Construction of a Regional Financial Inclusion Index in Turkey

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Abstract

This paper examines a multidimensional measurement of financial inclusion to gauge the extent of financial system across time in Turkey. A multidimensional index of financial inclusion has been developed to allow for comparison among regions and provinces of Turkey in terms of financial inclusion for policymakers. Financial access indicators are used to construct and index lying between 0 and 1. The normalized indicators are than extracted by the Euclidean distance formula. The empirical results show that financial inclusion values are parallel to the income levels of the regions and provinces. The high income level regions and provinces tend to have higher levels of financial inclusion and vice versa. These results should be primarily used by policymakers for future reference of the new legislations of financial inclusion.

Key Words: *Financial Inclusion, Financial and Economic Development, Turkey*
JEL Classification: *G2, G21, O16*

Özet - Finansal İçerme ve Ekonomik Kalkınma: Türkiye Örneği

Söz konusu çalışmanın amacı, Türkiye'nin ekonomik bölgeleri ve illeri için 2004 ve 2010 yıllarını kapsayan, yedi yıllık finansal içerme indeksi hesaplamaktır. Bu çok boyutlu ve yedi yıllık indeks ile Türkiye'deki bölgeleri ve illeri finansal içerme bazında birbirleriyle göreceli karşılaştırma imkanı da elde edilmiş olacaktır. Türkiye bazındaki finansal ulaşım göstergeleri kullanılarak 0 ile 1 rakamları arasındaki değerlerle finansal içerme derecesini gösteren bir indeks hesaplanmış olacaktır. Bulunan ampirik sonuçlara göre; bölgesel ve il bazında finansal içerme oranları söz konusu bölge ve illerin gelişmişlik düzeyleriyle doğru orantılıdır. İstanbul gibi gelişmiş bölgeler yüksek finansal içerme oranlarına sahipken; Güney Doğu Anadolu gibi bölgelerin finansal içerme oranları düşük bulunmuştur. Kanun yapıcıların bu sonuçları esas alarak yapacakları yeni düzenlemelerle bireylerin finansal araçları kullanımı arttırılıp, ekonomiye daha fazla dahil olmaları sağlanmalıdır.

Anahtar Kelimeler: *Finansal İçerme, Finansal ve Ekonomik Kalkınma, Türkiye*
JEL Sınıflandırması: *G2, G21, O16*

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1. Introduction

In recent years, the importance of an inclusive financial system has become an important policy objective in many countries. Governments, banks and financial regulators have set up new initiatives for financial inclusion and new legislative regulations have been initiated in economies. In the United States, the Community Reinvestment Act (1997) providing credits for every segments of the society, In France the law on exclusion that underlines a people's freedom for having a bank account in 1998, and in the U.K, in order to monitor the development of financial inclusion 'The Financial Inclusion Task Force (2005)' was established by the government (Financial Access 2009). Policy makers agreed that a common problem in the developing countries is the lack of access to financial services, and lending requirements such as, legal physical collateral of lower-income households. These restrictions have the impact of restricting some households that are located in relatively isolated geographic areas with low population densities. There is also evidence that there were restrictions based on gender. Besides, these lacks of inclusive and other obstructions to the financial system may widen income inequality (Conroy, 2008). According to the United Nations, 2.5 billion people around the world do not have access to formal financial services like savings accounts, credit, insurance, and payment services. In mature economies, rates of exclusion tend to be low – for example only an estimated 4% of the population in Germany and 9% in the United States go without basic access to services. But in the world's smaller and less mature economies, financial exclusion rates reach exorbitant levels; approximately 80% of the financially excluded live in Latin America, Asia or Africa. In this sense, financial inclusion poses policy challenges on a scale and with an urgency that is unique for developing countries. Therefore, financial inclusion became an important policy issue especially in the emerging market economies.

Financial inclusion purposes at drawing the population which are 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 (Hannig and Jansen, 2010). It implies the process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy (Sarma, 2008). The overall

definition of financial inclusion is building an inclusive financial system that available to all population groups and serves financial services as many people as possible in an economy. The aim of financial inclusion is:

- To bring previously excluded people under the root of financial system.
- Facilitating efficient allocation of productive resources
- Financial Inclusion is the process of making the banking services available to the low income groups.
- To provide the timely delivery of various financial services at an affordable price to financially excluded households and micro, small and medium-sized entrepreneurs.
- Financial inclusion is the aggregate way to reach an inclusive financial system.

