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Index of Financial Inclusion

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Abstract

The promotion of an inclusive financial system is a policy priority in many countries. While the importance of financial inclusion is widely recognized, the literature lacks a comprehensive measure that can be used to measure the extent of financial inclusion across economies. This paper attempts to fill this gap by proposing a multidimensional index of financial inclusion (IFI). The proposed IFI captures information on various dimensions of financial inclusion in one single number lying between 0 and 1, where 0 denotes complete financial exclusion and 1 indicates complete financial inclusion in an economy. The proposed index is easy to compute and is comparable across economies.

KEY WORDS: Financial inclusion, IFI, multi-dimensional index, normalized inverse Euclidean distance, financial exclusion

JEL Classification: G00, G21, O16

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1. Introduction

The academic literature has adequately discussed the close relation between financial development and economic growth.¹ However, there has not been much discussion on whether financial development implies financial inclusion. It has been observed that even ‘well-developed’ financial systems have not succeeded to be ‘all-inclusive’ and certain segments of the population remain outside the formal financial systems. The importance of an inclusive financial system is widely recognized in the policy circle and financial inclusion is seen as a policy priority in many countries.² An inclusive financial system is desirable for many reasons. First, it facilitates efficient allocation of productive resources. Second, access to appropriate financial services can significantly improve the day-to-day management of finances. And third, an all-inclusive financial system can help reduce the growth of informal sources of credit (such as moneylenders) which often tend to be exploitative. Thus, an all-inclusive financial system enhances efficiency and welfare by providing avenues for secure and safe saving practices and by facilitating a whole range of efficient financial services.

By the late 2000s, the significance of an inclusive financial system has been extensively recognised leading to it becoming a policy priority in many countries. Initiatives for building inclusive financial systems have come from the financial regulators, the governments and the banking industry. Several countries have initiated legislative measures, for example, the Community Reinvestment Act (1997) of the United States of America requires banks to offer credit throughout their area of operation and prohibits them from targeting only the rich neighbourhoods. The French law against exclusion (Loi du 29 Juillet 1998 contre l’exclusion) emphasises an individual’s right to have a bank account. In the United Kingdom, a ‘Financial Inclusion Task Force’ was constituted by

the government in 2005 in order to monitor the development on financial inclusion. Among several initiatives of the banking sector in promoting financial inclusion are the German Bankers' Association's voluntary code (1996) to provide for an 'everyman' current banking account that facilitates basic banking transactions, introduction of 'Mzansi', a low cost bank account, in 2004 for financially excluded people by the South African Banking Association and initiatives by the Reserve Bank of India (RBI) to achieve greater financial inclusion, such as facilitating 'no-frills' accounts and "General Credit Cards" for low deposit and credit. Alternate financial institutions, such as micro-finance institutions and 'Self-Help Groups', are also promoted in many countries in order to provide financial services to the excluded.

Multilateral organisations such as the World Bank (WB) and the International Monetary Fund (IMF) have also paid focussed attention to the issue of financial inclusion through policy prescriptions and guidelines.³ In addition, the IMF has recently initiated "Financial Access Survey" in an endeavour to put together cross country data and information relating to the issue of financial inclusion.⁴

Building an inclusive financial system is a complex process. The literature identifies five major forms of financial exclusion – *access exclusion*, where segments of population remain excluded from the financial system either due to remoteness or due to the process of risk management of the financial system; *condition exclusion*, when exclusion occur due to conditions that are inappropriate for some people; *price exclusion*, when the exclusion happens due to unaffordable prices of financial products; *marketing exclusion*, when exclusion occurs due to targeted marketing and sales of financial products and *self-exclusion*, that takes place when certain groups of people exclude themselves from the formal financial system owing to fear of refusal or due to psychological barriers

(Kempson and Whyley, 1999a, Kempson and Whyley, 1999b). Thus, financial inclusion is a multidimensional phenomenon.

While the importance of financial inclusion is widely recognized, the literature on financial inclusion lacks a comprehensive measure that can be used to measure the extent of financial inclusion in an economy. In this paper, we attempt to fill this gap by proposing an index of financial inclusion that captures information on several dimensions of an inclusive financial system. A robust and comprehensive measure of financial inclusion is important in order to take stock of the current state of affairs with respect to financial inclusion in an economy and to monitor the progress of the policy initiatives undertaken to promote financial inclusion. A robust and comprehensive measure of financial inclusion is also of importance for the research community to investigate hypothesis relating to financial inclusion that have been raised in the academic literature.

