011-2014	Gender, age, income-poorest 20%, income-second 20% income-third 20%, income fourth 20%, secondary education, tertiary education	Probit	Income, educational level, and gender are significant indicators of FI. Documentation and lack of income main barriers for FI

* CAR stands for capital adequacy ratio; FI stands for financial inclusion; GDP gross domestic product; HDI stands for human development index; NPA stands for non-performing assets

Chapter 3

DATA AND METHODOLOGY

This study focuses on investigating the impact of gross domestic product, shadow economy urbanization and inflation on financial inclusion in Turkey. This section will concentrate on the description of the dataset which was used and the time series methodology which applied to examine the relationship between variables.

3.1 Data

Annually figures used in this study for the period of 1985-2015 and variables used are financial inclusion (FI), shadow economy (SH), gross domestic product (GDP), urbanization (URB) and inflation (INF) as follows:

Financial Inclusion: *Liquid liabilities or monetary aggregates to (% of GDP)*

Shadow economy: *Shadow economy (% of GDP)*

Gross domestic product: *GDP (constant 2010 US\$)*

Urbanization: *Urban population growth (annual %)*

Inflation: *Consumer prices (annual)*

It is expected that there economic growth and urbanization positively affect financial inclusion. According to Dai-WonKim and Jung-SukYu (2017), if the economy of a country grows, it will boost inclusion in the financial market. Meanwhile, the study by Bhandari (2009) stated that higher rate of urbanization increases the level of financial inclusion. However, shadow economy and inflation are expected to affect financial inclusion negatively. According to Berdiev and Saunoris (2016), shadow

economy causes misallocation of resources and also misdirects the resources so results negative impact on financial inclusion. Moreover, for the most segment of poor and unbanked groups especially who live in agricultural areas, food production and consumption are main sources of income and expenditure. When there is a high level of inflation, for the same basket of goods, the mentioned segment of people can have higher expenditure in real terms which at the end decrease the purchasing power of them (Mehrota and Yetman,2015).

Data for financial inclusion, gross domestic product, urbanization and inflation are gathered from The World Bank Development Indicators (WDI), the website of World Bank (2017) while shadow economy data collected from dataset constructed by (Elgin and Oztunali, 2012).¹

3.2 Methodology

As mentioned before time series methodology applied in this study. First, The Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root tests are applied to each variable for checking stationarity of them. Secondly, Johansen co-integration applied to explore the long-term relationship between given variables and then VECM utilized to determinate short and long-run coefficients. At last, Granger causality test used to check the causal relationship between financial inclusion and its explanatory variables.

3.2.1 Empirical Model

In this decade, lots of studies have been done in order to find out determinants of financial inclusion. It depends on the topic and also econometric methodologies, a different type of data like time series, panel and cross-sectional data are used. In this

¹ Updated figures until 2015 were obtained from Assoc. Prof. Elgin and Assist. Prof. Dr Öztunali

study, the aim is to examine the impact of SH, GDP, FI, URB and INF on financial inclusion in Turkey. For purpose of estimating, the functional relationship shown as follows:

$$FI = f(\text{SH}, \text{GDP}, \text{URB}, \text{INF}) \quad (1)$$

Where financial inclusion (FI) is a function of shadow economy (SH), gross domestic product (GDP), urbanization (URB) and inflation (INF).

In order to capture growth impacts the functional relationship transformed in logarithmic form in the following model:

$$\ln FI_t = \beta_0 + \beta_1 \ln SH_t + \beta_2 \ln GDP_t + \beta_3 \ln URB_t + \beta_4 \ln INF_t + \varepsilon_t \quad (2)$$

where at period t, lnFI is the natural logarithmic of financial inclusion; lnSH is the natural logarithmic of shadow economy; lnGDP is the natural logarithmic of gross domestic product; lnURB is the natural logarithmic of urbanization, lnINF is the natural logarithmic of inflation and ε is the error term. In the long term; $\beta_1, \beta_2, \beta_3$ and β_4 give elasticities of SH, GDP, URB and INF variables respectively.