Financial inclusion has become an important policy issue in Turkey as an emerging market. As a starting point, measurement of the access to financial services is important to begin to understand how financial inclusion may influence the Turkish economy. To date, there has been little research done on financial inclusion in Turkey. The financial inclusion literature in Turkey focuses on the finance-growth nexus since there are many papers which investigate the direction of causality between financial development and economic growth in Turkey. Kar and Pentecost (2000), and Kar, Agir, and Peker (2010) are some of the leading papers that investigate the causality issue between financial development and economic growth in the literature. In order for policymakers to understand the impact of access to financial services and to design effective policies to improve access, it is very important to measure and identify the barriers to access. Measurement of financial inclusion serves two primary objectives:

- Measuring and monitoring levels of financial inclusion,
- Deepen understanding about factors that correlated with financial inclusion and subsequently, the impact of policies (Porteous, 2009).

The contribution of this paper is to provide a measurement of the financial inclusion in Turkey. This measurement can be used for policymakers to see the extent of the financial system and can be helpful them for policy making process. In this paper, we fill this gap by presenting an index of financial inclusion using Sarma's (2008) method, which is a comprehensive measurement for financial

inclusion. A feature of this methodology is that it takes disparate measures of financial inclusion and reduces them to a single index number. This paper is an original aspect of using the relevant method for Turkey, therefore the approach taken in this paper contributes the literature in some important aspects. We examine the NUTS-1 level regions and provinces of Turkey for the years 2004-2010; while the indices that constructed in the literature do not reflect the time trend we use panel data to construct the index of financial inclusion. In doing so, adding the time dimension permits a look at how financial inclusion has changed over time and how it has impacted or been impacted by other events. Short saying the most important potential contribution of this paper is the time series measures of financial inclusion for different regions and cities in Turkey. The paper begins by explaining financial inclusion in Turkey. The next part develops the index of financial inclusion for the NUTS-1 level of regions and the cities of Turkey for the years 2004 to 2010 by using the model developed by Sarma (2008). The next part illustrates the computation of the index and explains the data and relevant summary statistics, and a summary of the major findings and ideas for further research will conclude in the last part.

2. Existing Literature

The nexus between financial market development and economic development has always been an important topic in economics. Since the onset of the financial crisis of 2007, the relationship between financial development and economic growth has drawn more interest. While this crisis had its biggest impact on the developed world, the role of financial intermediation on economic growth and development is not well understood and still widely debated among economists. For one, the direction of causality is not clear: Does development lead to financial development or is it the case that financial development leads to economic growth? It is likely that the causality runs both ways and disentangling these effects is not trivial. Early works by a Schumpeter (1912) and Hicks (1969) found that financial development causes economic growth. However, Robinson (1952) and Levine (1997) argue that economic growth promotes financial development. According to the studies of Robinson (1952) and Levine (1997), economic growth creates demand and the automatic response of the financial system for this demand causes development on the financial system.

As a policy objective, financial inclusion may contribute to overall financial development growth and poverty reduction; this is the current consensus in a long-standing debate. Improved access to financial services has a positive impact on poor people's living standards (Hannig and Jansen, 2010). The majority of the world's poor remain do not use formal financial intermediaries. Thus, the absence of financial services for the poor makes it difficult for them to make future decisions and leads to an inefficient use of resources. An inclusive financial system provides several benefits. An inclusive financial system promotes effective allocation of productive resources, and a more efficient use of resources will likely reduce the cost of capital. An inclusive financial system makes it easier for individuals to access financial services, and this improves the daily management of finances. If the inclusive financial system comes at a relatively high cost, the system can reduce the inefficiencies in credit markets from the informal credit sectors. Thus, it is possible that countries can enhance efficiency and welfare by an all-inclusive financial system by providing ways for secure and safe saving practices and by promoting efficient financial services (Sarma, and Pais, 2008).

In recent years, the importance of an inclusive financial system has become an important policy objective in many countries. Governments, banks and financial regulators have set up new initiatives for financial inclusion and new legislative regulations have been initiated in economies. In the United States, for example, the *Community Reinvestment Act (1997)* "requires banks to offer credit throughout their entire area and prohibits them from targeting only the rich neighborhoods in the U.S" (Financial Access 2010). While this may have allowed greater access to credit markets, some economists contend that this was a contributing factor to the financial crisis in 2007-2008 (Financial Access 2009). Thus, there may be costs associated with financial inclusion and it is important to take these effects into consideration. In France the law on exclusion underlines a people's freedom for having a bank account in 1998. In the U.K, in order to monitor the development of financial inclusion 'The Financial Inclusion Task Force' was established by the government in 2005.

