Do well-functioning financial markets contribute to economic growth in less developed countries?

– A cross-sectional study on low- and lower-middle-income countries

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Abstract
This paper examines the correlation between credit intermediated by financial systems and economic growth in developing countries. More specifically we have studied whether well-functioning financial markets result in economic growth. We base our study on data from 53 low- and lower-middle income countries in the period 2004-2011. By comparing the two different economic theories, Schumpeter’s growth theory and Austrian business cycle theory, we have analysed our results from two different perspectives. The results from this study show an insignificant relationship between financial systems and economic growth, contradicting much of the theory and results from previous studies that have been reviewed. Other variables outside of the financial system in this study, such as economic freedom and corruption, could be a reason for the non-existent correlation between financial development and economic growth in this study.

Key words: economic growth, credit market, developing countries, financial systems, financial development, Schumpeterian theory of economic development, Austrian business cycle theory
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“‘You can remember him and only that he is gone,
Or you can cherish his memory and let it live on’”

– David Harkins

In loving memory of our friend Fredrik Olsson who was taken too soon from this life.
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1. Introduction

1.1. Background and objective of the study

One of the earliest economists to investigate the relationship between financial development and economic growth was Schumpeter (1934) with his *Theory of Economic Development*. It has since then been widely discussed among economists whether Schumpeter’s core argument, that innovation financed by credit is the engine for economic growth, is correct or not. Robinson (1952) reached an opposing conclusion, that the credit market is affected positively by economic growth and not the other way around, as suggested by Schumpeter. More recent discussions have been in Schumpeter’s favour arguing that economic growth is then is fuelled by credit (Levine, 2005; Ray, 1998: 529). The connection between the financial system and economic growth has also been challenged by the Austrian school of economics. This school of thought highlights the existence of good and bad credit in relation to a sustainable or unsustainable economic growth. Since the financial crisis in 2008 the Austrian business cycle theory gained attention for the economic reality that it predicts (Salerno, 2012: 12-14, Polleit, 2007).

This study will focus on low- and lower-middle-income countries since the economic structures in these countries differ greatly from higher-income countries. General characteristics of these countries include high population growth rates, a larger agriculture sector, a rapid rural migration, an export of primary products, and insufficient market information (Ray, 1998: 44, Todaro & Smith, 2009: 8). The choice to focus on less developed countries mean that a smaller quantity of data is available, which has made research on the topic more problematic than if the study had been conducted on more developed countries (Kumar et al., 2007: 8). The study has however been feasible to carry through thanks to the quality and large amount of data collected over the past decade, mainly by The World Bank and IMF.

The primary objective of this study is to investigate whether financial systems, through credit, foster sustainable growth or if they cause artificial booms that leads to a bust in less developed countries. In doing this we will test the fit of theory claiming that credit has a positive effect on economic growth, when applied on less developed countries.

1.2 Problem statement

Do well-functioning financial markets contribute to economic growth in less developed countries?
1.3 Methodology

The study will have an econometric focus in order to examine the strength of the correlation between economic growth and different dimensions of the financial system. In order to conclude whether financial systems promote sustainable or unsustainable growth, the regressions will be analysed using the Schumpeterian theory of economic development and Austrian business cycle theory.

Data will be collected from various databases; such as The World Bank’s data bank and the International Monetary Fund (IMF), with data from 53 low- and lower-middle income countries. A cross-sectional method will then be used to analyse the general effect that the financial system has on economic growth relative to other variables. Five explanatory variables are used in the study to examine the correlation between the financial system and economic growth: domestic credit to private sector, monetary supply (M2), number of commercial bank branches, distance to insolvency (bank z-score), and net interest margin. These variables have been chosen as characteristics for a well-functioning financial market. Control variables have been added to the specification in order to test reliability. All variables in this paper will be defined and discussed in the empirical analysis section. The data used for the regressions are mean values from the period 2004-2011.

The analysis will be done in three steps:

1. The relation between the financial indicators and real Gross Domestic Product per capita (GDP per capita) growth will be tested in multiple regression models.
2. An interpretation of the results will be done in order to draw conclusions over the financial system’s general impact on economic growth.
3. The interpreted connection between financial systems and economic growth will then be analysed using Schumpeterian theory of economic development and Austrian business cycle theory.

1.4 Scope of the study

This study is confined to 53 developing countries. The list of countries initially contained 90 countries defined by The World Bank as low- and lower-middle income countries but has been reduced in number due to the lack of data. The delimitation of the period in which data has been collected has been made in order to increase the chances to find adequate data and to acquire more accurate results. A cross-sectional method has been used in this study. A panel data approach would in most circumstances have been the optimal method of choice in order to investigate a problem statement such as ours. However
such a method is dependent on data from a wider time span which is in this case non-existent or unreliable (Kumar et al., 2007: 8).

Data related to the informal financial sector is difficult to come by or non-existent and will due to this problem not be included in the regressions run. Formal credit can be divided into several sub-categories and the two major ones are: foreign and domestic credit. A commonly used variable that describes exogenously transferred credit into a country is Foreign Direct Investment (FDI). This variable is often referred to as having a positive effect on economic growth. This study will however have a greater focus on the domestic financial systems even though FDI is included in the control variables. The main reason for this is that previous studies have shown that stable financial structures are needed before FDI will have a positive effect on economic growth (Hermes & Lensink, 2003: 150).

In recent years it has been seen that the stock market in developing countries has begun to expand, resulting in a debate on the effect that the stock market has on economic growth. Some studies show that the stock market has an independent positive effect on growth that is separate from the banking sector. Other studies show negative effects due to short-term speculation and unstable in- and outflows of money in the economy. This study has excluded variables measuring the stock market due to lack of data for the chosen countries. Hopefully data concerning this area within the financial sector will be more accessible in the future and therefore more thoroughly investigated (Todaro & Smith, 2009: 767-769).

Another category of credit that is not included in this study is microcredit. The main reason for the exclusion of this variable is the inconsistency of data. Microcredit generally has a regional rather than a national focus, which means that information on a national level is often non-existent (Bauchet & Morduch, 2009: 2). The structural difference between microcredit intermediaries and conventional banking is another explanation for the exclusion of this variable (Ray, 1998: 579).

1.5 Thesis structure
After this introduction section the essay is divided into six more sections. In the next section all the most central terms used in this study will be defined. Section three includes previous studies that are in different ways connected to our problem statement. Section four will present and explain the theories this study is based on. In section five the regression model will be presented and explained. The data and the OLS-model will then be presented and analysed in the sixth section. The study ends with a summary.
2. Definitions

2.1 The use of credit

The credit market can be divided into three different categories of use, namely:

- Credits for start-up of new firms or expansion of existing firms, *fixed capital*.
- Credit for on-going production, *working capital*.
- Credit for consumption, *consumption capital*.

*Fixed capital* is seen to be of highest importance in determining the aggregated growth in an economy; however, this does not mean that *consumption capital* and *working capital* are insignificant for growth. The two latter categories of credits show how a country provides economic support for the low income and disadvantaged part of the population (Ray, 1998: 531). The importance of the financial intermediaries is often explained by efficient resource allocation and expansion of economic opportunities resulting in furthering economic growth on the aggregate level (Cihak et al., 2012).

2.2 Developing countries

Due to several different definitions and measurements of how “developed” a country is, there is a need to specify the topology used in this study. Since we are investigating the link between economic growth and financial systems in developing countries we have chosen to take countries with a low GDP per capita. We have chosen to use the atlas method where countries are categorised based on their Gross National Income (GNI) per capita. Of these categories low- and lower middle income countries will be the focus of our study.

*Low-income countries*

For a country to be defined as a low-income country the GNI per capita must be $1,025 or less (The World Bank, 2012a; Todaro & Smith, 2009: 41).

*Lower-middle-income countries*

Countries with a GNI between $1,026- $4,035 are categorised as lower-middle-income countries (The World Bank, 2012b; Todaro & Smith, 2009: 41).

General characteristics in less developed countries include high population growth rates, a large agriculture sector, a rapid rural migration and primary products export. The existence of an informal credit market is also common in these countries, as will be further explained (Ray, 1998: 44, 534). In addition, these countries can be described as having highly imperfect commodity- and resource markets, asymmetrical information for consumers and producers, and a high occurrence of disequilibria. At a
more micro- or individual level, consideration to family, religion, and tribe may in a greater extent be prioritised over individualistic motives when utility calculations are made. Also the complexity and heterogeneity of these countries on a political, economic, cultural and institutional level when later discussing financial systems must be emphasised (Todaro & Smith, 2009: 89).

2.3 Economic growth
The dependent variable in this study is economic growth expressed in real gross domestic product (GDP) per capita terms. This measurement has limitations and it must be emphasised that economic development should not be equalised with per capita income (Ray, 1998: 8). Critics state the absurdity of using GDP as a measure of life quality and the fact that it does not take environmental and social aspects into account emphasises the matter (Rist, 2008: 245). Even with the criticism expressed about the variable, there is more or less a consensus on the correlation between economic growth and development (Ray, 1998: 9).