3.2.2 Unit Root Tests

It is obvious from the literature that most of the macroeconomic time series data are non-stationary. If mean and variance of given series are stable over a time period, then it means that series are stationary. If this condition isn't satisfied, then the process is called to be non-stationary (Charemza and Deadman, 1997). In order to avoid any spurious regressions, first of all, stationarity of the data should be checked by unit root tests. In the present study, Augmented-Dickey Fuller (ADF) and

Phillips-Perron (PP) unit root tests are applied to examine characteristics of series (Dickey and Fuller, 1981; Phillips and Perron, 1988).

Augmented Dickey-Fuller Test: Due to the Dickey-Fuller test had spurious results when error terms are correlated, the ADF unit root test developed to solve this problem and to get reliable results. The ADF test has different specifications as follows:

Model 1: random walk

$$\Delta Y_t = \alpha_0 Y_{t-1} + \sum_{j=1}^p \gamma_j \Delta Y_{t-j} + \varepsilon_t, \quad (3)$$

Model 2: random walk with intercept only

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum_{j=1}^p \gamma_j \Delta Y_{t-j} + \varepsilon_t, \quad (4)$$

Model 3: random walk with intercept and time trend

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_1 t + \sum_{j=1}^p \gamma_j \Delta Y_{t-j} + \varepsilon_t, \quad (5)$$

where, $Y = (\varphi - 1)$ which is the variable of interest, t is a time trend; α is a constant term (drift); ε_t is a Gaussian white noise and p is the lag order. To find out optimum lag it is better to use the Akaike Information Criteria (AIC). In order to accommodate higher-order autoregressive process, using the ADF unit root test is beneficial (Greene, 2003).

Phillips-Perron test: Recommended as an alternative to Augmented Dickey-Fuller test for a unit root. This test uses Newey-West method which makes test results robust and also useful for correcting autocorrelation and heteroscedasticity. This popular method estimate as follows:

$$\omega^2 = \gamma_0 + 2 \sum_{j=1}^q (1 - \frac{j}{q+1}) \gamma_j \quad (6)$$

$$\gamma_j = \frac{1}{T} \sum_{t=j+1}^T \hat{\epsilon}_t \hat{\epsilon}_{t-j} \quad (7)$$

Where q in the above equation shows the truncation lag, γ_j is the covariance of estimated residuals j -lag apart and T represent sample size.

Both tests, ADF and PP have a same null hypothesis which states that series has a unit root or in other words, it is non-stationary while alternative hypothesis states that series are stationary.

H_0 : Unit Root (non-stationary)

H_1 : No Unit Root (stationary)

If the null hypothesis can't be rejected at the level form $I(0)$, it means that coefficient isn't different from the zero and statistically isn't significant. Then first difference $I(1)$ of series should be taken to make it stationary. If at $I(1)$ null hypothesis can be rejected then to investigate the long-term relationship, Johansen co-integration test must be applied because when first difference is taken, series losses its long-term characteristics.

3.2.3 Co-integration Test

As mentioned previously, if variables are integrated in the same order $I(d)$, then co-integration test can be applied to given variables to investigate whether there is a long-term relationship between them or not. In order to not get spurious regression results, series which aren't stationary shouldn't be regressed on another time series data which are non-stationary. Moreover, if one series is stationary while another isn't, in this case the model's results can be spurious (Granger, 1981). To overcome

these misleading inferences, (Engel and Granger, 1987) and (Johansen and Juselius, 1990) suggested co-integration tests which are robust, for the long-term stability of relationship among series.

In this study, trace test of the Johansen approached employed to check possible co-integration among given variables. This approach is more reliable compared to (Engel and Granger, 1987) approach. Johansen approach based on Vector Auto Regressive model given in the following equation

$$Y_t = \Pi_1 Y_{t-1} + \dots + \Pi_k Y_{t-k} + \mu + e_t \quad (\text{for } t=1 \dots T)$$

(8)