The financial inclusion literature in Turkey focuses on the finance-growth, and financial inclusion-financial development-economic growth nexus since there are many papers which investigate the direction of causality between financial

development and economic growth in Turkey. Kar and Pentecost (2000), and Kar, Agir, and Peker (2010) are some of the leading papers that investigate the causality issue between financial development and economic growth in the literature. Kar and Pentecost (2000) identified the possible causal relationship between financial development and economic growth which seems economic growth leads to financial sector development in Turkey. In addition to this argument Kar, Agir, and Peker (2010) contribute the relationship between financial development, economic growth, and poverty reduction using a triple framework for Turkey. There is not much research on index construction in the literature. Most of the researches are made for the South-Asian countries like India and Bangladesh. Sarma (2008) is one of the first index construction researches while the financial inclusion is a new topic in the literature. There are other measurements for financial inclusion like Chakravarty and Pal's (2010) 'An Axiomatic Approach' in the literature. Researchers use different measurement methods and financial access indicators to construct the financial inclusion index. However, the results remain the same for all different methods; the high income countries tend to have higher financial inclusion rates, while the low income countries tend to have lower financial inclusion.

3. Financial Inclusion in Turkey

Financial inclusion includes regulation that is mostly aimed at microfinance and is a (policy) goal to reduce poverty in Turkey. Microfinance encourages deposits, remittances, payments, micro-insurance, and pensions, aside from credit for the poor. In addition deposit services must be convenient for access, liquid and safe; likewise, this service must be protected against inflation by positive real rates of interest for the poor to reduce poverty. Savings provides the poor with an opportunity to smooth their consumption expenditures in the face of uncertain income streams and protect households against catastrophic events (Conroy, 2008). Access to credit increases the productivity a household's labor in micro-enterprise activities. It can be difficult for lenders to know how borrowers use the funds they receive. As a consequence, the poor can benefit only when credit is provided in the context of a full portfolio of microfinance services (Conroy, 2008). Furthermore, while microfinance is more effective in reducing financial exclusion, financial inclusion is more efficient on reducing poverty through the provision of

financial services. Financial inclusion shows the inclusiveness of an economy and micro finance is a powerful tool for achieving higher levels of financial inclusion in economies. Therefore, the way to reach high level of financial inclusion is mostly using microfinance in Turkey.

Certain institutions were set up in Turkey with government subsidies and donations in order to eliminate financial exclusion. The first initiative was *The Foundation for the Support of Women's Work* (FSWW), which was established in 1986. FSWW is a non-profit and non-governmental organization. Their aim is to support low income women's groups to improve their quality of life as well as their communities and leadership. It is subsidized through public interest status and tax exemption. Another institution is The *Turkey Grameen Microfinance Programme* (TGMP), which was established by the Grameen Bank and The Foundation for Preventing the Wastage of Turkey and in 2003. The aim of TGMP is to reduce poverty in Turkey by supporting the economic and small business activities of poor women. The targets of these institutions are mostly women, unemployed youths, poor farmers, and street urchins. *Community Volunteers Foundation* (TOG) is another institution for micro-credits which was established in December 2002. This foundation aims to involve young people society by encouraging them to participate in social projects as volunteers. It was established by Nineteen May University's volunteer students and then spread to other universities in Turkey. Moreover, some government banks support micro-credits for poor people and small enterprises also known as (SME) such as Ziraat Bank for farmers and Halkbank for enterprises.

The Turkish government introduced financial legislation for a more inclusive financial system. *The Consumer Protection Law of 1995* included explicitly to financial services, and various consumer protection regulations within the framework of the financial sector. In 2003, The By–Laws on Rules and Procedures for Early Repayment Discount for Consumer Credits and Calculation of Annual Cost Rate was introduced. In 2007 The By–Laws on Rules and Procedures for Pre–Contractual Information Sheet Given by Housing Finance Institutions, The By–Laws on Rules and Procedures for Informing Consumers about Housing Finance Contracts Containing Variable Interest (2007), and By–Laws on Rules and Procedures for Early Repayment Discount and Calculation of Annual Cost Rate in

the Housing Finance System were passed into law. Furthermore, The By–Laws on Rules and Procedures for Refinance of Loans under Housing Finance was initiated in 2007 (Financial Access 2010). Efforts to develop a more inclusive financial system have been successful, and currently more than 85% of the population has some form of saving and deposit accounts after these laws and legislates in Turkey. Therefore, the number of bank branches per 100,000 individuals has increased to 8.49 from 12.36 compared to the global median of 8.4 for the year 2009. In addition, the number of ATM/Bank cards has increased from 48.3 million in 2004 to 69.9 million in 2010. Another important indicator of this trend is microfinance loans during the period 2004 to 2010. Total microfinance loans for only three institutions (FSWW, TGMP and TOG) are $ 19,569,500 (35,224,100 (TL)). If we were add to commercial banks and other institutions which provide such credits, this amount would surely be higher.