Section 2 of this paper defines financial inclusion; Section 3 presents an index of financial inclusion; Section 4 illustrates the computation of the index of financial inclusion using available data. Section 5 concludes this paper.

2. Defining Financial Inclusion (Exclusion)

Financial inclusion (or, alternatively, financial exclusion) has been defined in the literature in the context of a larger issue of social inclusion (or exclusion) in a society. One of the early attempts by Leyshon and Thrift (1995) defined financial exclusion as referring to those processes that serve to prevent certain social groups and individuals from gaining access to the formal financial system. According to Sinclair (2001), financial exclusion means the inability to access necessary financial services in an appropriate form.

Exclusion can come about as a result of problems with access, conditions, prices, marketing or self-exclusion in response to negative experiences or perceptions. Carbo et al. (2005) have defined financial exclusion as broadly the inability of some societal groups to access the financial system. The Government of India's 'Committee on Financial Inclusion in India' begins its report by defining financial inclusion '*as the process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as the weaker sections and low income groups at an affordable cost*' (Rangarajan Committee 2008).

Thus, most definitions indicate that financial exclusion is manifestation of a much broader issue of social exclusion of certain societal groups such as the poor and the disadvantaged. For the purpose of this paper, we define financial inclusion *as a process that ensures the ease of access, availability and usage of the formal financial system for all members of an economy*. This definition emphasizes several dimensions of financial inclusion, viz., accessibility, availability and usage of the financial system. These dimensions together build an inclusive financial system. As banks are the gateway to the most basic forms of financial services, banking inclusion/exclusion is often used as analogous to financial inclusion/exclusion.⁵ In this paper also, we will use banking inclusion as analogous to financial inclusion.

3. Developing an Index of Financial Inclusion (IFI)

3.1. Motivation

Several indicators have been used to assess the extent of financial inclusion. The most commonly used indicator has been the number of bank accounts (per 1000 adult persons). Some other indicators are number of bank branches (per million people), number of ATMs (per million people), amount of bank credit and amount of bank deposit. In Beck et al (2007), other indicators of banking sector outreach have been used

– geographic branch penetration, loan and deposit accounts per capita, loan-income and deposit-income ratios and so on. All these indicators provide important and useful information on outreach of the financial system of an economy. However, while used individually, they provide only partial information on the inclusiveness of the financial system. Using individual indicators may also lead to a misinterpretation of the extent of financial inclusion in an economy as seen from the example in Table 1 that presents some such indicators for a select group of countries.

As shown in Table 1, the number of bank accounts per 1000 adults is highest in Russia, followed by Thailand, Malaysia and Colombia. However, if we look at the number of bank branches per 100,000 adult people, Russia ranks the lowest. Looking at another dimension of an inclusive banking system, that is, usage of the banking system in terms of the volume of credit and deposit, Argentina seems to be having very low credit to GDP ratio in spite of moderate density of bank accounts and bank branches. In India, in spite of low density of bank branches, the usage of the banking system in terms of volume of credit and deposit seems to be moderately high. As evident from this example, any one single indicator fails to adequately capture the extent of financial inclusion.

Thus, a comprehensive measure, such as the index proposed in this paper, is required. It should be able to incorporate information on several aspects (dimensions) of financial inclusion preferably in one single number. Such a measure can be used to compare the levels of financial inclusion across economies and across states/provinces within countries at a particular time point. It can be used to monitor the progress of policy initiatives for financial inclusion in a country over a period of time. Further, such a measure would be of academic interest to address issues put forward in the growing

literature on financial inclusion. For example, scholars have attempted to investigate whether economic development leads to an all-inclusive financial system and whether low financial inclusion is associated with high income inequality (Kempson et al, 2004). In order to investigate such questions empirically, a robust and comprehensive measure of financial inclusion is required. A good measure of financial inclusion, in our view, should be constructed based on the following criteria: it should incorporate information on as many aspects (dimensions) of financial inclusion as possible; it should be easy and simple to compute and it should be comparable across countries.

We propose an index of financial inclusion (IFI), which satisfies these criteria. The proposed IFI takes values between 0 and 1, zero indicating lowest financial inclusion (complete financial exclusion) and 1 indicating complete financial inclusion.