Where $Y_t, Y_{t-1}, \dots, Y_{t-k}$ are vectors of level and lagged values of P variables respectively that are known as $I(1)$ in the model; matrices of coefficients with (PYP) dimensions are Π_1, \dots, Π_k ; μ is an intercept vector; and e_t is a vector of random errors. It is assumed that there isn't any auto correlation among error terms when the number of lagged values is determined. The rank of the Π shows number of co-integrating vectors. The trace statistics which suggested by (Johansen and Juselius, 1990), concluded that it can be determined by use of Eigen values. The trace statistic formula given as follows:

$$\lambda_{trace} = -T \sum \ln(1 - \lambda_i), i = r + 1, \dots, n - 1 \quad \text{and the null hypotheses are:} \quad (9)$$

$$H_0: v = 1 \quad H_1: v \geq 1$$

$$H_0: v \leq 1 \quad H_1: v \geq 2$$

$$H_0: v \leq 2 \quad H_1: v \geq 3$$

3.2.4 Vector Error Correction Model

As long as long-term relationship among variables detected by using co-integration test then VECM should be applied to get coefficients for each variable. The importance of the VECM is that short and long-term coefficients can be obtained by using this model because co-integration just specifies that there is a long-term relationship between variables and doesn't give any coefficients. Moreover, VECM can associate the short term relationship among variables which integrated at I (1) and also long-term for variables which are at I (0). There is an assumption which states that dependent variable might not instantly adjust to its long-term equilibrium level by any change by its explanatory variables. In this case, discrepancy among short-term and long-term the level of financial inclusion can be examined by following vector error-correction model:

$$\begin{aligned} \Delta \ln FI_t = & \beta_0 + \sum_{i=1}^n \beta_1 \ln FI_{t-j} + \sum_{i=0}^n \beta_2 \Delta \ln SH_{t-j} + \sum_{i=0}^n \beta_3 \Delta \ln GDP_{t-j} + \\ & \sum_{i=0}^n \beta_4 \Delta \ln URB_{t-j} + \sum_{i=0}^n \beta_5 \Delta \ln INF_{t-j} + \beta_6 \epsilon_{t-1} + u_t \end{aligned}$$

(10)

Where, Δ indicates a change in the FI, SH, GDP, URB and INF variables; ϵ_{t-1} is the one period lagged error correction term (ECT) which obtained from the long-term model.

3.2.5 Granger Causality Test

The main suggestion of Causality technique (Granger, 1969) is that this test doesn't investigate the relationship among variables but it examines the causality among them. For instances, if variable A is negatively or positively related to another variable B, then Granger causality test can explore the direction of causality among given variables. Additionally, it doesn't matter whether a positive or negative

relationship exists between A and B variables, the main point of this test is that if variable A Granger causes to B, then it means A has some very important information which using that, the value of B can be predicted efficiently. Considering Granger representation theorem, it emphasizes that if there is a long-term relationship between variables then there will be causality among them. In this study, the Block Exogeneity Wald technique under the VECM used for dealing with granger causality:

$$\Delta \ln Y_t = C_0 + \sum_{i=1}^m \beta_i \Delta \ln Y_{t-i} + \sum_{i=1}^n \alpha_i \Delta \ln X_{t-i} + p_i ECT_{t-1} + \epsilon_t \quad (11)$$

$$\Delta \ln X_t = C_0 + \sum_{i=1}^m \omega_i \Delta \ln X_{t-i} + \sum_{i=1}^n \theta \Delta \ln Y_{t-i} + \eta_i ECT_{t-1} + u_t \quad (12)$$

Where X and Y represent variables; ϵ_t and u_t shows random errors which aren't correlated; ECT_{t-1} shows error term of the VECM; η_i and p_i are coefficients of the ECT_{t-1} .

Equation (11) shows that variable Y at a time is related to the past values of X and vice versa. A similar interpretation can be done for equation (12). There are four possibilities:

- 1- $Y \rightarrow X: \sum \beta_i \neq 0$ and $\sum \omega_i = 0 \rightarrow$ *unidirectional causality*
- 2- $X \rightarrow Y: \sum \beta_i = 0$ and $\sum \omega_i \neq 0 \rightarrow$ *unidirectional causality*
- 3- $X \leftrightarrow Y: \sum \beta_i \neq 0$ and $\sum \omega_i \neq 0 \rightarrow$ *bilateral causality*
- 4- *No causality among variables, they are independent from each other*