4. The Financial Inclusion Index of Turkey

Several indicators that provide information on the outreach of the financial system for the economy have been used to measure the extent of financial inclusion. The most common indicators are the number of branches per million people, the number of ATM's per million people, and the amount of bank credits and deposits (Sarma, 2008). Another banking sector outreach indicators that have been used for this measurement are branch penetration, deposit and loan accounts per capita, and deposit -income and loan –income ratios (Beck at al. 2007). However, if these measures are used individually, the analysis potentially ignores important information on the functioning of the financial system; it may also cause a misinterpretation of the economy's financial inclusion levels (Sarma and Pais, 2008). It may also be the case that some of these instruments are substitutes for the other. As a result, there may be more information contained in an aggregate measure of financial inclusion. A comprehensive measure such as the financial inclusion index that indicates information on several dimensions as a single number is required for a clear interpretation of financial inclusion (Sarma, 2008). Such an index can be used to compare levels of financial inclusion across countries, states or regions for a given period. Similarly, it can be used to see the policy initiatives progress of financial inclusion for the countries or regions. A good measurement of the extent of financial inclusion should be set up based on some

criteria, and must incorporate information on as many dimensions of financial inclusion as possible and should be comparable across regions. Additionally, it should be easy and simple to compute. The index we use satisfies these criteria. The index of financial inclusion (IFI) takes values between 0 and 1, zero indicates the lowest financial inclusion (financial exclusion), and 1 indicates complete financial inclusion.

4.1 Methodology and the present index

The approach employed in this paper is similar to United Nations Development Programme (UNDP)'s computation for well-known development indices such as the Human Development Index (HDI), the Gender-related Development Index (GDI), and the Human Poverty Index (HPI). The computation for IFI starts by first calculating an index for each aspect of financial inclusion. The index of ith dimension, di, is computed by formula (1) for each region and city.

$$di = \frac{(Ai - mi)}{(Mi - mi)} .\qquad\qquad (1)$$

Where

(A_i)= Actual value of dimension i

(Mi)=97th quantile value of dimension i

(mi)= Minimum value of dimension i

In the following example, we used empirically observed minimum value for a dimension as the lower limit and the empirically observed upper limit for the dimension. Alternatively we can use 0 for the minimum value and 1 for the upper limit. We use different quantiles for each dimension in the computation because of the specifications of the data. Thus, we used the 97th quantile of the empirically observed upper limits for dimensions for each relevant year. If there is n dimension of financial inclusion considered in a city/region, then for the city or region i it will be represented by a point $D_i = (d_1, d_2, ..., d_n)$. Finally, the index of financial inclusion, IFI_i for the ith city or region, is measured by the formula (2) which is "the normalized inverse Euclidean distance" of the point D_i from the ideal point I = (1, 1, 1, ..., 1).

$$\text{IFI}_i = 1 - \frac{\sqrt{(1-d_1)^2+(1-d_{2,})^2+ \dots +(1-d_n)^2}}{\sqrt{n}} . \qquad (2)$$

In formula (2), the second component's numerator is the Euclidean distance of D_i from the ideal point I. We obtain the inverse normalized distance dividing it by $\sqrt{n}$ and subtracting from 1 in order to make the values lie between 0 and 1. A high IFI value represents higher financial inclusion with the normalized inverse distance.

For the financial inclusion index, we consider three basic dimensions of an inclusive financial system: banking penetration, availability of the banking services and usage of the banking system.

For an inclusive financial system, there should be wide penetration amongst users. Therefore, the size of the banking population is a measure of the banking penetration of the system. However, there is no available data for the numbers of people that have bank accounts; therefore in the absence of such data even for the number of bank accounts for cities and regions of Turkey, we use the volume of bank accounts as a proportion of the total population as an indicator of the banking penetration dimension.

For an inclusive financial system, we would like to have the financial services available for users. The number of bank outlets (per 1000 people) and/or ATM's (per 1000 people) are indicators of the availability on this dimension. We use data on the number of bank branches per 1000 of persons to measure the availability dimension because of the availability of such data for the cities and regions of Turkey.

Having a bank account by itself is not enough for an inclusive financial system; in addition, the banking services must be adequately utilized. Thus, the volume of credits and deposits as the proportion of municipal and regional GDP is used to measure usage dimension for Turkey.

After considering these three dimensions (penetration, availability and usage), we can identify a city and region i by a point (p_i, a_i, u_i) in the three dimensional Cartesian space where p_i, a_i and u_i are the dimension indices for city/region i computed using formula (1). For cities and regions, the IFI is measured by the

normalized inverse Euclidean distance of the point (p_i, a_i, u_i) from the ideal point (1, 1, 1). The new formula is:

$$\text{IFI} = 1 - \frac{\sqrt{(1-pi)^2+(1-ai)^2+(1-ui)^2}}{\sqrt{3}} \quad . \qquad (3)$$

4.2 Data and Selection of Variables

Data availability is the main challenge for computing such an index. Therefore, we use the indicators explained above to avoid the missing data issue while constructing the index. In this paper, we used data from each dimension covering geographical regions and cities of Turkey from different sources. We use The Nomenclature of Territorial Units for Statistics (NUTS), where the 12 regions of Turkey are indicated by NUTS-1 level. Most of the data for these dimensions are not yet available or of limited availability. Therefore, we used different indicators for the dimensions that have this data problem to avoid the missing data issue.