3.2 Methodology

As the inclusiveness of a financial system should be evaluated along several dimensions, we follow a multidimensional approach while constructing our index of financial inclusion (IFI). Our approach is similar to that used by UNDP for computation of some well known development indexes such as the HDI, the HPI, the GDI and so on.⁶ As in the case of these indexes, our proposed IFI is computed by first calculating a dimension index for each dimension of financial inclusion. The dimension index for the i^{th} dimension, d_i , is computed by formula **(1)**. A weight w_i such that $0 \leq w_i \leq 1$ is attached to the dimension i , indicating the relative importance of the dimension i in quantifying the inclusiveness of a financial system.

$$d_i = w_i \frac{A_i - m_i}{M_i - m_i} \quad (1)$$

where

w_i = Weight attached to the dimension i , $0 \leq w_i \leq 1$

A_i = Actual value of dimension i

m_i = lower limit on the value of dimension i , fixed by some pre-specified rule.

M_i = upper limit on the value of dimension i , fixed by some pre-specified rule.

In the example that follows, we have used the empirically observed minimum value of a dimension as the lower limit and the empirically observed 94th quantile of a dimension as the upper limit for the dimension. The reason for this choice of lower and upper limits is explained in Section 3.4.

Formula **(1)** ensures that $0 \leq d_i \leq w_i$. Higher the value of d_i , higher the country's achievement in dimension i . If n dimensions of financial inclusion are considered, then, a country will be represented by a point $D = (d_1, d_2, d_3, \dots, d_n)$ on the n -dimensional Cartesian space.

In the n -dimensional space, the point $O = (0, 0, 0, \dots, 0)$ represents the point indicating the worst situation while the point $W = (w_1, w_2, \dots, w_n)$ represents the highest achievement in all dimensions. The index of financial inclusion, IFI, for a country, is then measured by the normalized inverse Euclidean distance of the point D from the ideal point $I = (w_1, w_2, \dots, w_n)$. The exact formula is

$$IFI = 1 - \frac{\sqrt{(w_1 - d_1)^2 + (w_2 - d_2)^2 + \dots + (w_n - d_n)^2}}{\sqrt{w_1^2 + w_2^2 + \dots + w_n^2}} \quad (2)$$

In formula (2), the numerator of the second component is the Euclidean distance of D from the ideal point W, normalizing it by the denominator and subtracting by 1 gives the inverse normalized distance. The normalization is done in order to make the value lie between 0 and 1 and the inverse distance is considered so that higher value of the IFI corresponds to higher financial inclusion.

For simplification, if we consider all dimensions to be equally important in measuring the inclusiveness of a financial system, then $w_i = 1$ for all i . In this case, the ideal situation will be represented by the point $I = (1,1,1,\dots,1)$ in the n -dimensional space and the formula for IFI will be

$$IFI = 1 - \frac{\sqrt{(1-d_1)^2 + (1-d_2)^2 + \dots + (1-d_n)^2}}{\sqrt{n}} \quad (3)$$

The IFI so defined, can be used to measure financial inclusion at different time points and at different levels of economic aggregation (village, province, state, nation and so on).

3.3 The present index

In the index presented here, we consider three basic dimensions of an inclusive financial system: banking penetration (BP), availability of the banking services (BS) and usage of the banking system (BU). These dimensions are largely motivated by availability of relevant and consistent data for a large number of countries to compute comparable IFI.⁷

Banking penetration (dimension 1): An inclusive financial system should have as many users as possible, that is, an inclusive financial system should penetrate widely

amongst its users. The size of the ‘banked’ population, i.e. the proportion of people having a bank account is a measure of the banking penetration of the system. Thus, if every person in an economy has a bank account, then the value of this measure would be 1. However, data on the number of ‘banked’ people is not readily available and in the absence of such data, we use number of bank accounts as a proportion of the total adult population as an indicator of this dimension.⁸ We assign a weight 1 to this dimension, as banking penetration is the primary indicator of financial inclusion.

Availability of banking services (dimension 2): In an inclusive financial system, banking services should be easily available to the users. Indicators of availability are banking outlets (offices, branches, banking personnel and so on). Thus, availability of services can be indicated by the number of bank outlets (per 1000 population) and/or by the number of ATM per 1000 people. The number of bank employees per customer can also be used as another indicator of the availability of banking services. Further, keeping in view the move towards electronic banking in many countries, data on availability of electronic/internet based banking services should also be incorporated in this dimension. In the present index, we use data on the number of bank branches and the number of ATMs per 100,000 population to measure the availability dimension. Two separate indexes are calculated for bank branches and ATMs. Then, a weighted average of these two indexes, using 2/3rd weight for bank branch index and 1/3rd weight for ATM index is considered as the index for the availability dimension. As data on the number of employees and internet/electronic banking are not readily available for a large number of countries, we are unable to incorporate these aspects into the index for availability dimension.

