NTNU

The middle-income trap, democracy and human capital

A study of Korea

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Preface

This Master's thesis is part of our two year Master of Science in economics at NTNU. The Master's thesis is written as a collaboration between Ingrid Hammer Zakariassen and Marte Eriksen. We would like to thank our advisor Ragnar Torvik for valuable discussions and feedback. We would also like to thank Yikai Wang for the presentation of his model at NTNU as well as a constructive discussion. Lastly, we wish to thank each other for a great collaboration as well as Isabel, Andreas, Lauren, Christian, Fredrik and Tor, for feedback and proofreading.

Abstract

In this thesis, we examine factors that are important for a country to escape or avoid a middle-income trap, and whether democracy and human capital are necessary conditions for a country to achieve high economic growth. We use results from two economic models; one by Wang (2016), and the second by Saint-Paul and Verdier (1992), and extend the latter to include the decision to democratize as an endogenous variable. From the extended model, we conclude that a high level of human capital in the population, investment in education and a relatively equal income distribution increases the probability of democratizing. Wang concludes that a country will democratize if the private sector capital is larger than the state sector capital. In both models, the economic growth rate will be higher in a democracy than in an authoritarian regime. We compare the evidence from Korea with the extended model by Saint-Paul and Verdier and the model by Wang, and find that these models are consistent with the empirical evidence. However, the models do not include all aspects that may have been important in the democratization process in Korea, which invested extensively in R&D and education, and experienced pressure to democratize from the international market and by collective actions in the population. Our analyses indicate that democracy induce higher economic growth, which may have prevented Korea from being caught in a middle-income trap.

Table of Contents

Table of figures

1. Introduction

The concept of the middle-income trap (MIT) is relatively new. It was first introduced by Gill and Kharas in 2006 and has since captured the interest of many economic researchers. Still, most studies on this topic is done through empirical analysis. The results from these studies usually concern whether or not a country is stuck in a middle-income trap. Economic models explaining the transition from middle- to high-income are scarce. Our aim with this Master's thesis is to examine which factors are important to escape or avoid the middle-income trap, and whether democracy and human capital are necessary conditions to achieve high economic growth. To examine this, we will conduct a case study on the economic transition of the Republic of Korea, henceforth referred to as Korea. This case study is chosen on the basis that Korea avoided a middle-income trap and has reached a high-income level. We wish to examine if the decision to democratize has had an impact on its economic performance, as well as the mechanisms behind the transition to democracy. We will examine two models of economic growth. The first is by Wang (2016), which focus on the middle-income trap as well as the relationship between democracy and economic growth. Wang claims that allocation of capital between the private and state sectors determines if a country will democratize and thus achieve continuous economic growth. This model does not include all necessary variables to predict the political regime. Therefore, we will also look at a second model, by Saint-Paul and Verdier (1992). In this model, education is the main factor for income redistribution and economic growth. As the model assumes that the decision of democratizing is exogenous, we will extend the model to make the decision endogenous. The results from the model by Wang (2016), and the extended model based on Saint-Paul and Verdier (1992), will be compared with empirical evidence from Korea to see if they are consistent.

The thesis is organized as follows. Chapter 2 gives a literature review of the concept of the middle-income trap. We discuss this in detail, as the topic is controversial among researchers. Since democracy is an important feature in our paper, we discuss the relationship between democracy and economic growth in chapter 3. In chapter 4, we present one of the few models concerning the middle-income trap, democracy and economic growth, a political-economic model by Wang (2016). We then examine Korea's history of political regimes and economic performance before and after they democratized, in chapter 5. Chapter 6 gives a discussion of the consistencies between the model by Wang and the empirical evidence from Korea. The assumption that education promotes democracy is discussed in chapter 7. In chapter 8, the

model by Saint-Paul and Verdier (1992) is presented. We expand the model to make the decision of democratizing endogenous in chapter 9. In chapter 10, we discuss consistencies between the extended model and empirical evidence from Korea. Chapter 11 summarizes and concludes.

2. The middle-income trap

In this section, a literature review on the middle-income trap will be presented. First, we will give a short presentation on middle-income countries, followed by an introduction and a definition of the concept of the middle-income trap. Further, we will give an overview of literature with analysis in favor of and against the existence of a trap. Last, we will present reasons why countries may be stuck in a trap and how they can avoid it.

2.1 Middle-income countries and income groups

The World Bank divides countries into three main groups by income level determined by gross national income (GNI) per capita[1]: low-income (USD 1,045 or less), middle-income (above USD 1,045 and below USD 12,736) and high-income countries (USD 12,736 or more). The middle-income countries can be divided into two separate groups: lower middle-income and upper-middle income countries, separated at USD 4,125 (World Bank, 2016a)[2]. Later, we will use data with GNI per capita in constant prices. Some researchers use gross domestic product (GDP) per capita in their analysis. For most countries, however, the difference between GNI and GDP is not substantial.