With this said, it is difficult to distinguish sustainable and unsustainable growth from each other on several accounts. First, there are different definitions of what sustainable growth implies. Second, even if we would clearly define the limits of sustainable growth it is hard to find indicators and variables to measure the stage of sustainability that a country’s economy is currently in (Economics online, 2013).

2.4 Institutions
The definition of an institution is any mechanism or structure of social order leading the behaviour of a set of individuals within a set community. Institutions are basically rules that govern people’s behaviour, including their economic choices (Commons, 1931: 648).

Institutions are commonly categorised into formal and informal institutions. The latter category includes norms, which indirectly impact several different aspects of a country’s economic behaviour and structures in which people act (Yami et. al, 2009). The definition of institutions somewhat differs when researching literature on the subject. As Greif (2006:17) puts it: “…institutions are not monolithic entities but are composed of interrelated but distinct components particularly rules, beliefs, and norms which sometimes manifest themselves as organizations”. This statement shows a clear difference in claiming that organisations are institutions and that institutions can be found within organisations. In our paper we have chosen to define institutions as norms and rules that influence human behaviour and does not equate organizations with institutions (Jütting, 2003:11).
It is often stated that people’s actions and incentives, i.e. informal institutions, matter in shaping a society and that formal institutions alone do not form this type of behaviour (Jütting, 2003: 8). It is therefore important to realise the impact of both types of institutions in order to examine the role they play for economic growth.

### 2.4.1 Formal institutions

Formal institutions can be defined as structures that are established through jurisdiction on a variety of matters. These institutions are established by legal authorities and are the base for the formal rules in a country (Yami et. al, 2009). These institutions vary in different regions and can be seen as the legal and formal side of the societal behaviour.

One example of a formal institution is the structures of banking that can be found in pre-dominantly Islamic countries, namely Islamic banking, which is a financial institution that is based on Quranic principles (Warde, 2000: 124). The main reason for the rise of Islamic banking is that the Qur’an states that it is prohibited to charge or pay money for loans, meaning that Muslims (that follow this law) are unable to conduct business with conventional banks (Jaffe, 2002). Because of this Islamic banks have developed different kinds of interest-free, financial services that are approved by the Shari’ah laws.

### 2.4.2 Informal institutions

Informal institutions, such as norms, are guidelines that form social customs and practices in a society. This type of institution is hard to define, identify, measure and quantify, resulting in that the effect on societal behaviour is often neglected (Jütting, 2003). One prime example of the effect of norms on economic growth and development is corruption. The definition of corruption stated by Transparency International is: “Corruption is the abuse of entrusted power for private gain. It hurts everyone who depends on the integrity of people in a position of authority” (Transparency International, 2013).

Where the rule of law is weak there are few or no consequences for acts of corruption, which can lead to an amplification of such norms. Structures like these (or the lack of them) result in cynicism towards public authorities and can be seen as a societal justification for further corruption. Formal institutions can hereby have a destructive impact on informal institutions (Panth, 2011:2).

An example of the opposite can be seen in the existence of Islamic banks. It could be said that informal institutions (such as religious norms) are the foundational cause for the way the formal institutions have been formed. The conclusion that can be made is that there is usually a close interdependence between formal and informal aspects of institutions.
2.5 Informal credit markets

Formal intermediaries such as commercial banks, credit bureaus and government banks often grant loans in developed countries. Structures in developing countries are however different and has resulted in the wide use of informal lending as a result of various restrictions and the lack of access to formal financial services. As an example, many poor farmers are incapable of providing formal lenders with collateral and they are therefore excluded from the formal credit system (Ray, 1998: 534). Where banks usually require some type of property as security to grant credit, informal lenders are more flexible when it comes to loan-collateral (Ray, 1998: 537). These types of informal financial services are often associated with a higher risk for both lenders and borrowers than the formal services.

This significant structural difference has to be considered when investigating the effects of credit and economic growth (The World Bank, 2009). The fact that the informal credit market is relatively large in less developed countries has to be acknowledged for two reasons. Firstly, it might be an attenuator to the financial development’s impact on economic growth. Secondly, as will be explained later, the figures of the estimates from our regressions will be greater than the actual levels since the informal credit cannot be converted to numbers.

3. Previous studies

Previous studies are important for our study’s empirical basis and this section will discuss the methods used as well as the different results. There have been several studies done to investigate the role of the credit market in less developed countries. As the first four studies will show, financial access is a major issue in these countries. The last study presented has a wider perspective taking additional dimensions into account.

In the book ‘Building Inclusive Financial Systems’ by Kumar, Barr and Litan, (2007) three studies on financial access are presented (Kumar et al., 2007: 7-8). The paper written by Chidzero, Ellis and Kumar (2006) concludes results from studies made in three Latin American countries and three African countries. This study has a more qualitative approach and the indicators are focused on the user perspective of the financial market. The indicators used in this study make it possible to grasp the size of the informal market. This is done by getting data on the consumer usage of financial services and comparing this with the demand side of formal financial services (Chidzero et al., 2006: 2). This study showed highly varied results emphasizing the structural differences from country to country. The
estimated cost of such a detailed survey is unfortunately too high to be used for studies on a larger scale (Chidzero et al., 2006: 7, 9).

The second paper, written by Claessens and Tzioumis (2006), analyses how the financial sector should be measured through a business perspective. The empirical method in this paper has been to analyse surveys of enterprises that have been conducted by central banks, multilateral organizations, statistical agencies etc. (Claessens and Tzioumis, 2006). Unfortunately there is still too little information available to be able to conduct a cross-country analysis. This is partly because studies on firms’ access to finance tend to be made in one country at a time with different concepts, indicators and definitions (Kumar et al., 2007: 25).

The following two studies are financed and/or conducted by The World Bank and has progressively deepened the dimensions in how to measure credit markets. A report written by The World Bank (2009) presents different levels of access to banking services in countries with similar GDP per capita income. This study emphasises barriers that can be seen in the access to banking, which in turn can affect a country’s economic growth. The study measures the cost and complexity of using services offered in each of four transaction categories: opening an account, making payments, saving, and borrowing money. Cross-country regressions of bank access based on these measures have then been run to observe differences between countries. The results show that a primary barrier to banking in developing countries is the lack of sufficient wealth. Since informal income is common, the poorest people in the 54 countries surveyed do not have money enough in order for a bank account to be useful (The World Bank, 2009: 7-8).

The most recent study in this section is done is by Cihak, Demirguc-Kunt, Feyen and Levine (2012). This study presents ways to measure the size of financial systems; the accessibility of the systems, how efficient intermediary markets are in allocating financial transactions and, the stability of financial systems. This study is more focused on examining the correlation between economic growth and credit. It is a cross-sectional study showing the difference between countries, as well as a time series study in order to see trends over time (Cihak et al., 2012: 8). The goal is to measure financial systems by examining four characteristics of such systems, namely: depth, access, efficiency, and stability.

The above mentioned study also acknowledges the theoretical standpoints on the role of financial systems in economic development as well as the empirical aspects. Financial systems are argued to be a base for economic growth to occur rather than the other way around. In addition, the paper recognizes
that finance affects economic growth by changing the allocation of a society’s savings rather than affecting the aggregate savings rate. Hence, a more developed financial system leads in this way to an increase of economic opportunities (Cihak et al., 2012: 5).

4. Theory

4.1 Introduction

In this section the theory concerning the financial system and its role for the economy will be presented. This section is divided up into six parts; firstly a general discussion about the function of credit markets, secondly Schumpeter’s theory of economic development, then the Austrian business cycle theory, followed by the different dimensions of financial systems discussed in the paper from The World Bank (2012c). The section ends with a conclusion of the stated theories.

The financial system provides several services for the economy as a whole. One of these services is to match savers and investors in order for a firm to expand its production (Todaro & Smith, 2009: 255). A financial intermediary can in theory solve the following problems better than what an individual can:

- Borrowers typically require larger loans than what any single person is willing to lend out.
- Borrowers want to lend money for a longer time-period than lenders are willing to save.
- A financial system has more resources in order to collect information than an individual. There are certain “economies of scale”-effects that come with an intermediary.
- A larger intermediary can withstand a lender that defaults to a certain extent, leading to a lower risk for savers. The risk for an individual lender would be a lot higher since all the savings would be lost if the borrower would default (Carlin & Soskice, 2006: 256).