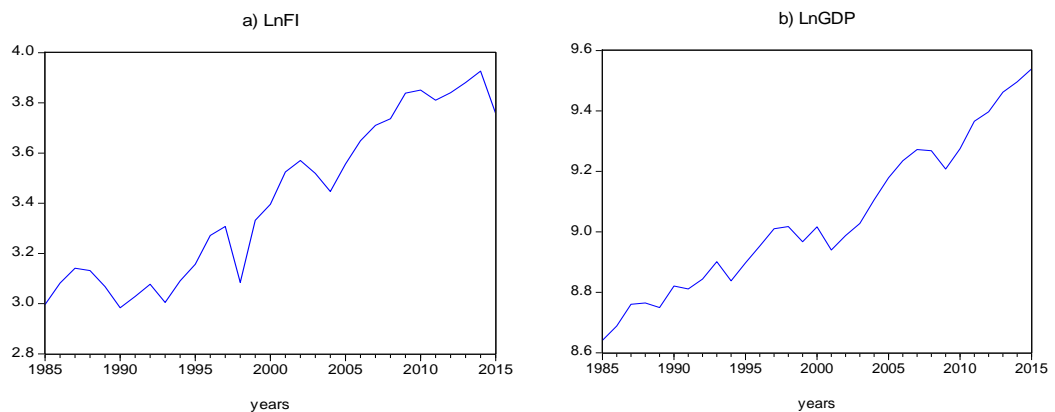
Chapter 4

EMPIRICAL ANALYSIS

The results obtained from analyses will be discussed in this section. Unit root, co-integration, VECM and causality tests applied on the variables; financial inclusion, shadow economy, economic growth, urbanization and inflation; to check stationarity, to find long and short-run coefficients and see if there is a causal relationship between these variables.

4.1 Tests for Stationarity

There are formal and informal ways to check the raw data for stationarity. In time series analysis, it is always a good idea first to check a visual plot of each given data. (Gujarati and Porter, 2009).