Figure 1: NUTS-1 Level Regions and Cities of Turkey

TR1 ISTANBUL	TR2 WEST MARMARA	TR3 AEGEAN	TR4 EAST MARMARA	TR5 WEST ANATOLIA	TR6 MEDDITERNIAN	TR7 MID-ANATOLIA	TR8 WEST BLACK SEA	TR9 EAST BLACK SEA	TRA NORTH-EAST ANATOLIA	TRB MID-EAST ANATOLIA
TR100 Istanbul Province	TR211 Tekirdag Province	TR310 Izmir Province	TR411 Bursa Province	TR510 Ankara Province	TR611 Antalya Province	TR711 Kirikkale Province	TR811 Zonguldak Province	TR901 Trabzon Province	TRA11 Erzurum Province	TRB11 Malatya Province
	TR212 Edirne Province	TR321 Aydin Province	TR412 Eskisehir Province	TR521 Konya Province	TR612 Isparta Province	TR712 Aksaray Province	TR812 Karabuk Province	TR902 Ordu Province	TRA12 Erzincan Province	TRB12 Elazig Province
	TR213 Kirklareli Province	TR322 Denizli Province	TR413 Bilecik Province	TR522 Karaman Province	TR613 Burdur Province	TR713 Nigde Province	TR813 Bartin Province	TR903 Giresun Province	TRA13 Bayburt Province	TRB13 Bingol Province
	TR221 Balikesir Province	TR323 Mugla Province	TR421 Kocaeli Province		TR621 Adana Province	TR714 Nevsehir Province	TR821 Kastamonu Province	TR904 Rize Province	TRA21 Agri Province	TRB14 Tunceli Province
	TR222 Canakkale Province	TR331 Manisa Province	TR422 Sakarya Province		TR622 Icel Province	TR715 Kirsehir Province	TR822 Cankiri Province	TR905 Artvin Province	TRA22 Kars Province	TRB21 Van Province
		TR332 Afyon Province	TR423 Duzce Province		TR631 Hatay Province	TR721 Kayseri Province	TR823 Sinop Province	TR906 Gumushane Province	TRA23 Igdir Province	TRB22 Mus Province
		TR333 Kutahya Province	TR424 Bolu Province		TR632 Kahramanmaras Province	TR722 Sivas Province	TR831 Samsun Province		TRA24 Ardahan Province	TRB23 Bitlis Province
		TR334 Usak Province	TR425 Yalova Province		TR633 Osmaniye Province	TR723 Yozgat Province	TR832 Tokat Province			TRB24 Hakkari Province
							TR833 Corum Province			
							TR834 Amasya Province			

Source: T.R Ministry of Development http://www.dpt.gov.tr

For the banking penetration dimension, we used the data on 'Loans and Deposits by Geographical Regions and Provinces in Terms of Banking Groups' and 'Summary Information by Geographical Regions and Cities' from The Banks Association of Turkey for the years 2004 through 2010. These are made up deposit accounts, savings, commercial bank deposits, and other institutional deposits. In addition, we used the data for the population from "The Address Based Population Registration System" of Turkstat. For the availability dimension, we used the data on bank branches from the source "Banks, Branches, Deposits and Credits by Geographical Regions and Cities" of The Banks Association of Turkey for the same years. Branches contain commercial banks and other financial institutions, like post offices, that accept transferable deposits. For the usage dimension we used the data on "Banks, Branches, Deposits and Credits by Geographical Regions and Cities" for the volumes of credit and deposit from The Banks Association of Turkey for the years 2004 through 2010. Additionally, we used GDP rates for cities and geographical regions of Turkey on the data "Gross Domestic Product by Region, and Cities" from Turkstat for the relevant years.

4.3 Construction of the Financial Inclusion Index

As seen in Tables 1 and 2, the IFI values are computed for cities and geographical regions of Turkey for the relevant years using data on all three dimensions (banking penetration, availability and usage). Regions and cities are placed in the following categories depending on their IFI values in line with Sarma (2008): IFI values from 0 to 0.3 are considered low financial inclusions, from 0.3 to 0.5 medium financial inclusions, and from 0.5 to 1 high financial inclusion in this index.