Additionally it is argued that if firms have access to credit it benefits the economic productivity as a whole and increases the wellbeing of the people that can be employed by such firms. Credit aids small firms to expand their businesses, resulting in new jobs being created as well as an increased output (Todaro & Smith, 2009: 754). Many economists claim that credit is a key component for an economy to move forward. However, developing countries are generally associated with certain properties, such as a lack of money supply and an unstable inflation rate, resulting in a poorer foundation for credit to be intermediated in the economy (Todaro & Smith, 2009: 754, The World Bank, 2009: 55).
4.2 Schumpeterian theory of economic development

According to Schumpeter (1934), innovation is the engine of economic development. An innovation as defined by Schumpeter, is a new method of production, a new product, a new source of supply, the creation of a new market or a new way to organise a business. This is established through entrepreneurs financed through an existing credit system (Schumpeter, 1934: 106). The process in which the economy develops is through business cycles containing four stages: prosperity, recession, depression and recovery. Although the word “development” used by Schumpeter has a more qualitative focus, it is still clear from his theory that he also includes the more quantitative aspects of growth. A simplified version can be presented in the following way:

In the first stage, the entrepreneur receives credit from a bank and is able to start up a process of innovation. Credit is therefore a foundation for economic development to take place. If successful, the new innovation gives the leading entrepreneur an advantage on the market resulting in a profit for him. A spill-over effect progressively reduces this profit as other firms catch up to the leading entrepreneur. In general, the quality of the output goods are improved throughout the economy (Schumpeter, 1939: 156). This process leads the economy through the next three stages resulting in a new equilibrium with an improved production function and a GDP level that is relatively higher than before (Schumpeter, 1939: 137). This is argued to be the outcome of a cyclical process, spurred by innovation, initially financed by credit, resulting in economic development, which includes economic growth (Schumpeter 1939: 137).

Combination and resistance

Swedberg and Knudsen (2010) highlight another way that Schumpeter describes the economy’s connection to innovation and entrepreneurship, through the terms combination and resistance. An existing economic situation is a combination of many different forces, factors, and materials. When this is altered into a new combination, innovation has been produced with the entrepreneur as the driving force. Everything that hinders new combinations to occur, Schumpeter calls resistance. The word resistance could today be replaced by norms, common procedure, culture, lack of credit etc. (Swedberg & Knudsen, 2010).

With these terms, economic growth takes place in the following way: an economic system is a combination of different factors that has created a resistance for change. An entrepreneur takes the lead in doing something in a new way and is met with different kinds of resistance. If the entrepreneur is successful in overcoming these obstacles the reward is profit. Credit is, again, needed for the
entrepreneur to have enough incentives to carry through the innovation with the existing resistance. Imitators progressively catch on to the entrepreneur’s profitable idea. This process continues until the new combination that the entrepreneur has carried through becomes the common combination in the economy (Swedberg & Knudsen, 2010). This new arrangement of ideas, materials, production methods and other factors is an improved combination that has made production in the economy more effective and hence economic growth has taken place.

**The importance of credit**

According to Schumpeter credit and banks have a fundamental role in explaining the phenomenon of economic development for two reasons. First, the presence of credit in an economy indirectly changes production in a positive way through innovation from new entrepreneurs. Second, money is created by banks, “…forcing the economic system into new channels, for putting its means at the service of new ends…” (Schumpeter, 1912: 69-70). Continuing, he claims that credit has a unique role in an economy because of three main elements (Bertocco, 2007: 17-18):

1. Through the existence of credit new actors that do not have access to production resources can carry out innovation. If innovation is realized by existing firms, credit is not necessary since these already have the ability to carry through the innovation. For new entrepreneurs however, external finance is necessary.

2. Credit is important to promote the “full employment of production resources”. Through credit, resources can be transferred from firms with access to productive resources to innovative entrepreneurs without that access. Hence productive resources are utilized in a more effective manner in a system with banks and credit.

3. Credit promotes private ownership of resources used for production. This is argued in contrast to a socialist system in which the allocation of resources is centrally managed.

These arguments by Schumpeter on the importance of credit in order for economic development to occur have been tested over the last century and are still seen as useful. King and Levine (1993) studied the impact of financial services provided in an economy on economic growth and came to the conclusion that Schumpeter might have been right. The basic argument is that finance is positively correlated to GDP per capita growth through a higher efficiency of capital resource allocation (King & Levine, 1993: 734). This can be reflected in the thoughts of Schumpeter as economic growth being fuelled by innovation made possible through credit. Using Schumpeter’s own terms, the availability of financial services can be a way of reducing the resistance against innovation. This view on the economic process differs from the Austrian business cycle theory, as will be presented next.
4.3 Austrian business cycle theory

Business cycles as described by the Austrian school of economics do not lead to a process where economic growth takes place. Instead the phenomenon is seen as evidence for financial mismanagement. We will present the major outlines of this theory since there are several interpretation differences within the Austrian school on how the economic system works.

**Time preferences**

A vital term in order to understand an Austrian business cycle is *time preferences*. The term can be defined as people’s future and present consumption choices (Garrison, 2001: 26, 39-40). The incentives of present consumption are affected by the yield that can be made from saving money in a bank. The interest rate is therefore related to people’s time preferences through the supply and demand of present goods (i.e. demand and supply of future goods). A low interest rate makes it less attractive to abstain from consumption now rather than saving for future consumption (Polleit, 2007).

A famous example from Eugen von Böhm-Bawerk as summarized by Bagus (2010) describes time preferences in a simplified world. Robinson Crusoe collects and saves berries and the pile that he has collected (his real savings) allows him to survive a certain period of time. Robinson wants to build a bow and arrow (capital goods) in order to collect food more efficiently and needs time in order to do so. He therefore refrains from consumption in order to be able to consume more in the future (Bagus, 2010: 4). The succession of this project is affected by his time preferences. The amount and quality of the savings of berries will affect how long Crusoe can sustain from collecting berries. If his savings runs out before the bow and arrow are finished he must abandon the project and start collecting berries again. Crusoe therefore has to anticipate future time preferences in order to come up with a plan that will allow him to finish the project (Bagus, 2010: 4).

The main difference between the Robinson Crusoe environment and the complex economic systems of today is that savings are in monetary terms. This means that the savings that are accumulated can also be lent to an investor. Therefore money has an additional dimension when compared to berries: the nominal amount and the duration. The duration dimension is more complex and abstract as it is affected by invisible schedules of time preferences (Bagus, 2010: 4).

**Sustainable economic growth**

For the long-term economic growth to be sustainable the interest rate has to reflect consumer’s *time preferences*. According to Austrian Theory, sustainable growth takes place when consumption and
investment is backed up by real savings (Bagus, 2010: 1). In Garrison’s model (2001) the basis for growth is a financial system that keeps the consumption level balanced over time. Savings is defined as being equal to both future consumption and investment when the financial system succeeds in correctly reflecting consumer time preferences. The only method for the financial system to have an influence on people’s preferences in this model is the interest rate (Garrison, 2001: 39-40). Thorsten Polleit (2007) explains sustainable growth in the following way: “as peoples’ time preference declines, a growing portion of current income is saved and invested, and thereby put to productive use. As a growing portion of present goods is devoted to production rather than consumption, the supply of present goods in the future can be increased.” (Polleit, 2007)

**The Austrian business cycle**

A distortion of the sustainable preferences means that there is a distribution imbalance where either future consumption outweighs present consumption or vice versa. Such a distortion leads to what Garrison (2001) refers to as a credit expansion, meaning that the amount of credit given to investors exceeds the amount that people are willing to save (Garrison, 2001: 26). This leads to a boom induced by an artificially increased money supply that will later lead to a contracting economic growth (Polleit, 2007). The eventual economic contraction is due to a too low interest rate that increases the demand for credit and spurs investment. At the same time the willingness to save will decrease, since the return from keeping money in the bank is lowered. People will therefore be more motivated to spend money now than in the future, i.e. present consumption will increase. This creates a conflicting combination of consumption and investment that exceeds the present production possibilities in the economy (Garrison, 2001: 72). As opposed to Schumpeter, this type of business cycle does not result in a higher economic growth and hence no improvements of the economy’s production function.

**The critique of financial systems today**

The financial crises and the poor economic activity the last few years has led to an increased interest for the Austrian business cycle. Several high-profile economists have used this model in their explanation of what went wrong. There has also been a critique of other more mainstream macroeconomic theories and their inability to forecast the crisis (Salerno, 2010: 4). A contributing factor to the crisis in 2008 was that the most widely used banking institution can be categorized as fractional reserve banking. This institution allows short-term deposits to be used in order to finance long-term lending (Schlichter, 2011: 2). This kind of banking system has long been criticized by the Austrian School of economics as being the fundamental factor in the occurrence of economic instability that can be seen as booms and busts (Zelmanovitz, 2011: 40, Reynolds, 2010: 33)
Within the Austrian school of economics there are several different views on how financial systems should be built up in order for long-term economic growth to take place and how economic instability should be avoided. Some Austrian economists suggest that a free banking system is the solution to the problem, where an increased competition between banks would limit excessive lending and credit expansion. Others argue that a 100 percent reserve system is needed in order to rule out credit expansion (Bagus, 2010: 2). Bagus (2010) compares these different alternatives and concludes that not even a 100 percent banking system would be sufficient in order to prevent business cycles to take place in an economy. This due to so-called maturity mismatching which can be seen where banks use short-term liabilities in order to give out long-term loans (Bagus, 2010: 2). This also takes place in other financial intermediaries, such as investment banks, through structured financial vehicles (SFVs) where short-term financial papers are used to finance long-term investments (Bagus, 2010: 2). In spite of the differences, one thing seems to be clear within the Austrian school of economics; the solution to economic instability lies in reducing or optimally removing the use of credit in the economy completely.