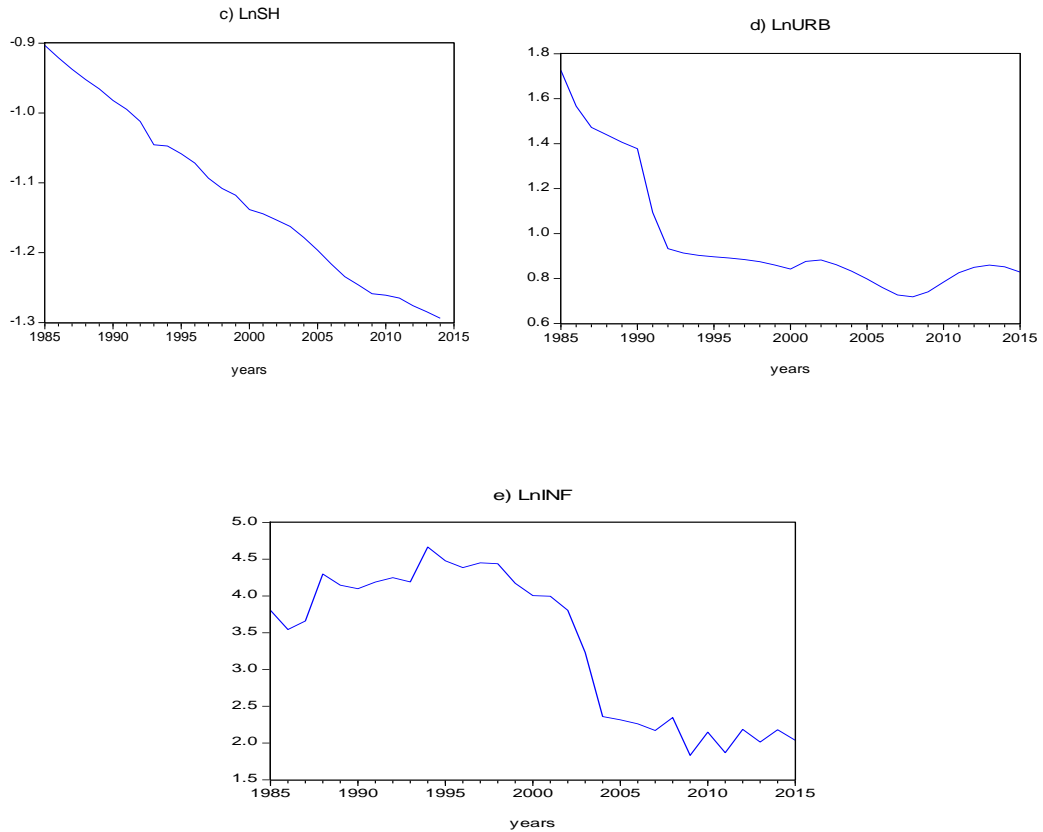


Figure 1. Time series pots of the logarithmic form of variables

The first impression from these four graphs is that all variables most probably are non-stationary. From figure 1.a and bit is obvious that LNFI and LNGDP have upward trend which indicates that during the different periods mean value of variables are changing and it sign for non-stationarity. The remaining three variables, which illustrated respectively in figure 1.c, d and e are decreasing over the time with a downward trend, proposing possibly that the given variables are non-stationary. But this is the informal way for checking stationarity of variables. Formal tests must be conducted to investigate stationarity nature of variables. In this study, we used Augmented Dickey-Fuller and Philips and Peron tests.

4.2 Unit Root Test Results

Liquid liabilities to GDP (%), shadow economy (% of GDP), GDP (constant 2010 US\$), urban population growth (annual %), consumer prices (annual %) variables for

Turkey tested for unit root between 1985 and 2015. ADF and PP test results are given in table 1.

Table 2. ADF and PP Unit Root Tests

Statistics (Level)	LnGDP	lag	LnINF	lag	LnURB	lag	LnFI	lag	LnSH	lag
τ_T (ADF)	0.236	0	-0.333	0	-1.272	5	-0.812	0	-2.271	0
τ_μ (ADF)	-2.033	0	-1.739	0	-2.031	1	-2.692	0	-1.053	0
τ_T (PP)	0.566	4	-0.385	2	-1.293	3	-0.691	8	-2.318	1
τ_μ (PP)	2.033	0	-1.739	0	-1.786	7	-2.528	4	-1.051	2
Statistics (First Difference)	Δ LnGDP	lag	Δ LnINF	lag	Δ LnURB	lag	Δ LnFI	lag	Δ LnSH	lag
τ_T (ADF)	-5.871***	0	-5.793***	0	-3.108**	0	-5.751***	0	-4.921***	0
τ_μ (ADF)	-5.858***	0	-5.835***	0	-3.863**	0	-5.575***	0	-5.625***	0
τ_T (PP)	-5.896***	3	-5.775***	3	-3.041**	3	-5.842***	3	-4.931***	3
τ_μ (PP)	-5.901***	3	-5.821***	3	-3.728**	3	-5.609***	3	-5.688***	3

Note: FI is financial inclusion; GDP is gross domestic product; INF is inflation; SH is the shadow economy; URB is urbanization. τ_T stands for the general model with a drift and trend; τ_μ is the model with a drift but without trend. Numbers in parentheses show optimum lag levels. *, **, *** represents the rejection of the null hypothesis at 10%, 5% and 1% level of alpha, respectively

The test results illustrate that all variables are non-stationary at the level form. However, when first difference is taken, all variables are integrated in order one I (1), which can be expressed other words as, they are stationary in first difference form.

4.3 Co-integration Test Results

If given variables are integrated of the same order d , Johansen co-integration test can be used for variables to search possible long-run relationship among those variables. Due to all variables are integrated in the same orders I (1), co-integration test applied to FI, SH, GDP, URB and INF variables to investigate the existence of long-run

relationship between mentioned variables. The result for Johansen co-integration test is given in table 2. Results indicate that null hypothesis of at most 2 co-integrating vector is rejected, so, it points out that financial inclusion which is dependent variable and its explanatory variables: economic growth, shadow economy and banking sector development have the tendency to move together in the long-run.