Table 1: Index of Financial Inclusion (IFI) for NUTS-1 Level of Turkey

Region	2004	2005	2006	2007	2008	2009	2010
Istanbul	0.956	0.956	0.956	0.956	0.958	0.959	0.980
West Anatolia	0.863	0.862	0.861	0.855	0.874	0.870	0.878
Aegean	0.835	0.829	0.815	0.817	0.820	0.824	0.822
Mediterranean	0.661	0.664	0.664	0.668	0.677	0.678	0.686
East Marmara	0.656	0.633	0.583	0.588	0.589	0.582	0.588
West Black Sea	0.542	0.522	0.524	0.525	0.523	0.527	0.527
West Marmara	0.531	0.519	0.511	0.516	0.506	0.504	0.499
Mid-Anatolia	0.516	0.491	0.490	0.473	0.471	0.474	0.482
East Black Sea	0.561	0.522	0.482	0.482	0.472	0.473	0.474
South-East Anatolia	0.418	0.362	0.354	0.359	0.370	0.378	0.388
North-East Anatolia	0.347	0.346	0.345	0.331	0.325	0.332	0.331
Mid-East Anatolia	0.322	0.313	0.313	0.302	0.291	0.299	0.298

Source: Authors own calculations.

The IFI values of cities and regions in Turkey are calculated for each year from 2004 to 2010. There are 80 cities and 12 (NUTS-1) regions. We considered NUTS-1 level (12 geographical region) and 80 cities under these regions of Turkey as seen in Figure 1. NUTS-1 region TR1 Istanbul leads with the highest IFI values during these years with the average value of 0.96546 and TRB Middle-East Anatolia ranks the lowest with the average IFI value of 0.305373 (Table 1). Seven of the NUTS-1 level regions are in the high IFI category: Istanbul, West Anatolia, Aegean, Mediterranean, East Marmara, West Black Sea, and West Marmara, according to levels of IFI for relevant years except 2010. West Marmara seems to fall into the medium IFI level category with a slight decrease in 2010. The rest of the five regions are in the medium IFI category during 2004 to 2010, except Mid-East Anatolia, which is in the low level IFI category with a slight decrease after 2005. The high IFI level regions are also highly developed regions in Turkey in line with the income levels. Medium IFI regions are mostly low and medium income regions. While Mid-Anatolia and East Black Sea are 'upper middle income' regions, South-East Anatolia, Middle East Anatolia, and North East Anatolia are 'low income' regions. Besides these results, there could be some discussion on the break-down of IFI levels with respect to income. For example, while East Marmara is ranked second in income level amongst these regions, it has the rank of 5th for IFI. The higher rank of West Anatolia, compared to East Marmara, in IFI, can be primarily

attributed a high level of branches/ATMs networks and high credit plus deposits, relative to GDP in West Anatolia. Additionally, West Marmara has the rank of 7th in IFI, while it has the rank of 3rd in income level among regions. The Aegean and Mediterranean regions have higher IFI ranks compared to West Marmara due to their higher credit and deposit volumes as a proportion of GDP. Similarly, while Mid-East Anatolia has the lowest IFI rank in the index, South-East Anatolia has the lowest income level among regions. Moreover, South-East Anatolia has a higher IFI rank compared to Mid-East Anatolia and North-East Anatolia due to its higher level of credit and deposit volumes.

Another important contribution of the results is most of the regions seem to have decreasing financial inclusion rates over time, since the availability, penetration and usage of the banking sector tend to have increasing in Turkey. This contradiction comes from the construction method, those slightly changes can be tested with a broader empirical research in the future.

Table 2: Index of Financial Inclusion (IFI) for Provinces of Turkey

Provinces/IFI	2004	2005	2006	2007	2008	2009	2010
Balıkesir	0.73	0.72	0.718	0.706	0.705	0.704	0.69
Çanakkale	0.559	0.576	0.579	0.57	0.56	0.557	0.539
Edirne	0.531	0.525	0.518	0.521	0.529	0.531	0.521
Kırklareli	0.515	0.512	0.507	0.499	0.496	0.494	0.487
Tekirdağ	0.558	0.572	0.573	0.589	0.579	0.578	0.561
Afyonkarahisar	0.523	0.506	0.494	0.481	0.49	0.49	0.476
Aydın	0.689	0.719	0.713	0.711	0.73	0.72	0.695
Denizli	0.71	0.702	0.68	0.673	0.709	0.697	0.698
İzmir	0.965	0.965	0.965	0.965	0.974	0.971	0.949
Kütahya	0.46	0.449	0.437	0.436	0.447	0.452	0.435
Manisa	0.631	0.635	0.622	0.623	0.64	0.651	0.625
Muğla	0.8	0.858	0.868	0.881	0.881	0.887	0.844
Uşak	0.525	0.511	0.497	0.474	0.463	0.462	0.46
Bilecik	0.439	0.444	0.436	0.441	0.45	0.45	0.422
Bolu	0.456	0.454	0.445	0.439	0.445	0.443	0.437
Bursa	0.709	0.699	0.708	0.717	0.733	0.731	0.736
Düzce	0.373	0.383	0.374	0.368	0.358	0.357	0.356
Eskişehir	0.581	0.596	0.583	0.587	0.602	0.616	0.577
Kocaeli (İzmit)	0.702	0.71	0.688	0.683	0.712	0.701	0.714
Sakarya	0.421	0.439	0.422	0.42	0.424	0.43	0.44
Yalova	0.447	0.437	0.447	0.441	0.424	0.416	0.409
Ankara	0.965	0.965	0.965	0.965	0.983	0.998	0.998
Karaman	0.363	0.359	0.36	0.344	0.35	0.36	0.376