4.4 Four categorising dimensions of financial systems

In The Global Financial Report, conducted by The World Bank (2012c), a method of benchmarking financial systems is presented. Financial systems are benchmarked using four dimensions, namely: depth, access, efficiency, and stability (The World Bank, 2012c: 22). A matrix from Cihak et al, (2012: 9) shown in table 9.1 in the appendix, displays the variables that can be used to measure the different dimensions within the financial sector.

4.4.1 Financial depth

Financial depth is a dimension concerning the size of the financial sector and to what extent financial services are used in a country. This dimension has been the most commonly measured within financial systems when looking at previous studies. The variables describing the size of the financial system relative to a country’s GDP has been the empirically dominant measure in studies of this sort. Because of this, there is a great deal of theory connecting financial depth with long term economic growth and poverty reduction. In a broader perspective financial depth is seen to have a positive correlation to economic growth as well as reducing poverty (The World Bank, 2012c: 23).

As highlighted by King and Levine (1993) there is a robust correlation between the financial development (where one dimension concerns the size) and economic growth. In their study they point specifically to the fact that as more financial services are provided in an economy the allocation of capital resources will be more efficient and the rate of physical capital accumulation improved. As these
two factors are seen to be empirically connected to economic growth the importance of financial depth to an economy is therefore established (King & Levine, 1993: 734).

Another view on financial depth is expressed by Arcand, Berkes and Panizza (2012). The authors reflect on studies showing that financial depth has no effect in countries with poor financial structures and that too much depth is seen as negative to economic growth as exemplified by the recent financial crisis (Arcand et. al. 2012: 4). It is however concluded that financial depth has a positive effect on economic growth in countries with small and intermediate financial sectors (Arcand et. al. 2012: 23).

### 4.4.2 Financial access

Financial access is a dimension that is crucial in regards to individuals’ and firms’ access to financial services, such as money transactions and opening bank accounts. There seems to be a strong connection between economic development and financial access separated from the correlation between financial depth and economic development. Beside this connection, financial access also reduces inequality by enhancing competition and increasing the demand for labour. These factors improve the income distribution within a country, which in itself has a positive effect on economic growth. It is important to note that even though finance might be accessible, the quality of these financial services is also of importance to economic growth (The World Bank, 2012c: 26).

### 4.4.3 Financial efficiency

By efficiency it is meant that a system can allocate resources with as low costs as possible. In order for a financial system to be able to give services of high quality it has to be efficient. This dimension describes how efficient capital resources are allocated within a country’s market for finance. There is usually a connection between an efficiently run bank and a profitable bank; this is however not always the case due to volatility in the economy, resulting in that inefficient banks can make large profits. (The World Bank, 2012c: 27).

### 4.4.4 Financial stability

The fourth dimension of the financial system according to The World Bank (2012c) is stability, which is closely linked to long-run financial development and long-run economic development. Financial stability is “…the prevalence of a financial system, which is able to ensure in a lasting way, and without major disruptions, an efficient allocation of savings to investment opportunities. How close an economy is to the break point, exceeding which would impair the efficient allocation of savings, could be labelled the degree of financial fragility“(Issing, 2003: 1-2). In our study the prime example of financial stability
is related to the distance to default in the perspective of banks.

The aspect of stability also includes a bank’s trustworthiness in its actions on the domestic market, such as, not expanding credit to risky investments or having a too low assets-to-credit ratio. An increase of credits yielded always comes with some degree of instability meaning that there exists a certain trade-off between the two. This trade-off can cause confusion when looking at the correlation between the stability dimension and economic growth. A country with a high financial depth and a low financial stability can show higher levels of economic growth than a country that has the opposite characteristics. When looking at this example one could wrongly assume that financial instability contributes to economic growth.

If the banks are too risky in their credit-yielding this will not only have an effect on the financial stability but also on the efficiency of the credit process. Excessive credit growth is one of the most common features in preceding a bank crisis and has been seen repeatedly during the recent decades (The World Bank, 2012c: 28).

When discussing financial stability there are certain factors that are seen as problematic. There is for example an on-going debate on the effect that competition between banks has on bank stability. Bank competitions can in many ways be seen as something positive as the prices for loans are reduced and the incentives for offering a higher standard for services are increased. However, as banks are forced to decrease their profit-margins their risk-taking is increased, meaning that financial stability is reduced (Berger et. al., 2008: 1).

Another contributing factor to a country’s financial instability is inflation. Issing (2003) expresses inflation as one major factor of financial instability and argues that inflation can increase the asymmetrical information between lenders and borrowers regarding future economic outlooks. He further argues that excessive credit growth is seen as a foundation to financial instability and underlines that monetary policies, with stable prices as a goal, provide the basis for stable financial markets (Issing, 2003: 3).

The trade-off between economic growth and financial stability is also highlighted. In order for a stable economic growth to be upheld there is a need for policies keeping inflation low. In the long-run stable prices will reinforce a sustainable economic growth (Issing, 2003: 3). Issing also points to that most
financial crisis were proceeded by high levels of inflation but underlines that a stable inflation rate on its own is not a sufficient condition for financial stability to be attained (Issing, 2003: 4).

As previously shown, Austrian business cycle theory shows the instability that artificial created credit can cause in an economy. Hence supporters of the Austrian school see financial instability is seen as primarily negative to sustainable economic growth by the theory’s supporters (Reynolds, 2010: 33).

4.5 Conclusion
As seen by the different theories presented in this section the correlation between financial systems and economic growth is something that they all have in common. However there are different views regarding credit as having a positive or a negative effect on growth and under what circumstances financial systems promote growth through credit.

Research from The World Bank has led to the use of four dimensions in order to benchmark financial systems where each dimension has a unique relationship to the economy and more specifically economic growth. The World Bank emphasises the complexity of financial systems and the importance of investigating financial depth, access, stability and efficiency. In this study we will use these four dimensions and their connection to economic growth in order to compare Schumpeter’s growth theory with Austrian business cycle theory regarding financial systems and credit.

Concluding this section it is clear the Schumpeter’s view on the role of credit clearly differs from that of the Austrian economists. According to the Schumpeter’s theory of economic development credit has the role of balancing production resources in the economy so that the new entrepreneurs can be empowered to carry through their production improvements. Summarising the development process, credit is necessary for new combinations within the economy to take place. Hence in an economic system without credit, innovation is hampered disfavouring economic development including growth. The financial variables are therefore expected to be positively correlated to economic growth. This claim is not completely certain since there could be other resistances to growth-induced innovation than lack of credit.

Conversely, the Austrian school of economics sheds light on the instability that credit causes to an economic system claiming that when there is an artificial creation of money in the economy the result will be negative. They repeatedly point to the volatility that credit creates in an economic system and the importance of being cautious when it comes to policies of credit expansion. Hence, credit causes an
imbalance in the way resources, production and consumption is allocated in the economy, eventually leading to a bust. Looking at the specification of the regression used in our study, this theory would predict a negative or insignificant correlation between the financial variables and economic growth. An exception is possible for the financial stability indicator (which is hard to interpret) where the estimate could be positive.

5. Empirical analysis

In this section the regression models, the variables used as well as the data will be presented. In table 5.1 the variables are presented as well as the impact they have on economic growth according to Schumpeter’s theory of economic development and Austrian business cycle theory. Each variable and the expected outcome will then be further explained. Table 5.2 gives a summary of the collected data increases the understanding of the spread of the observations. The section will then be concluded with an analysis of the multiple regressions where variables are gradually added.