Table 3. Co-integration Test Results

Hypothesized No of CE(s)	Eigen Value	Trace Statistic	5% Critical Value	Prob.*
None ***	0.808	129.15	69.818	0.000
At most 1 ***	0.703	79.634	47.856	0.000
At most 2 ***	0.603	42.818	29.797	0.002
At most 3	0.276	15.059	15.494	0.058

Note: ***stands for the rejection of the null hypothesis at 5% level of significance

4.4 Vector Error Correction Model Results

Based on results from the co-integration test which showed the existence long-run relationship among financial inclusion and its regressors, in the next step long and short-term coefficients of the model of $FI = f(SH, GDP, URB, INF)$ can be estimated by error correction model. Table 3 present results of VECM. The ECT is significant and in the range of the expected magnitude; between (0,-1) or (-1, -2). In the first case (0, -1), the ECT tends to cause the dependent variable to converge monotonically to its long-term equilibrium level. When the value is between (-1, -2) the ECT will produce dampened oscillation in the dependent variable towards its long-term equilibrium level (Alam and Quasi, 2003; Narayan and Smyth, 2006). In this case, the coefficient -1.741 shows that the error correction process isn't

converging to the equilibrium path monotonically, it fluctuates around the long-term value in dampening manner.

The results from VECM table shows that economic growth has a positive and significant effect on financial inclusion of Turkey in the long-term. When GDP increases by 1%, financial inclusion will increase by 0.58% in the long-run and coefficient is significant. Economic activity is the main determinant of financial inclusion and expectedly it has a positive effect on financial inclusion in the long term. If the economy of a country grows, it will boost inclusion in the financial market (Dai-WonKim and Jung-SukYu, 2017).

Moreover, the results also indicate that in the long-term shadow economy has a negative and significant effect on financial inclusion. If there is a 1% increase in the shadow economy, financial inclusion of Turkey will decrease by 2.34%. The negative impacts of shadow economy on financial inclusion is expected and also it is obvious because shadow economy represents hidden part of economy and improvements on this part would definitely effect all financial system negatively. Shadow economy causes misallocation of resources and also misdirects the resources from financial system (Berdiev and Saunoris, 2016). There are several studies investigate the relationship between shadow economy and financial system (Schneider, 1994; Blacburn, Bose and Capasso, 2012; Capasso and Jappelli, 2013) but to our best knowledge, there is only one study (Hajilee, Stringer and Metghalchi, 2017) examined the relationship between financial inclusion and the shadow economy. They examined eighteen developing countries and concluded that shadow economy has a significant effect on financial inclusion in short and long-term. They

reported that for most of the countries shadow economy negatively impacts financial inclusion.

The results also illustrate that urbanization has a positive effect on financial inclusion. If there is a 1% increase in urbanization, financial inclusion will increase by 0.60%. Similar results found by (Sarma and Pais, 2008) and (Chaia, Alberto, Dalal and Golland, 2009) where they concluded that urbanization has a positive effect on financial inclusion.

Lastly, on long-term coefficients, the result indicates that inflation has a negative impact on financial inclusion, as expected, but the result statistically isn't significant. In the literature, most of the studies investigate inflation with financial development (Boyd, Levine and Smith, 2001; Bittencourt, 2011) but there a few articles examined directly inflation with financial inclusion (Mehrotra and Yetman, 2015) where they concluded that there is an inverse relationship among inflation and financial inclusion.

In table 3, short-term coefficients are given and results show that as long-term coefficients, short-term coefficients have similar effects on financial inclusion. Economic growth has a positive, while inflation has a negative relationship with the dependent variable in short-term. The coefficient of the first lag of the differenced GDP variable is statistically significant and positive. When there is an increase in GDP by 1%, financial inclusion increases by 1.41% in Turkey. The coefficient of first and second lag of the differenced inflation variable is statistically significant and has a negative effect. When inflation increases by 1% financial inclusion decreases

by 0.15 % at first lag. Same interpretations can be done for second lag of difference where the coefficient is -0.18.