Usage (dimension 3): This dimension is motivated by the notion of ‘underbanked’ or ‘marginally banked’ people, as observed by Kempson et al (2004). They have observed that *‘in some apparently very highly-banked countries, a number of people with bank account are nonetheless making very little use of the services on offer...’*. These people are termed ‘underbanked’ or ‘marginally banked’. Thus, merely having a bank account is not enough for an inclusive financial system; it is also imperative that the banking services are adequately utilized. In incorporating the usage dimension in our index, we consider two basic services of the banking system – credit and deposit. Accordingly, the volume of credit and deposit as proportion of the country’s GDP has been used to measure this dimension.

Weights assigned to the dimensions: Assigning appropriate weights to the dimension indexes is a difficult task. While all the three dimensions considered here are equally important for an inclusive financial system, the lack of adequate data on important indicators that completely characterize the availability and usage dimensions renders us to give less weight to these dimensions in the present index. As far as availability of banking services is concerned, many countries have moved towards internet banking, thus reducing the importance of physical bank outlets. Some countries also offer banking services through telephones. Thus, using data only on physical outlets (such as bank branches and ATMs) can give an incomplete picture of the availability of banking services. Similarly, data on credit and deposit can only partially depict the usage of the financial system as other services of the banking system, such as payments, transfers and remittances are not included. In the absence of such data, a complete characterization of these dimensions is not possible.

In the present index, we have provided the following weights– 1 for the index of banking penetration, 0.5 for the index of availability and 0.5 for the index of usage. Given these weights, we can represent a country k by a point (p_k, a_k, u_k) in the three dimensional Cartesian space, such that $0 \leq p_k \leq 1$, $0 \leq a_k \leq 0.5$, $0 \leq u_k \leq 0.5$, where p_k , a_k and u_k are the dimension indexes for country k computed using formula **(1)**. In the three dimensional Cartesian space, the point $(0,0,0)$ will indicate the worst situation (complete financial exclusion) and the point $(1,0.5,0.5)$ will indicate the best or ideal situation (complete financial inclusion) in the present context.

The IFI for the country k is measured by the normalized inverse Euclidean distance of the point (p_k, a_k, u_k) from the ideal point $(1, 0.5, 0.5)$. Algebraically,

$$IFI = 1 - \sqrt{\frac{(1 - p_i)^2 + (0.5 - a_i)^2 + (0.5 - u_i)^2}{1.5}} \quad (3)$$

3.4 Points of difference with UNDP methodology:

Although the IFI proposed here follows a multidimensional approach of index construction similar to the UNDP approach, there are methodological differences between the two approaches. We explain the differences below highlighting the justification and merits of our methodology.

The first point of methodological difference with the UNDP methodology is the manner in which dimension indexes are combined to compute the final index. Unlike the UNDP's methodology of using an average (a simple arithmetic average in case of HDI, GDI and GEM and a geometric average for HPI), our index is based on a measure of the distance from the ideal.⁹ Nathan et al (2008) have shown that this distance-based

approach satisfies several interesting and intuitive properties of a development index, viz. normalization, symmetry (or anonymity), monotonicity, proximity, uniformity and signaling (collectively termed NAMBUS). They have compared how an index based on the distance-based approach and an index based on UNDP's HDI methodology fare with respect to all of these properties. They show that UNDP's HDI methodology satisfy only three of these properties while the distance based methodology satisfy all. The failure of the HDI methodology to satisfy all the properties is due to the so-called 'perfect substitutability' across dimensions under this methodology. Perfect substitutability implies that an increase in one dimension can be compensated for by a decrease of equal magnitude in another dimension. As all dimensions are assumed to be equally important for the overall index value, the perfect substitutability can hardly be appropriate (Desai, 1991). The distance based approach does not suffer from this shortcoming.

The second difference of the proposed methodology with the UNDP methodology is with respect to the choice of lower and upper limits for computing the dimension indexes. While the UNDP methodology uses pre-fixed values for the lower and upper limits for each dimension to compute the dimensional index, we use empirically observed minimum for the lower limit and empirically observed 94th quantile value for the upper limit for each dimension. There are two reasons for using the empirically observed lower/upper limits.