5.1 Regression model

When all the variables are included, the regression model will have the following specification:

\[
GDP_{GROWTH} = \beta_0 + \beta_1 DCP + \beta_2 M2 + \beta_3 COM + \beta_4 ZSCORE + \beta_5 NET + \beta_6 \ln GDP_{INITIAL} + \beta_7 FDI + \beta_8 LIFE + \beta_9 CPI + \varepsilon
\]
5.1.1 Explanation of variables

Table 5.1 Summary of variables used

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Type of variable</th>
<th>Expected outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDPGROWTH</td>
<td>Average real GDP per capita growth 2004-2011</td>
<td>Dependent</td>
<td>SGT ABCT</td>
</tr>
<tr>
<td>DCP</td>
<td>Domestic credit to private sector (% of GDP)</td>
<td>Independent, explanatory</td>
<td>+ INS/−</td>
</tr>
<tr>
<td>M2</td>
<td>Money and quasi money % of GDP</td>
<td>Independent, explanatory</td>
<td>+ INS/−</td>
</tr>
<tr>
<td>COM</td>
<td>Commercial bank branches per 100,000 adults</td>
<td>Independent, explanatory</td>
<td>+ INS/−</td>
</tr>
<tr>
<td>ZSCORE</td>
<td>Distance to default for banks</td>
<td>Independent, explanatory</td>
<td>+/− +</td>
</tr>
<tr>
<td>NET</td>
<td>Net interest margin</td>
<td>Independent, explanatory</td>
<td>INS/− INS/+</td>
</tr>
<tr>
<td>GDPINITIAL</td>
<td>GDP per capita 2004</td>
<td>Independent, control</td>
<td>− −</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
<td>Independent, control</td>
<td>+ +</td>
</tr>
<tr>
<td>LIFE</td>
<td>Life expectancy at birth</td>
<td>Independent, control</td>
<td>+ +</td>
</tr>
<tr>
<td>CPI</td>
<td>Corruption index</td>
<td>Independent, control</td>
<td>− −</td>
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</tbody>
</table>

SGT = Schumpeterian theory of economic development  
ABCT = Austrian business cycle theory  
INS = Insignificant

Table 5.2 Summary of collected data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Max</th>
<th>Min</th>
<th>Standard deviation</th>
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</thead>
<tbody>
<tr>
<td>GDP per capita growth</td>
<td>3.0160</td>
<td>2.7693</td>
<td>6.7090</td>
<td>-0.76266</td>
<td>1.7266</td>
</tr>
<tr>
<td>log Initial GDP per capita</td>
<td>6.3546</td>
<td>6.3320</td>
<td>8.2200</td>
<td>4.4802</td>
<td>647.29</td>
</tr>
<tr>
<td>CPI</td>
<td>4.7818</td>
<td>5.6280</td>
<td>101.30</td>
<td>5.7680</td>
<td>21.647</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>62.758</td>
<td>55.795</td>
<td>75.245</td>
<td>45.750</td>
<td>4.2288</td>
</tr>
<tr>
<td>FDI</td>
<td>4.9846</td>
<td>4.0489</td>
<td>26.288</td>
<td>0.056000</td>
<td>4.6643</td>
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<tr>
<td>M2</td>
<td>41.987</td>
<td>38.822</td>
<td>101.30</td>
<td>12.345</td>
<td>21.647</td>
</tr>
<tr>
<td>DCP</td>
<td>25.558</td>
<td>22.760</td>
<td>59.132</td>
<td>3.9894</td>
<td>15.525</td>
</tr>
<tr>
<td>Commercial banks</td>
<td>7.8600</td>
<td>4.3314</td>
<td>51.493</td>
<td>0.49160</td>
<td>8.9339</td>
</tr>
<tr>
<td>Z-score</td>
<td>17.316</td>
<td>15.494</td>
<td>47.909</td>
<td>4.6952</td>
<td>9.2398</td>
</tr>
<tr>
<td>Net interest margin</td>
<td>4.8299</td>
<td>4.4356</td>
<td>10.666</td>
<td>0.48872</td>
<td>1.9077</td>
</tr>
</tbody>
</table>

5.2 Data and specification of chosen variables

Building on the theoretical section we will compare Schumpeter’s theory of economic growth and Austrian business cycle theory by using the World Bank benchmarking-method previously mentioned. This means that our model should include at least one indicator for each of the four dimensions of the financial system (depth, access, efficiency, and stability). We argue that all of these four dimensions enable us to draw conclusions about financial systems connected to both theories. As a starting-point we have looked at the indicators listed in table 1 in the appendix. Unfortunately some highly interesting indicator-variables hade to be excluded from our study due to lack of data.

The explanatory and dependent variables are the variables specifically connected to our problem statement. The control variables are added in order to get the most realistic expression for economic
growth as possible. The explanatory estimates can then be compared to the control variables in order to see the relative impact that they have on the dependent variable (GDP per capita growth).

5.2.1 Dependent variable

**Real GDP per capita growth, 2000 US$ (GDP\textsubscript{GROWTH})**

The dependent variable examined in this study is the real GDP per capita growth-rate. GDP per capita growth-rate is a measure of a country’s change in total output divided with the country’s population. The growth rate is expressed in average annual percentages during the period 2004-2011. GDP per capita growth-rate is useful in order to compare countries and has been widely used in the majority of growth models. This variable is used to give us information concerning the economic development in the respective countries.

Real GDP per capita growth-rate is a solid measurement for the standard of living even though there are certain drawbacks (as described in the definitions section) (Weil, 2005: 6). Real values are used so that the values are unaffected by inflation. The average GDP per capita growth-rate is calculated by using the compound method shown in the following formula where \( n \) is the number of periods:

\[
\text{Equation 5.1} \quad \text{Average growth \%} = \left[ \left( \frac{\text{Last year value}}{\text{First year value}} \right)^{\frac{1}{n}} - 1 \right] \cdot 100
\]

5.2.2 Independent explanatory variables

**Domestic credit to private sector, \% of GDP (DCP)**

This variable is chosen as an indicator for financial depth. Private credit is a variable that has gained much attention in many recent empirical studies. The measurement of this variable is defined as "deposit money bank credit to private sector as a percentage of GDP." (Cihak et al., 2012: 10). This variable takes only private sector issued credit into account and therefore excludes credit issued by for example central banks as well as credits given to governments and public firms. The variable is of importance due to the previously stated link between private credit to GDP and economic growth in the long run (Cihak et al., 2012: 10). A downside with this variable is that it does not take the non-performing loans into consideration, which is why we have chosen to complement this measurement with money and quasi money (The World Bank, 2006). However the effect that this variable has on economic growth is debated and can be both positive and negative depending on how the credit is used.
(Arcand et al., 2012). If Schumpeter was right in his assumptions concerning the importance of financial development, this coefficient will most likely be positive. If predictions were to be made using the Austrian business cycle theory as a basis, this coefficient would be negative or insignificant. The statistics are averaged values for the period 2004-2011.

**Money and quasi money, % of GDP (M2)**

This variable is, as the previous, an indicator for financial depth. Money and quasi money (M2) comprise the sum of currency outside banks, demand for deposit other than those of the central government, and the time-, savings- and foreign currency deposits of resident sectors other than the central government (The World Bank, 2012c). This is an important tool to measure the depth of the financial systems in a country and provides understanding for the monetization of an economy and is expressed as percentage of GDP, averaged for the period 2004-2011. A higher monetization is associated with a higher level of economic growth and the variable is expected to be positive (McLoughlin and Kinoshita, 2012: 3).

There are several weaknesses with using M2 as a proxy of financial depth. First it only includes liquidity concerning the private sector. The M2 definition of monetization excludes external capital inflows and government lending from the financial sector. It can be argued that these two factors can have a great impact on the liquidity and hence the financial depth of the economy. Another downside with using M2 is that is does not capture the extent of bank intermediation (The World Bank, 2006). A solution to incorporate these excluded factors would be to use M3 instead of M2 (Dushimumukiza, 2010). For our study this choice was not available as there was a lack of data for M3 for the countries chosen.

Combined with the DCP variable we obtain a broader indicator of financial depth. As with the previous variable focused on financial depth, the impact that the variable should have on economic growth varies depending on what theoretic lenses you look through. The Austrian school of thought would most likely see an increase in M2 as something negative for economic growth. This school claims that there is nothing positive with an increase in the liquidity of the economy if peoples’ time preferences don’t back up the change. Looking at Schumpeter’s growth theory a higher M2 and a higher liquidity, through financial intermediaries, should be positive for economic growth as the possibilities for innovation increases.

**Commercial bank branches per 100,000 adults (COM)**

This variable was chosen as an indicator for financial access. Commercial bank branches is defined as local commercial banks, still connected to a main office under the same name, which provides bank
services and other financial services to customers. The statistics on this variable will show the general
access to financial services. A country with a higher amount of local bank offices suggests a higher
access to credit for the population. This variable is therefore expected to be positive (The World Bank,
2012c). The amount of commercial bank branches per 100,000 adult will be based on the averaged
statistics cross the countries chosen over the period 2004-2011. The term financial access is not a term
that is directly used by Schumpeter or the Austrian school but it is still possible to view this variable
from these two different points of view. If viewed through a Schumpeterian-growth-perspective an
increase of financial access would be identified as something positive since more people would be able
to use financial services. This would theoretically amplify innovation and economic growth in the
economy as a whole. On the other hand Austrian economists might argue that more accessible credit
increases the risk for unsustainable growth.

**Bank Z-score (ZSCORE)**

To get an indication of financial stability the bank Z-score is incorporated in the specification. This
variable is used to measure a banks’ distance to insolvency and compares buffer assets, such as returns,
with the possible risks, such as the unpredictability of returns. The score gives a value of the soundness
of financial intermediaries since it is directly connected to the probability that a banks’ assets will be
worth less than the value of its debt. A limitation with the z-score is that it is only based on accounting
data and it is possible that financial stability is exaggerated. Another constraint of the variable is that the
amount of financial intermediaries that the statistics are based on can vary from country to country. This
means that negative outcomes in one part of a system, that has an impact on a country’s economy, are
not necessarily taken into account into the measurement (Cihak et al., 2012: 15).