Table 4. VECM Results

Description	Variable	Coefficient	Standard Error	<i>t</i> Statistic
Speed of adjustment	ΔLnFI	-1.741	0.694	-5.509
	$\Delta \text{LnGDP}(-1)$	0.572***	0.202	-2.823
Long-term coefficients	$\Delta \text{LnURB}(-1)$	0.606***	0.066	-9.181
	$\Delta \text{LnSH}(-1)$	-2.338***	0.528	4.427
	$\Delta \text{LnINF}(-1)$	-0.018	0.013	1.358
Short-term coefficients	$\text{LnGDP}(-1)$	1.409**	0.665	-2.117
	$\text{LnGDP}(-2)$	0.027	0.641	0.032
	$\text{LnGDP}(-3)$	0.381	0.458	-0.829
	$\text{LnURB}(-1)$	0.261	0.477	-0.548
	$\text{LnURB}(-2)$	0.075	0.345	-0.216
	$\text{LnURB}(-3)$	0.309	0.437	-0.707
	$\text{LnSH}(-1)$	-6.219	5.152	1.207
	$\text{LnSH}(-2)$	-0.075	0.345	-0.216
	$\text{LnSH}(-3)$	5.289	3.741	-1.413
	$\text{LnINF}(-1)$	-0.151**	0.073	-2.065
	$\text{LnINF}(-2)$	-0.179**	0.088	-2.026
	$\text{LnINF}(-3)$	-0.017	0.066	-0.263
	C	0.047	0.099	0.475

Note: **, *** represents the rejection of the null hypothesis at 5% and 1% level of alpha, respectively.

4.5 Granger Causality Test Results

After Johansen co-integration test and VECM results concluded that there is a long-run relationship between variables, in next step Granger causality tests should be applied to find out if there is a causal relationship between variables or not. The Granger Causality test under Block Exogeneity Approach results are given in table 4. The null hypothesis of the model is that there isn't any causality among variables. If the null hypothesis is rejected at any significance level (1, 5 or 10%), it will illustrate that change in one variable (economic growth) may lead to a change in another variable (financial inclusion). In this case, findings indicate that there is unidirectional causality running from GDP to FI, from SH to INF, from INF to FI and from SH to URB and from SH to GDP. It means that for example, changes or movement in FI precedes movement in GDP. Same interpretations can be concluded for rest of the variables which had unidirectional causality.

Table 5. Wald Test Results

Null hypothesis	Chi-square	df	Prob.
lnFI Does not Granger cause lnGDP	5.475	3	0.141
lnGDP Does not Granger cause lnFI	6.86***	3	0.076
lnFI Does not Granger cause lnINF	6.047	3	0.109
lnINF Does not Granger cause lnFI	0.58**	3	0.014
lnFI Does not Granger cause lnSH	3.572	3	0.311
lnSH Does not Granger cause lnFI	10.43***	3	0.015
lnFI Does not Granger cause lnURB	0.218	3	0.974
lnURB Does not Granger cause lnFI	2.266	3	0.519
lnGDP Does not Granger cause lnINF	2.627	3	0.452
lnINF Does not Granger cause lnGDP	0.193	3	0.978
lnGDP Does not Granger cause lnSH	0.178	3	0.178

lnSH Does not Granger cause lnGDP	7.876**	3	0.048
lnGDP Does not Granger cause lnURB	0.218	3	0.974
lnURB Does not Granger cause lnGDP	2.471	3	0.485
lnINF Does not Granger cause lnSH	1.991	3	0.574
lnSH Does not Granger cause lnINF	5.498	3	0.138
lnINF Does not Granger cause lnURB	5.911	3	0.116
lnURB Does not Granger cause lnINF	0.614	3	0.893
lnSH Does not Granger cause lnURB	19.65***	3	0.002
lnURB Does not Granger cause lnSH	1.149	3	0.765

*Note: *, **, *** denotes rejection of the hypothesis at the 10%, 5%, 1 level*

Chapter 5

CONCLUSION

Financial inclusion has a considerable role for individuals, firms and the economy. Inclusive financial systems help the unbanked and poor people to gain easy access to financial instruments such as; opening accounts, getting insurance packages, and risk management without any constraints or barriers. Without the well-functioning inclusive financial system, disadvantaged groups can have difficulties then trying to gain access to financial services and especially credits. This can be a reason for the shrink in the economy and the increase income inequality (Demirguc-Kunt and Klapper, 2012). The inclusive financial system helps SMEs without any difficulties reach the credit needed for their investments in businesses to pursue growth opportunities. In many development theories, financial inclusion is an important factor for the economy through enhancing growth, decreasing inequality and reducing poverty (Kakwani and Pernia, 2000; Clarke, Xu, and Zou, 2006; Demirguc-Kunt, Klapper and Randall, 2014; Bruhn and Love, 2014). Increasing the level of financial inclusion will have positive effects for all participants of the economy. Hence, determination of the factors that might contribute to financial inclusion are of great importance.