Konya	0.589	0.598	0.593	0.593	0.625	0.629	0.643
Adana	0.678	0.686	0.685	0.684	0.695	0.7	0.692
Antalya	0.852	0.874	0.894	0.901	0.909	0.9	0.903
Burdur	0.451	0.461	0.462	0.468	0.479	0.478	0.466
Hatay (Antakya)	0.563	0.556	0.551	0.537	0.548	0.541	0.542
Isparta	0.486	0.489	0.492	0.494	0.503	0.496	0.475
Mersin	0.637	0.643	0.647	0.657	0.674	0.665	0.662
Kahramanmaraş	0.33	0.355	0.36	0.355	0.365	0.372	0.382
Osmaniye	0.271	0.296	0.291	0.286	0.301	0.3	0.292
Aksaray	0.38	0.369	0.365	0.348	0.349	0.356	0.355
Kayseri	0.613	0.623	0.636	0.629	0.654	0.658	0.66
Kırıkkale	0.382	0.375	0.389	0.378	0.38	0.381	0.384
Kırşehir	0.445	0.422	0.431	0.411	0.412	0.416	0.414
Nevşehir	0.497	0.501	0.498	0.485	0.48	0.48	0.479
Niğde	0.343	0.346	0.341	0.324	0.328	0.331	0.337
Sivas	0.495	0.494	0.487	0.46	0.476	0.483	0.473
Yozgat	0.413	0.41	0.401	0.386	0.403	0.407	0.416
Amasya	0.454	0.464	0.452	0.444	0.464	0.46	0.448
Bartın	0.432	0.42	0.437	0.425	0.426	0.416	0.414
Çankırı	0.433	0.443	0.439	0.436	0.43	0.424	0.424
Çorum	0.463	0.469	0.471	0.458	0.466	0.484	0.485
Karabük	0.457	0.433	0.436	0.441	0.427	0.431	0.42
Kastamonu	0.501	0.513	0.523	0.513	0.509	0.507	0.495
Samsun	0.604	0.581	0.602	0.603	0.624	0.624	0.629
Sinop	0.446	0.457	0.45	0.428	0.429	0.441	0.437

Tokat	0.385	0.398	0.389	0.393	0.421	0.418	0.421
Zonguldak	0.57	0.567	0.561	0.55	0.567	0.583	0.56
Artvin	0.482	0.482	0.478	0.476	0.479	0.478	0.474
Giresun	0.787	0.707	0.514	0.503	0.495	0.501	0.494
Gümüşhane	0.355	0.352	0.34	0.325	0.326	0.328	0.358
Ordu	0.467	0.453	0.463	0.469	0.464	0.464	0.454
Rize	0.49	0.5	0.488	0.491	0.485	0.489	0.493
Trabzon	0.724	0.705	0.689	0.668	0.672	0.669	0.653
Ağrı	0.195	0.204	0.206	0.209	0.213	0.221	0.226
Ardahan	0.4	0.406	0.392	0.377	0.366	0.375	0.37
Bayburt	0.374	0.376	0.366	0.366	0.359	0.362	0.366
Erzincan	0.456	0.451	0.449	0.431	0.444	0.446	0.422
Erzurum	0.408	0.422	0.444	0.397	0.398	0.409	0.403
Iğdır	0.303	0.305	0.291	0.264	0.277	0.289	0.285
Kars	0.363	0.371	0.37	0.366	0.347	0.355	0.354
Bingöl	0.237	0.24	0.232	0.22	0.213	0.216	0.218
Bitlis	0.236	0.238	0.231	0.218	0.214	0.223	0.237
Elazığ	0.422	0.409	0.416	0.4	0.4	0.409	0.395
Hakkari	0.221	0.232	0.229	0.211	0.194	0.2	0.198
Malatya	0.413	0.409	0.423	0.404	0.403	0.408	0.398
Muş	0.178	0.178	0.175	0.165	0.164	0.174	0.175
Tunceli	0.463	0.459	0.458	0.453	0.445	0.453	0.462
Van	0.266	0.276	0.274	0.265	0.265	0.274	0.263
Adıyaman	0.295	0.268	0.271	0.283	0.295	0.306	0.301
Batman	0.244	0.224	0.23	0.229	0.232	0.235	0.231

Diyarbakır	0.392	0.359	0.366	0.374	0.386	0.396	0.399
Gaziantep	0.498	0.509	0.508	0.513	0.532	0.54	0.539
Kilis	0.261	0.253	0.245	0.265	0.27	0.285	0.289
Mardin	0.272	0.243	0.25	0.231	0.25	0.275	0.269
Siirt	0.241	0.234	0.219	0.207	0.203	0.215	0.213
Şanlıurfa	0.311	0.271	0.267	0.277	0.288	0.302	0.3
Şırnak	0.253	0.232	0.219	0.2	0.201	0.203	0.212

Source: Authors Own Calculation.