Relating back to theory, financial stability should have a positive effect on economic growth in the long
run. This is primarily mentioned by The World Bank (2012c) claiming that excessive credit is one of the
most common features in preceding a bank crisis, hence a negative impact to the economy in the long
run. This is however balanced with the theory of a trade-off between financial depth and stability. The
World Bank (2012c) also claims that financial depth has a positive effect on economic growth indirectly
meaning that a certain level of instability can be positive for the economic growth. The Austrian school
of economics view financial instability as purely negative. This is because financial instability is the root
of artificial booms that lead to bust through excessive credit. With this said it is still uncertain what sign
this coefficient will have since there might exist a certain trade-off between financial depth and financial
stability. The z-scores are averaged values from the period 2004-2010.
**Net interest margin (NET)**

The net interest margin is an indication of financial efficiency. Profitability of banks is measured by the relative difference between the interest income generated and the interest paid out to lenders by financial systems. The cost of such matching has been shown to have a vital part to play for economic performance in a country and is defined as the bank’s accounting value of net interest revenue as a portion of the interest bearing assets (The World Bank, 2012c: 84). A higher net interest margin means that the measured banks receive more interest revenues compared to what they give out.

When looking to theory it is hard to determine if a high net interest margin leads to a higher economic growth or not. High levels of this variable means that the cost of credit and the yield made from saving is set to a level where the financial system makes a high profit. It could mean that financial services are expensive in a country because of a lack of competition. This scenario would according to Schumpeterian theory of economic development be negative in order to promote growth through credit-based innovation. High levels of net interest margin could also indicate that the financial system is well operated and that a financial crash is less likely to occur, but this is also not a certain statement that can be made since profit can be used in multiple ways. Using Austrian business cycle theory this example could be used to argue that a high interest margin leads to a more stable economic development. Values used in the regression are averaged from the period 2004-2010, the period shortened to 2010 due to the lack of data from 2011.

### 5.2.3 Independent control variables

**Initial real GDP per capita, 2000 US$ (GDP\textsubscript{INITIAL})**

The base year for this study, and therefore the initial GDP per capita, is based on 2004. The initial GDP per capita is, as a standard in studies of economic growth, expressed in log form (Arcand et al. 2012: 9). The reason for this is to adjust for convergence between countries. As expressed in neoclassical theory convergence between countries implies that a higher initial GDP per capita gives a lower GDP per capita growth rate (Ray, 1998). It is therefore necessary to incorporate this variable in the regression. The coefficient is anticipated to be negative in the regressions run.

**FDI net, % of GDP (FDI)**

The largest inflow of physical capital is through foreign direct investment, a situation where a foreign company invests (builds or purchases) in a plant or factory in another country (Weil, 2005: 312). The inflow of this kind is projected to be positive since investment of this kind is associated with economic development. In the regression the values are averaged in percentage of GDP from the years 2004-2010.
Due to the absence of data for year 2011 the study and regression will only contain data from the above mentioned period.

**Life expectancy at birth, years (LIFE)**

Life expectancy at birth shows the average amount of years that a new-born is expected to live. A low life expectancy can however be explained by high levels of child mortality (Weil, 2005: 100). The values are displayed in average years between the years 2004-2011 and are included because of the strong correlation between life expectancy and economic growth (Weil, 2005: 157). The sign of this variable is therefore expected to be positive.

A higher life expectancy can be interpreted as a healthier population. When keeping all other factors constant, healthier workers results in a more productive workforce which gives a positive effect on GDP per capita growth (Weil, 2005: 158-159). The correlation between life expectancy and economic growth is however secondary to the extent that it increases the supply of workers which as a result increases productivity.

**Level of corruption (CPI)**

Transparency International has developed an index to measure corruption, namely the Corruption Perception Index (CPI). A high level of corruption has a negative effect on economic growth due to several reasons. It leads to a reduced trust between market actors, which also leads to the weakening of financial systems and a greater inefficiency in the way credit is invested (Weil, 2005: 350). The aspect of rent-seeking, a term used to describe people gaining self-wealth from other peoples’ labour, is also a part of the negative impact that corruption has on the economy (Kay, 2010). The index ranks the countries on a scale from 1-10 where a high value represents a low level of corruption. The expected outcome that this variable has on the dependent variable is therefore positive. All the countries analysed in this study have relatively low values of CPI with the highest being 5.6 at a scale from 10. Including this variable in the specification will show us how decisive the corruption factor is in contributing to economic growth in the high-corruption sample chosen. An averaged range of values has been compiled from the years 2008-2011.

5.2.4 **Omitted variable example: The informal credit market**

As shown in the previous studies, especially the paper presented is written by Chidzero, Ellis and Kumar (2006), the informal financial market can have a significant impact on the economy in some countries. Similarly ‘Banking the Poor’ conducted by The World Bank (2009) mentions the significant size of the informal sector in less developed countries.
If it is predicted that the informal financial sector positively affects economic growth, the exclusion of the variable will affect the estimates of the remaining variables. This could be interpreted in two ways. First, the observation figures that show depth and access to credit will be underestimated. This leads to the conclusion that the data of the financial depth and financial access variables will be undervalued causing the estimates to be greater than the actual values.

Second, the informal sector is in itself a variable that is omitted in the regression models used. The omitted variable will have the following effect on the other regression model: The expected values for all the remaining coefficients that in some way are correlated with the informal market will not be equal to the actual values. Instead, each of these coefficients will be equal to the actual level of the coefficients plus bias. This interpretation similarly leads to a conclusion that the informal-sector-related estimates will be greater than the actual values (Studenmund, 2011: 170-171). The same theoretical presentation can be made concerning other unidentified variables such as the stock market.

**5.3 The functional form**

The general functional form when conducting econometric studies is the linear (sometimes called default) functional form. If any other functional form than the default form is chosen, it is optimal that the choice is backed up by theory. In rare occasions the fit of the specification can be sufficient to motivate using non-linear functional form (Studenmund, 2011: 212-213).

If a non-linear relationship is observed it is hard to specify the exact non-linear link that exists between the independent and dependent variables. The choice between the best non-linear function to describe these relationships can in such a case not be made by using economic theory (Studenmund, 2011: 229). In order to come up with the criteria used to choose the correct form, statistical methods must be used. By using these methods the form of the regression model could be optimized in a systematic way giving more accurate results (Kuha, 2004: 188). However we do not have enough statistical knowledge to further analyse these relationships. Therefore the regression will mainly be linear with the exception of initial GDP per capita which has a theoretically log relationship to GDP per capita growth.

**5.4 Outliers**

Outlier values are figures that lay outside the range compared with the rest of the observations (Studenmund, 2011: 74). A way to systematically observe these values is by looking at the standard error. If a value is drastically different from the rest the standard error should be drastically changed if the value is dropped. Outliers can also be observed by looking at the mean, maximum and minimum for
each variable. The outlier value does not have to be incorrect just because it does not fit in well with the rest of the observations but it can have a substantially negative impact on the regression as a whole.

The objective of our study is to interpret the impact that financial systems have on the economy through two theoretical perspectives and not to create a regression model with as good-looking figures as possible. If the latter would be the goal, the problem statement would have to be completely changed. Therefore data-mining (including dropping unfitted variables) should be avoided as much as possible (Studenmund, 2011: 74). In this study, two countries: Vietnam and Zimbabwe have been removed from the sample because of outlier values. This can be seen relatively clear in the diagram 9.1 and 9.2 in the appendix. In spite of the discussion earlier it has been decided that these observations can be dropped from the sample.