Using data for Turkey over the period of 1985-2015, this study investigates the determinants of financial inclusion in Turkey, in order to find out what could be effective policies for achieving a higher level of financial inclusion in Turkey. To

accomplish this goal, this study focuses on the relationship between financial inclusion, economic growth, shadow economy, inflation and urbanization. Time-series technique was utilized in order to investigate this relationship. Firstly, unit root tests: ADF and PP were applied to check stationarity of the variables. Secondly, Johansen co-integration test utilized to find out the possible long-term relationship between variables then, VECM were applied in order to get the short and long-term coefficients. Lastly, Granger causality test used to check if there was any causal relationship among variables.

Results of this study suggest that GDP, SH, URB and INF are in long-term equilibrium relationship with financial inclusion which indicates that, these variables are determinants of financial inclusion in Turkey. The long-term results show that GDP has a significant and positive impact on financial inclusion which is as expected. Economic growth can have direct and indirect positive impacts on financial inclusion. For instances, greater economic growth can help to minimize unemployment which can be very important to achieve an advanced level of financial inclusion. The poor and unbanked groups, in this case, can find and get jobs easily with regular cash flows which is one of the main barriers (not enough or regular cash flow) among this segment of the population that are not using formal financial services. Moreover, URB also has a positive and significant effect on financial inclusion in Turkey. As the level of urbanization increases, individuals are getting a more regular or stable income compare to one who works and lives rural areas. As mentioned before, one of the main reasons for low-level financial inclusion is not enough or instable income. When people live and work in urban areas, they have enough or at least a steady source of income which increases the level of financial inclusion. Moreover, as the population shifts to urban areas, it motivates

financial institutions to open more branches and operate in urban centers in order to meet financial needs of this segment and it increases the level of financial inclusion. According to results, shadow economy has a significant and negative impact on financial inclusion which is not surprising as well. Because, as mentioned before, shadow economy represent hidden part of economy and improvements on this part would definitely effect all financial system negatively. Resources can be misallocated, wealth might be transferred to other economies illegally in order to avoid taxation and other regulations. All of these activities in shadow economy directly and indirectly, negatively impact financial inclusion. Lastly, inflation has a negative impact on financial inclusion, as expected, but the results are statistically insignificant.

According to these results, various macroeconomic policy recommendations can be provided, these can be applied to increase the level of financial inclusion. Policy makers in Turkey should take several actions in order to achieve a higher level of financial inclusion. To this aim, the government of Turkey should try to decrease the level of the shadow economy. Policy makers might implement new taxation rules or make some encouragements, especially for SMEs in order to not participate in the shadow economy and enhance the overall economy. To achieving this, level of financial inclusion can be in advance levels. Moreover, urbanization has a positive effect on inclusion. As matter of fact most parts of poor and unbanked groups live in rural areas, so the government should take some actions in order to increase participation of banks with-in this segment in the financial sector. The government might motivate formal financial institutions which operate in rural areas to offer appropriate financial services and financial products at affordable costs. In urban areas, there are many financial institutions with many branches which offer several

financial services with low cost. But in rural areas, most of the financial institution do not want to operate. So, policy makers also should encourage the financial institution to open more branches and operate in rural areas, which at the end might help to achieve a higher level of financial inclusion in Turkey.

Future studies can be devoted to the investigation of possible nonlinear interaction among financial inclusion and macroeconomic variables. Also, the relationship between financial inclusion and infrastructure related variables (cable TV, computer, and internet) might be investigated in further studies. These variables might have a significant effect on financial inclusion in today's world. However, due to lack of sufficient data for a time series analysis in our study we haven't used mentioned variables.

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