First, unlike the human development dimensions, it is difficult to fix minimum/maximum for dimensions of financial inclusion. For dimensions used in UNDP's HDI, such as the literacy rate and life expectancy, it may be easy to fix limits for the dimensions (e.g. 0 and 100 for literacy rate and 25 and 85 years for life expectancy),¹⁰

however, this is not as straight forward in the case of financial inclusion. For example, under the usage dimension, there is no ‘maximum’ or even an ‘optimum’ desirable level of credit (measured as credit to GDP ratio) in an economy. Data on domestic credit to GDP ratio from the IMF show that even within the OECD countries, this ratio varies widely ranging from about 14 per cent and 22 per cent in case of Turkey and Mexico respectively to 226 and 172 per cent respectively in case of Greece and Ireland.¹¹ Therefore an empirical scheme has been adopted. In this, the minimum value can either be 0 or the empirically observed value; we have used the empirically observed minimum. However, in case of the maximum, empirically observed value may be an outlier completely distorting the scale of the index. In order to cope with this problem, we have used the 94th quantile value as the upper limit. If a country has a dimension value higher than this, it is set equal to this level. By setting the upper limit at the 94th percentile, we avoid comparing countries against excessively high benchmarks and thus remove outliers and smoothen the value of the index at the upper level.¹²

Second, by using the empirical scheme, we are attempting to measure financial inclusion with respect to a prevailing situation. This permits changes in the lower and upper limits for any dimension for different points of time and also for changes in the number of countries in the estimation. By computing the IFI in this manner, we incorporate an element of relativity in the IFI, i.e., it measures the extent of financial inclusion in an economy relative to the prevailing situation in all economies. This way, the index has a dynamic character.

4. Computation of IFI – an illustration

4.1 Data

While computing an index such as the one proposed here, availability of data is a big challenge. The World Bank's 'World Development Indicators (2006)' database published, for the first time (and unfortunately for the last time till date), some data on deposit money bank branches and deposit accounts for 99 out of 209 countries in the World Bank's list of economies. These data are for the latest year during 2001-04, and collected from surveys of banking and regulatory institutions by the World Bank's Research Department and Financial Sector and Operations Policy Department (WDI, 2006).¹³ For the usage dimension, International Monetary Fund's (IMF) 'International Financial Statistics (IFS)' database provides data on credit and deposit.

For financial (banking) penetration dimension, we have used the data on 'Bank Deposit Accounts' from World Development Indicators (2006) of World Bank. These are deposit accounts, including checking (or current), savings, and time deposit accounts for business, individuals and others. For the availability dimension, we have taken the data on deposit money bank branches from the same source. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.¹⁴ For the availability dimension, we also use the data on number of ATMs from World Bank's website.¹⁵ For the usage dimension, we have used the data on 'domestic claims on the private and resident sector' and the data on 'total deposits' from International Financial Statistics (IFS, 2006) of the IMF.¹⁶ All data and hence the estimation of the IFI are for the year 2004.¹⁷

Of the 99 countries, consistent data on all the 3 dimensions of financial inclusion are available for only 54. Further, of the 54 countries on which there are data, a few have the features of overseas financial centres (OFCs) where non-resident banking activities dominate.¹⁸ We consider these OFCs as outliers and exclude them while computing the

IFI as these countries may show high level of financial inclusion due to high number of non-resident banking activities.¹⁹ After dropping the OFCs, we are left with data for 49 countries for which we have computed the IFI.²⁰

4.2 Results and Discussion

Table 2 presents the IFI values computed for 49 countries using data on all three dimensions (*penetration, availability and usage*). Depending on the value of the IFI, countries are placed in one of the following three categories:

1. $0.5 \leq \text{IFI} \leq 1$ – high financial inclusion
2. $0.3 \leq \text{IFI} < 0.5$ – medium financial inclusion
3. $0.0 \leq \text{IFI} < 0.3$ – low financial inclusion

Austria leads with the highest IFI value of 0.953 and Madagascar ranks the lowest with an IFI value of 0.009 (Table 2). Out of these 49 countries, there are eleven countries in the high IFI category. They are – Austria, Denmark, Belgium, Spain, Greece, France, Norway, Malaysia, Czech Republic, Thailand and Iran. Thus, most of the high IFI countries are high income and OECD countries, although middle income countries like Malaysia, Thailand and Iran also are found to be having high IFI.²¹ The medium IFI countries are 9 of the 49 in the list; of which Italy (with a rank of 12th) and Trinidad and Tobago (ranked 17th) belong to high income category and Russia, Bulgaria, Chile, Turkey, Lithuania and Romania are upper middle income countries. Majority of the countries (30 out of 49) are having low IFI. These are dominated by low income countries but there are some exceptions. For example, Saudi Arabia, a high income country has low IFI. Similarly, upper middle-income economies such as Brazil, Lebanon, Venezuela, Argentina and Mexico are also found to be having low IFI.