5.5 Chosen observation countries

Now when the chosen variables have been presented, the observations that are included in the study will be shown. Of the 90 countries initially chosen for this study, several countries have been removed as data has been collected. The main reason is missing data for the chosen variables and the second reason is outlier values. Countries that have been removed are shown in list 9.1 in the appendix. The following countries are included in the final observation sample after the countries lacking data have been removed, (N= 53)

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<tr>
<td>Ethiopia</td>
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<td></td>
<td></td>
<td></td>
<td>Sierra Leone</td>
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</table>
## 5.6 Regression analysis

### Table 5.3 Summary of regression

Dependent variable: Real GDP per capita growth average (2004-2011)

<table>
<thead>
<tr>
<th>Model:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
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<tbody>
<tr>
<td><strong>Independent variables</strong></td>
<td>Estimated Coefficient</td>
<td>Estimated Coefficient</td>
<td>Estimated Coefficient</td>
<td>Estimated Coefficient</td>
</tr>
<tr>
<td>log Initial GDP</td>
<td>−0.00199769*** (0.000401472)</td>
<td>−0.00202607*** (0.000405349)</td>
<td>−0.00196111*** (0.000403762)</td>
<td>−0.00196202*** (0.000408742)</td>
</tr>
<tr>
<td>Corruption</td>
<td>0.917799*** (0.277920)</td>
<td>0.862130*** (0.289439)</td>
<td>0.889873*** (0.287081)</td>
<td>0.889271*** (0.290590)</td>
</tr>
<tr>
<td>FDI</td>
<td>0.0672440 (0.0422894)</td>
<td>0.0596939 (0.0437302)</td>
<td>0.0399869 (0.0455012)</td>
<td>0.0395097 (0.0468173)</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>0.0425194 (0.0278593)</td>
<td>0.0373788 (0.0288628)</td>
<td>0.0377580 (0.0285606)</td>
<td>0.0383156 (0.0305776)</td>
</tr>
<tr>
<td>DCP</td>
<td>0.0208968 (0.0243555)</td>
<td>0.0128727 (0.0268090)</td>
<td>0.00943050 (0.0266408)</td>
<td>0.00899136 (0.0280791)</td>
</tr>
<tr>
<td>M2</td>
<td>−0.00424972 (0.0158829)</td>
<td>−0.000960142 (0.0165804)</td>
<td>0.00572566 (0.0170866)</td>
<td>0.00623133 (0.0195259)</td>
</tr>
<tr>
<td>Commercial banks</td>
<td>0.0227940 (0.0310562)</td>
<td>0.0363046 (0.0322086)</td>
<td>0.0363901 (0.0326159)</td>
<td>0.0363901 (0.0326159)</td>
</tr>
<tr>
<td>Z – score</td>
<td>−0.0386636 (0.0276085)</td>
<td>−0.0388643 (0.0281585)</td>
<td></td>
<td>0.00743284 (0.133543)</td>
</tr>
<tr>
<td>Net interest margin</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Summary Statistics</strong></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.425611</td>
<td>0.432405</td>
<td>0.456625</td>
<td>0.456664</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.350690</td>
<td>0.344113</td>
<td>0.357829</td>
<td>0.342943</td>
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<tr>
<td>F-statistic</td>
<td>5.680841</td>
<td>4.897419</td>
<td>4.621920</td>
<td>4.015635</td>
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<tr>
<td>P-value (F-test)</td>
<td>0.000176</td>
<td>0.000360</td>
<td>0.000381</td>
<td>0.000878</td>
</tr>
</tbody>
</table>

N = 53

Standard error in parenthesis

*** level of significance at 1%

** level of significance at 5%

* level of significance at 10%
The table below shows the average importance that each variable has in each model to impact the outcome of the average GDP per capita growth.

<table>
<thead>
<tr>
<th>Table 5.4 Average effects on average GDP per capita growth (Mean values multiplied by the estimates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent variables</td>
</tr>
<tr>
<td>log Initial GDP</td>
</tr>
<tr>
<td>Corruption</td>
</tr>
<tr>
<td>FDI</td>
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<tr>
<td>Life expectancy</td>
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<tr>
<td>DCP</td>
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<tr>
<td>M2</td>
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<tr>
<td>Commercial banks</td>
</tr>
<tr>
<td>Z – score</td>
</tr>
<tr>
<td>Net interest margin</td>
</tr>
</tbody>
</table>

6. Results and findings

6.1 Observation analysis

In order to evaluate the variables and to optimise the specification used in this study variables have been added in a systematic way. The first model includes the control variables and the financial depth variables. In the succeeding three models, the other financial indicators are gradually added. The results of the four different regressions are displayed in table 5.3.

**Model 1**

*Model 1* contains log initial GDP per capita, corruption perception index, FDI, life expectancy and domestic credit to private sector (DCP) and M2. As can be seen the log of initial GDP per capita and CPI were both significant at a 1%.

The coefficient of the explanatory variables in this model, DCP and M2 are both insignificant. This occurrence is repeated in the first four models. This insignificance could be explained by the multicollinearity observed in *diagram 9.1 in appendix*. It should also be noted that the M2 estimate has an unexpected sign. As interpreted by the adjusted R² (≈0.351) this model has the second best fit of the five models.

**Model 2**

In *model 2* the variable commercial bank branches has been added to the function. The significant coefficients in this model are unchanged. This means that it is not possible to see any correlation
between financial depth, financial access and economic growth if only observing this model. The M2 estimate is also negative in this model.

Adjusted \( R^2 \) is reduced compared with the previous model to around 0.344, which points to a worse fit. Concerning the F-test, the p-value in model 2 is lower than in model 1 showing a higher probability of significance as a whole.

**Model 3**

In *Model 3* the bank z-score variable is added to the specification. The significant coefficients in this model are unchanged pointing to zero correlation between the financial dimensions and economic growth.

Looking at the adjusted \( R^2 \) and the p-value of the F-test it is not possible to tell whether this model is an improvement from the previous model or not. One differing detail compared with the previous models is that the M2 estimate (although still insignificant) is now positive.

**Model 4**

Moving forward to *model 4*, the net interest margin variable has been added to the specification. This did not change the significance of the already included variables. The adjusted \( R^2 \) was also reduced compared to the previous model indicating that the net interest margin did not result in an improved specification fit.

To our surprise none of the explanatory variables are significant in any of the four regressions run. It should also be concluded that the specification fit was not affected much by the added variables in model 2-4. The two variables that were consistently significant was corruption and log initial GDP.

### 6.2 Interpreting the results

Presented in this section are our interpretations of the results. Four financial dimensions have been investigated in order to grasp the complexity of financial systems as good as possible. Since none of these dimensions had an impact on economic growth from the observations that we have made, there is a need to reflect on the reasons for the insignificances found.

**Previous studies**

The results are rather surprising and contradicting the theoretical framework as well as the previous studies used. The correlation to the dimensions of financial systems mentioned by Cihak et. al. (2012) is not seen at all in our study. Therefore our results cannot back up the argument that more developed
financial systems result in economic growth by changing the allocation of savings in a society (Cihak et al., 2012: 5).

Our conclusions somewhat contradict the results from previous studies on the topic, for example the solid linkage observed between financial depth and economic growth by King and Levine (1993). The differences between our study and the one conducted by King and Levine (1993) can be seen on several levels; such as the dataset used, the time period observed, and the variables included (amount and selection). In their study they used a data set of 80 countries (including developed and developing countries) over a 30-year period with a different set of variables in their regression. Our study analyses 53 countries in a shorter time period where all the countries observed are low- or lower-middle-income countries. The short period, for one, impacts our study in that long-term fluctuations in economic activity and its effects are impossible to observe. Another factor for the differences in results is most likely the sample of countries chosen. The consequence of choosing only developing countries is that the size of the sample is significantly smaller resulting in a bigger chance for a bias outcome.

Financial access is also taken up by several of the earlier studies referred to, such as Beck et. al. (2006). Although the intention with the studies was not primarily to connect access to finance with economic growth, access was brought up as positive to economic development. The positive correlation is further underlined by The World Bank (2009) and Claessen & Tzioumis (2006). The results from our study contradicts this trend as commercial bank branches per 100 000 people was seen to have an insignificant correlation to GDP per capita. The fact that this indicator only takes up geographic financial access means that the whole concept of financial accessibility is not included. As previously mentioned it is common that poor people are excluded from financial services because their lack of sufficient collateral. Hence this indicator is not enough in order to fully investigate the concept of financial access and its connection to economic growth in less developed countries.

Another finding that can be compared to previous studies is that the informal sector can represent a big fraction of the total financial market. The bigger part that is informal, the more unreliable and non-existent is the amount of data. This means that accurate results are difficult to present for the countries we have chosen, giving reason to be critical whether our results are reliable or not.

**Theory**

When going back to theory we will analyse two assumptions:

1. Our results are accurate and reflect real economic conditions.
2. Our results do not accurately reflect reality.

We start our analysis by assuming that our results are accurate in answering our problem statement. Looking to Schumpeter the results does not support the claims that his theory states. This since the core of the Schumpeterian growth model includes credit depth as a vital factor for economic growth to take place. The only way to defend this theory is by arguing that the chosen countries have a lower level of innovation potential. In other words that credit is available but this is not enough in order to promote growth.

From the perspective of the Austrian business cycle theory the results turn out to be more supportive in their nature and do not come as a surprise. One of the foundations in this economic school is that credit does not have a positive impact on long-term economic growth, which our data supports. The only indicator that still remains unanswered is the financial stability indicator, which was completely insignificant. This is somewhat perplexing since this school of thought continually points to stability as a core aspect of sustainable growth. What should also be highlighted is that the stability variable used in this study might not be sufficient to capture the instability versus growth aspect that this theory describes. The stability variable used is based on the assumption that the bank can increase and decrease stability through revenue from loans, i.e. interest. This in contrast to the instability that credit causes by its pure existence that is argued within the Austrian business cycle theory.