Ankara and İzmir lead with the highest IFI values and Muş has the lowest rank of IFI values. Out of these 80 cities, there were twenty-eight cities in 2004, thirty-one in 2005, twenty-seven in 2006, twenty-six in 2007-09, and twenty-four in 2010 in the high IFI category, as seen in Table 2. As with regions, the IFI values of cities follow a similar order to the income levels of these cities with some exceptions. While Isparta, Burdur, Bolu, Yalova, Bilecik, Kırklareli, and Sakarya are in high income group cities; their IFI ranks are in the medium group because of the lack of one or more indicators for the dimensions in the index. On average, half of the cities are in the medium level IFI category during the years 2004 to 2010. Another argument for the ranks of IFI and development level is that some cities are in the medium income level group while their ranks are in the high IFI category. For instance, Trabzon, Giresun, Gaziantep, Kastamonu, Uşak and Afyon (at 2004 and 2005), and Giresun (for the years 2006, 2007 and 2009) are in the middle income level, though they have high IFI ranks. However, Ardahan, Diyarbakır, Kars, Gümüşhane and Adıyaman (after 2008) are in the low income level group with less development, but they are in the middle IFI category in the index. The rest of the cities are in the low IFI category for the relevant years; Osmaniye, Adıyaman, Şanlıurfa, Kilis, Van, Iğdır, Mardin, Batman, Bingöl, Bitlis, Hakkari, Ağrı, Siirt, Şırnak and Muş are also low income cities in Turkey. Finally, as the last argument for a low IFI category, Osmaniye is in the middle income group, although it is found in the low IFI category, in the index.

The same important problem is seen in the provinces across time. The financial inclusion rates of most provinces tend to decrease over time which seems as a contradiction compare to the reality.

5. Conclusion

Financial development enhances human development, and access to financial services makes a positive impact on people's lives particularly poor people. In addition, financial development reduces income inequality and boosts incomes. Over the last few decades, policymakers have considered financial sector reforms that promote financial inclusion. We attempt to measure the extent of financial system in Turkey with this research. The index of financial inclusion was used to measure the extent of the financial system in Turkey settled up by using a multidimensional computation model which was developed by Sarma (2008) for the NUTS-1 level regions and cities of Turkey for the years 2004 to 2010 in Section 1. We find that levels of financial inclusion for the regions and provinces in line with their income levels. The financial inclusion values of the regions are found as expected manner. Istanbul leads with the highest IFI values during these years and Middle-East Anatolia ranks the lowest. Seven of the NUTS-1 level regions are in the high IFI category: Istanbul, West Anatolia, Aegean, Mediterranean, East Marmara, West Black Sea, and West Marmara, according to levels of IFI for relevant years except 2010. West Marmara seems to fall into the medium IFI level category with a slight decrease in 2010. The rest of the five regions are in the medium IFI category during 2004 to 2010, except Mid-East Anatolia, which is in the low level IFI category with a slight decrease after 2005. The high IFI level regions are also highly developed regions in Turkey in line with their income levels. Medium IFI regions are mostly low and medium income regions. While Mid-Anatolia and East Black Sea are 'upper middle income' regions, South-East Anatolia, Middle East Anatolia, and North East Anatolia are 'low income' regions. The IFI values of the provinces are found that Ankara and İzmir lead with the highest IFI values and Muş has the lowest. Out of these 80 cities, there were twenty-eight cities in 2004, thirty-one in 2005, twenty-seven in 2006, twenty-six in 2007-09, and twenty-four in 2010 in the high IFI category. As with regions, the IFI values of cities follow a similar order to the income levels of these cities. Policymakers should take into consideration to these results in light of any new legislation for the financial

system in Turkey. The regions and specifically the provinces that have low financial inclusion ranks need to be considered primarily by policymakers. Lowering the cost of using financial services must be the primary regulation for consumers to easy access to the services.

For further research, the indicators of the dimension of financial inclusion index can be extended for broader measurements. Since in most of the developed countries financial services have turned electronic or virtual systems, using the usage of internet and mobile banking data has become most important for identifying the extent of the financial system. However, the lack of data on internet banking is still a critical issue for such measurement. The IFI can be used to compare the levels of financial inclusion across economies. In addition, it can be used to see the policy initiative progress of financial inclusion over years. Additionally, such an index can be used in order to investigate various empirical questions like the relationship between financial inclusion and development.

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