The extent of financial inclusion across different countries as seen from their IFI ranking is generally on expected lines. The results for the European countries are in broad agreement with a recent report by European Commission (EC) that studied financial exclusion in the EU 25 countries (European Commission 2008). Based on surveys of individuals aged 18 or over conducted in 2003 (known as Eurobarometer Survey), the report pointed out that levels of financial exclusion (defined by the report as percentage of adults without any bank accounts) vary widely within the European Union. It reported that 1 per cent of adults in Denmark and Belgium, 2 per cent in France, 3 per cent in Austria, 8 per cent in Spain and 28 per cent in Greece are financially excluded.

Our IFI ranks these countries in a similar order, except that France is found to have a lower IFI rank than reflected by the EC report. France (IFI 0.702) is ranked lower than Spain (IFI 0.784) and Greece (IFI 0.763). Since our IFI is multidimensional incorporating information on number of bank A/C, availability and usage of banking, some amount of discrepancy in the IFI ranks of different countries vis-à-vis the EC report's ranking is not unexpected. The higher rank of Spain compared to France in our IFI can primarily be attributed to the high branch/ATM network in Spain compared to France.²² As far as the higher IFI rank of Greece compared to France is concerned, this is due to higher number of bank deposit A/C per 1000 adults in Greece (2836) compared to France (2193) reported by the World Bank data that we are using for the computation of our IFI. Thus, while the survey based EC report found less financial exclusion in France than in Spain and Greece, our multidimensional IFI reveals somewhat higher financial inclusion in Spain and Greece compared to France. Further, Spain is ranked higher than Norway (IFI 0.595) which seems somewhat unexpected.²³ As mentioned above, the essential difference between the IFI measure and the other

previous attempts to measure financial inclusion is the multidimensionality of the IFI. It may be a fact that the proportion of population in Norway having bank accounts is higher than in Spain. This, however, is only one of the dimensions of financial inclusion. People have to have access to banks (number of ATMs, bank branches and recently internet banking) and finally people have to use their bank accounts (as measured by the credit and deposit data). In both the access as well as usage dimensions, data show that Spain ranks above Norway.²⁴ A similar line of argument can be used to explain the higher IFI rank of Greece compared to Norway. Thus in a sense, the higher IFI value for Spain and Greece when compared with Norway and France is not unexpected – given that financial inclusion is viewed here in a more comprehensive and holistic manner.

Notwithstanding this, the IFI measures for many other European Countries are in broad agreement with Eurobarometer Survey. Further, as the IFI measures are computed by using consistent secondary data from internationally well known sources the estimates can be used to carry out wider cross country comparisons.²⁵

4.3 Data related issues

Apart from this, some data related issues need to be discussed here. Appropriate and comparable data for a large number of countries is the essence of a robust IFI. For example, in most advanced industrial countries, financial services have turned electronic or virtual (as against cash or paper). Electronic banking through the internet (or internet banking) has grown rapidly in recent years in these countries and this process has often been at the expense of the growth of conventional banking services such as the bank branches and ATMs. Thus, the lack of data on internet banking is likely to provide under-estimates of financial inclusion in advanced countries such as Norway. Also

payments and remittances, two important aspects of the usage dimension have not been considered in the IFI computation above due to lack of data on them. The IFI can be improved by utilising data on internet banking, payments and remittances.

When the IFI is used at the aggregate country-level, it may suffer from loss of country specific information owing to the aggregative nature of the data. For example, geographical aspects of financial inclusion (such as rural/urban divide) and the gender related aspects are not covered in the illustrative example in this paper. Owing to lack of appropriate data, we are unable to incorporate many aspects of an inclusive financial system in the example, such as affordability, timeliness and quality of the financial services.

5. Conclusion:

In this paper, we have proposed an Index of Financial Inclusion (IFI) – a multidimensional measure similar to the well known development indexes such as HDI, HPI, GDI and GEM. The IFI can be used to compare the extent of financial inclusion across different economies and to monitor the progress of the economies with respect to financial inclusion over time. For example, subject to availability of data, it can be used to measure financial inclusion at different time points and at different levels of economic aggregation (village, province, state, nation and so on). In the present case, due to reasons that include data availability, the illustrative example given in the paper is at the country level.