Secondly, we look at the assumption that our results are inaccurate when showing an insignificant correlation between financial systems and economic growth. There are several factors that according to theory and previous studies could cause biased result. A large factor is that our indicators do not include the structural and institutional characteristics of the chosen countries. As previous research has shown there are several structures that less developed countries have in common, including high levels of corruption and financial institutions that exclude the poorest fraction of the population. The structure of the financial system across countries can vary greatly and so can the use of credit. The depth of the financial system does therefore not have to reflect upon the quality of credit or the allocation of capital resources. Another institutional element, corruption, can be seen as a critical factor regarding the outcome of credit usage and the allocation efficiency of such capital resources. This slows down economic activity, for example innovation and entrepreneurship and therefore further explains the barrier to economic development (Kay, 2010).
So, do we give Schumpeter’s theory the upper hand with his claims of the close correlation between financial and economic development or do we see that the arguments made from the Austrian business cycle theory make more sense? In our results we find no connection between high levels of financial depth, access, stability and efficiency and economic growth. As previously mentioned there are several reasons to be critical towards our results. This makes it difficult to draw any definite conclusions. However our study can be shown useful when connected with a future study that includes variables we have not been able to take into consideration in this paper. We have only scraped the surface of what common denominators these low- and lower-middle-income countries have and the effect these common factors have on financial systems and the economy as a whole. Aspects not taken into consideration in this study are, to mention a few, culture, gender and demographic structures, aid dependency, natural resource endowment, level of democracy and freedom. A more in-depth study should include additional variables in order to fill the existing gaps in our study.

7. Summary

Do well-functioning financial markets contribute to economic growth in less developed countries?

The results from this study show an insignificant relationship between financial systems and economic growth, contradicting much of the theory and results from previous studies that have been reviewed. Other variables outside of the financial system in this study, such as economic freedom and corruption, could be a reason for the non-existent correlation between financial development and economic growth in this study.

When comparing our study to others within the same field, such as King and Levine (1993), differences in the way our study has been conducted can be seen and further explain the variances in the results. Our study covers a shorter time period only including low and lower-middle income countries.

Although this area of research is characterized by a lack of data related to sectors such as the informal credit market and the stock market, this study gives an increased insight of the financial system in low- and lower-middle-income countries. This study can be seen as an additional piece of the puzzle in order to grasp the whole picture concerning the complexity of the relationship of credit and economic growth.
8. References


Commons, J. R. (1931) Institutional Economics. The American Economics Review. Vol. 21


### Data sources

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<tr>
<th>Variable</th>
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<td>Initial GDP per capita</td>
<td>2004</td>
<td>The World Bank, Data Bank</td>
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<tr>
<td>Mean Corruption Perception Index</td>
<td>2004-2011</td>
<td>Transparency International</td>
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<td>Mean Foreign Direct Investment</td>
<td>2004-2010</td>
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<td>Mean M2</td>
<td>2004-2011</td>
<td>The World Bank, Data Bank</td>
</tr>
<tr>
<td>Mean Domestic Credit to Private sector</td>
<td>2004-2011</td>
<td>The World Bank, Data Bank</td>
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<tr>
<td>Mean Net Interest Rate</td>
<td>2004-2010</td>
<td>The World Bank, Financial Sector Development Indicators</td>
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<td>Mean Population growth rate</td>
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<td>Mean Z-score</td>
<td>2004-2010</td>
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<td>Mean Life expectancy</td>
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The World Bank (2012) *Data Bank* [Online]:

The World Bank (2012) *World Development Indicators* [Online]:

International Monetary Fund, *e-Library: Cross-dataset Query Builder* [Online]:
>elibrary-data.imf.org\querybuilder.aspx?s=322&key=1445284< (Cited: 2012-11-11)
## Appendix 1: Benchmarking financial systems around the world

*Table 1 based on “Benchmarking financial systems around the world” (Cihak et al, 2012: p. 9)*

<table>
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<tr>
<th>Dimensions</th>
<th>Financial Institutions</th>
<th>Financial Markets</th>
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<tbody>
<tr>
<td><strong>Depth</strong></td>
<td>Private sector credit to GDP</td>
<td>Stock market capitalization plus outstanding domestic private debt securities to GDP</td>
</tr>
<tr>
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<td>Financial institutions’ assets to GDP</td>
<td>Private debt securities to GDP</td>
</tr>
<tr>
<td></td>
<td>M2 to GDP</td>
<td>International debt securities to GDP</td>
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<tr>
<td></td>
<td>Deposits to GDP</td>
<td>Stock market capitalization to GDP</td>
</tr>
<tr>
<td></td>
<td>Gross value-added of financial sector to GDP</td>
<td>Stocks traded to GDP</td>
</tr>
<tr>
<td><strong>Access</strong></td>
<td>Accounts per thousand adults (commercial banks)</td>
<td>Percent of market capitalization of top 10 largest companies</td>
</tr>
<tr>
<td></td>
<td>Branches per 100,000 adults (commercial banks)</td>
<td>Percent of value traded outside of top 10 traded companies</td>
</tr>
<tr>
<td></td>
<td>% of people with a bank account</td>
<td>Government bond yields (3 months and 10 years)</td>
</tr>
<tr>
<td></td>
<td>% of firms with line of credit (all firms)</td>
<td>Ratio of domestic to total debt securities</td>
</tr>
<tr>
<td></td>
<td>% of firms with line of credit (small firms)</td>
<td>Ratio of private to total debt securities (domestic)</td>
</tr>
<tr>
<td><strong>Efficiency</strong></td>
<td><strong>Net interest margin</strong></td>
<td><strong>Turnover ratio</strong> (turnover/capitalization) for stock market</td>
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<td>Lending-deposits spread</td>
<td>Price synchronicity (co-movement)</td>
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<td>Non-interest income to total income</td>
<td>Private information trading</td>
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<td>Overhead costs (% of total assets)</td>
<td>Price impact</td>
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<td>Profitability (return on assets, return on equity)</td>
<td>Liquidity/transaction costs</td>
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<td>Boone indicator (or Herfindahl or H-statistics)</td>
<td>Quoted bid-ask spread for government bonds</td>
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<td><strong>Stability</strong></td>
<td><strong>Z-score</strong> (or distance to default)</td>
<td><strong>Volatility</strong> (standard deviation / average) of stock price index, sovereign bond index</td>
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<td>Capital adequacy ratios</td>
<td>Skewness of the index (stock price, sovereign bond)</td>
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<td>Asset quality ratios</td>
<td>Vulnerability to earnings manipulation</td>
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<td>Liquidity ratios</td>
<td>Price/earnings ratio</td>
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<td>Other (net foreign exchange position to capital etc.)</td>
<td>Duration</td>
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<td>Ratio of short-term of total bonds (domestic, international)</td>
</tr>
<tr>
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<td>Correlation with major bond returns (German, US)</td>
</tr>
</tbody>
</table>
Appendix 2: Imperfect multicollinearity

Multicollinearity is found when two independent variables are perfectly correlated with each other. In practice this is extremely rare; however it is common that two or more variables are imperfectly correlated with each other in a regression (Studenmund, 2011: p. 248-250).

Multicollinearity does not cause bias, there are still substantial consequences:

- The standard errors will increase, increasing the probability of an unexpected sign.
- The t-scores will fall, making the estimates less significant.
- Estimates will become more sensitive to changes made in the regression model. (Studenmund, 2011: p. 252-254)

If multicollinearity is observed it can be dealt with in several ways:

- To do nothing since removing a variable in the specification can lead to bias because of an omitted variable.
- To drop one or several variables that has a part in the multicollinearity effect.
- To increase the sample size so that the multicollinearity effect become more imperfect. (Studenmund, 2011: p. 261-264)

In this study a suspected imperfect multicollinearity has been observed between the variables DCP and M2 as can be seen in the diagram below. The line-crossing diagram indicates that the two variables are imperfectly related to each other:

Diagram 1: correlation between M2 and DCP
In spite of the imperfect multicollinearity a decision has been made to “do nothing” and keep both variables in the specification. This because both variables are seen as adequately important to be included in the specification and the exclusion of one of them would result in bias. The largest consequence of this is that it will be harder to analyse the estimated coefficient values of these two variables separately.

**Appendix 3: Outliers**

*Diagram 2 GDP growth per capita to Domestic credit to private sector, N=55*
Diagram 3 GDP growth per capita to Net interest rate, N=55

Appendix 4: Excluded countries

List 1 Excluded countries (included countries are found under 5.5)

Afghanistan*    Guinea *    Mauritania*    Timor-Leste*
Albania*        Guinea-Bissau  *    Micronesia*    Togo*
Benin *         Haiti*        Myanmar*      Tonga*
Burkina Faso *  Kiribati*      Niger*        Uzbekistan*
Comoros *       Korea, Dem. Rep.*    Sao Tome and Principe*    Vietnam^ 
Cote d'Ivoire * Djibouti *     Senegal*      West Bank, Gaza*
Eritrea *       Malawi*        Solomon Islands*    Zimbabwe^ 
Fiji *          Mali*          Somalia*      
Gambia, The *    Marshall Islands*   South Sudan*   

Reason for exclusion:
* = Missing data in one or several variables
^ = Outlier values in one or several variables