Regular and periodic (annual) data on different aspects of financial inclusion such as banking penetration, availability and usage are not available. Further data on affordability, timeliness and quality of financial services are not available from any source. International organizations such as the World Bank, International Monetary Fund and UN organizations like UNDP with their experience and reach are rightly placed to collect and disseminate these data. IMF's recent initiative on "Financial Access Survey" to collect periodic data on financial inclusion indicators will go a long way in computing the index of financial inclusion on a periodic basis. This paper is only a first step in the direction of appropriately measuring financial inclusion over time and across regions. While improvements and technical innovations in the index are always possible, as we have noted here, presently the availability of data seems to be the biggest constraint.

Endnotes

1. See, for example, Levine (1997) for a survey of this debate.
2. For a review of policy level responses to financial exclusion in developed economies, see Kempson et. al. (2004).
3. See, for example, Claessens et al. (2009).
4. For more on this initiative, see <http://fas.imf.org/>
5. In fact, according to Leeladhar (2005), “Financial inclusion is the delivery of banking services at an affordable cost...”.
6. For details of these indexes see Technical Note in UNDP’s Human Development Reports available at <www.undp.org>.
7. Apart from these three dimensions, one can think of many other dimensions of an inclusive financial system. For example, “Affordability” and “Timeliness” can be very important aspects of an inclusive financial system, as pointed out by the recent Rangarajan Committee Report on Financial Inclusion in India (Rangarajan Committee, 2008). However, data for measuring such dimensions, such as “transaction cost” and “time taken” for a bank transaction, are not readily available. Therefore these dimensions have not been incorporated in the present index. In countries where such data are available, one can construct more detailed country specific index using our proposed methodology.
8. There may be persons having more than one bank account co-existing with others who may have none. Therefore, number of accounts per capita, is likely to actually provide an overestimation of the proportion of the “banked” population. For example, number of bank accounts per 1000 adult people is 1250 in Malaysia, 1207 in Romania and 1423 in Thailand, in spite of having many people without bank accounts in these countries.
9. This methodology dates back to Zeleny (1974).
10. UNDP’s fixation of minimum and maximum per capita income for the “standard of living” dimension is not without criticism; see, for example, Desai (1991), Trabold-Nubler (1991), Luchters and Menkhoff (1996) and Sagar and Najam (1998), among others.
11. These data are for 2004.
12. The choice of 94th quantile may appear to be arbitrary. This choice is driven by the total number of observations for which data are available. In the present exercise, given the size of the sample, 94th quantile appears to be appropriate. If more observations were available then a higher quantile (98th or even 99th) can be used.
13. Further details of the data can be found in Beck, Demirgüç-Kunt, and Martinez Peria (2007).
14. Thus, the data includes commercial banks, post offices and other such financial institutions accepting deposits.

15. The website from which these data were retrieved is (web page visited in July 2008)
<http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/648083-1108140788422/Data3.xls>
16. Thus, for credit data we use line 32d and for deposit data we use line 24 plus line 25 of IFS. Deposit data comprises of demand, time, and foreign currency deposits of resident sectors.
17. Data on bank branches and bank accounts are actually for the latest year during 2001-04 (WDI, 2006).
18. The OFCs are defined by the IMF as “centres where the bulk of financial sector activity is offshore on both sides of the balance sheet (that is the counterparties of the majority of financial institutions’ liabilities and assets are non-residents), where the transactions are initiated elsewhere, and where the majority of the institutions involved are controlled by non-residents. OFCs are also known to provide one or more of the following services: low or zero taxation; moderate or light financial regulation; banking secrecy and anonymity (IMF 2000).
19. These are – Fiji, Malta, Mauritius, Panama, Singapore and Switzerland.
20. If we drop one of the dimensions, viz., banking penetration, we have the advantage of having data for a bigger set of 93 countries. Accordingly, a 2-dimensional IFI (using only availability and usage dimensions) can be conceived. However, this 2-dimensional IFI has limited usefulness since the primary dimension of financial inclusion, viz., banking penetration, is missing here. In an earlier version of this paper, we have computed the 2 dimensional IFI for 93 countries.
21. The World Development Report classifies economies into four income groups depending on the gross national income (GNI) per capita, calculated using the World Bank Atlas method. The groups are: low income (LIC), \$905 or less; lower middle income (LMC), \$906–3,595; upper middle income (UMC), \$3,596–11,115; and high income, \$11,116 or more.
22. The numbers of bank branches and ATM per 100,000 adults are 112 and 148 respectively in Spain, while they are 53 and 86 respectively in France.
23. Norway was not part of the Eurobarometer survey and hence Norway’s position in financial inclusion vis-à-vis the EU 15 is not known.
24. As per the WDI (2006) database of World Bank, Spain had 112 bank branches and 148 ATMs per 100,000 adult people while Norway had only 29 bank branches and 60 ATMs per 100,000 adult people. According to and IFS (2006) data base of the International Monetary Fund, the credit to GDP and deposit to GDP ratios are 1.3 and 0.9 respectively in Spain and 0.8 and 0.5 respectively in Norway.

25. See, for example, Sarma and Pais (2010) that has attempted to identify country specific factors associated with financial inclusion.

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Table 1: Indicators of Financial Inclusion for select countries (2004)

Country	No. of bank A/C (per 1000 adults)	No. of Bank Branches (per 100,000 adults)	Domestic credit (as % of GDP)	Domestic deposit (as % of GDP)
Argentina	503.3	13.7	10.3	23.2
Colombia	892.5	12.7	19.1	24.2
India	627.1	9.4	36.9	54.9
Lebanon	539.4	25.4	75.4	206.6
Malaysia	1858.8	14.6	117.9	123.9
Russia	2244.8	2.7	24.1	27.4
Thailand	1875.8	9.5	94.4	102.2

Sources: WDI (2006), World Bank; IFS (2006), IMF.

Table 2: Index of Financial Inclusion (IFI)

Country	D1(Penetration Index)	D2 (Availability Index)	D3 (Usage Index)	IFI	IFI Rank
Austria	1.00	1.00	0.88	0.953	1
Belgium	1.00	1.00	0.78	0.908	2
Denmark	1.00	0.77	1.00	0.906	3
Spain	0.73	1.00	1.00	0.784	4
Greece	0.86	0.62	0.66	0.763	5
France	0.67	0.91	0.72	0.702	6
Norway	0.61	0.55	0.59	0.595	7
Malaysia	0.56	0.25	1.00	0.530	8
Iran	1.00	0.13	0.23	0.527	9
Czech Republic	0.69	0.23	0.39	0.525	10
Thailand	0.57	0.19	0.92	0.514	11
Italy	0.34	0.98	0.62	0.439	12
Russia	0.68	0.05	0.18	0.424	13
Bulgaria	0.47	0.31	0.30	0.413	14
Chile	0.42	0.26	0.50	0.404	15
Turkey	0.48	0.23	0.24	0.387	16
Trinidad and Tobago	0.41	0.23	0.27	0.354	17
Lithuania	0.43	0.18	0.18	0.333	18
Romania	0.43	0.23	0.03	0.315	19
Jordan	0.23	0.24	0.96	0.298	20
Brazil	0.26	0.32	0.34	0.283	21
Lebanon	0.16	0.37	1.00	0.265	22
Dominican Republic	0.31	0.17	0.13	0.253	23
Guyana	0.24	0.08	0.56	0.252	24
Namibia	0.22	0.16	0.40	0.234	25
Colombia	0.27	0.19	0.14	0.229	26
Guatemala	0.21	0.33	0.19	0.227	27
El Salvador	0.21	0.14	0.33	0.213	28
India	0.18	0.10	0.38	0.198	29
Ecuador	0.18	0.18	0.15	0.177	30
Venezuela	0.21	0.16	0.06	0.176	31
Philippines	0.14	0.16	0.32	0.167	32
Bosnia & Herzegovina	0.15	0.07	0.33	0.163	33
Saudi Arabia	0.10	0.19	0.32	0.151	34
Argentina	0.15	0.22	0.09	0.148	35
Honduras	0.14	0.03	0.34	0.148	36
Mexico	0.14	0.22	0.11	0.145	37
Peru	0.14	0.09	0.12	0.125	38

Bangladesh	0.10	0.05	0.26	0.117	39
Pakistan	0.09	0.08	0.25	0.113	40
Kenya	0.03	0.02	0.70	0.105	41
Zimbabwe	0.08	0.07	0.18	0.096	42
Albania	0.06	0.03	0.21	0.079	43
Nicaragua	0.04	0.06	0.24	0.076	44
Bolivia	0.01	0.05	0.33	0.064	45
Papua New Guinea	0.05	0.02	0.11	0.057	46
Armenia	0.04	0.10	0.00	0.041	47
Uganda	0.02	0.01	0.04	0.021	48
Madagascar	0.00	0.00	0.05	0.009	49