Today, five out of seven billion people live in middle-income countries. The middle-income group are diverse by geographical size, income level and population. The countries representing this group account for around one third of world GDP and some of them are among the most important contributors to the world's economic growth (World Bank, 2016c).

2.2 The concept of the middle-income trap

Convergence of the economic size of countries is a powerful theory, but is not the case for all economies (The Economist, 2012). In recent years, there has been concern that some countries are trapped at a middle-income level. The term "the middle-income trap" is used to describe the phenomenon of countries trapped at levels of middle-income. The term was first introduced by Gill and Kharas in 2006 and has since been widely used by researchers and policy makers (Gill & Kharas, 2015). According to a study by The Economist, using World Bank data, most countries with middle-income status in 1960 were still at middle-income levels in 2008 (The Economist, 2012).

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[1] The current grouping is based on income levels as of 2014.
[2] The World Bank's definition is presented using the Atlas method with current prices (World Bank, 2016b).

For several middle-income countries, there are concerns that successful policies for moving from low- to middle-income may not yield the same success in moving towards high-income levels (Bulman, Eden & Nguyen, 2014). In 1950, 39 countries were classified at middle-income levels, increasing to 56 in 1980. Between 1990 and 2010, 50 countries were classified as middle-income economies (Felipe, Abdon & Kumar, 2012). In 2009, Malaysia's Prime Minister Najib Razak expressed concern that the country was facing a middle-income trap and formed a National Economic Advisory Council to find solutions to the issue. In 2010, in the preparation for China's 12th five-year plan, the Chinese politician and economist Liu He acknowledged that China could be vulnerable to a middle-income trap. With the World Bank's report on *China 2030* in 2012, the media's interest increased. Economists still seek to construct a reliable growth theory to help policy makers navigate from middle-income status towards high-income levels (Gill & Kharas, 2015).

To illustrate the phenomenon of a middle-income trap, two graphs of selected countries will be presented in the following.
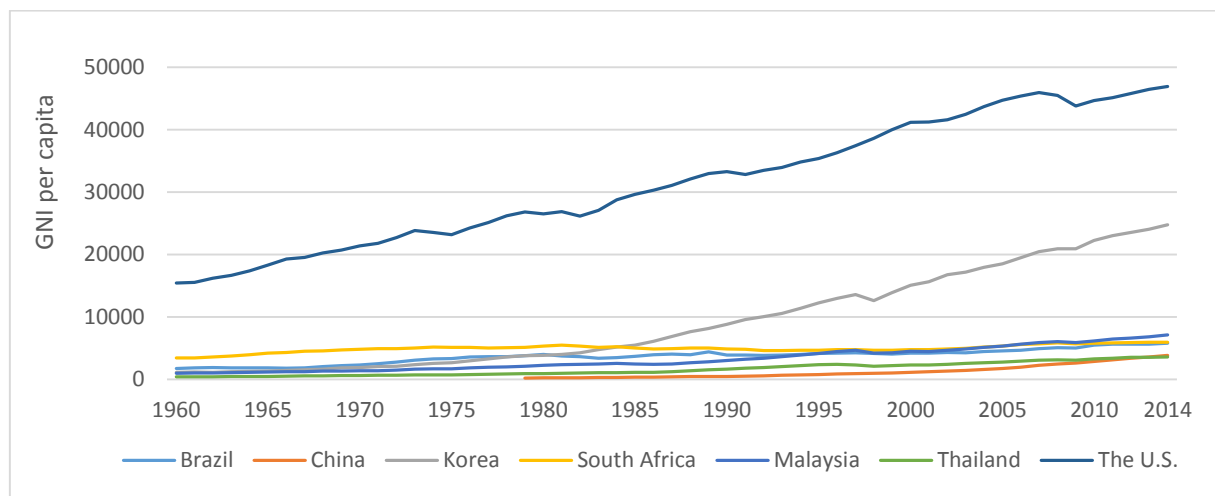
Figure 1. *Countries escaping and caught in a middle-income trap* (World Bank, 2016d).

Figure 1 plots GNI per capita[3] from 1960 to 2014 in Korea, Brazil, South Africa, China, Malaysia, Thailand and the U.S. As seen from the figure, the U.S. has had a significantly higher GNI per capita than the other countries illustrated during the whole period. The other countries had a relatively low GNI per capita in 1960 and are still in a band with relatively low per capita income, except Korea, which has reached a high-income status. In 1960, all countries illustrated, except the U.S., had a GNI per capita of between USD 380 and USD 3,398. In 2014,

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[3] In 2005 constant U.S. dollars.

the same countries had a GNI per capita of between USD 3,564 and USD 7,115. The exception was Korea, which had an initial GNI per capita of USD 1,121 in 1960, while reaching USD 24,758 in 2014. It is clear that Korea escaped a middle-income trap, while that is less clear among the others.
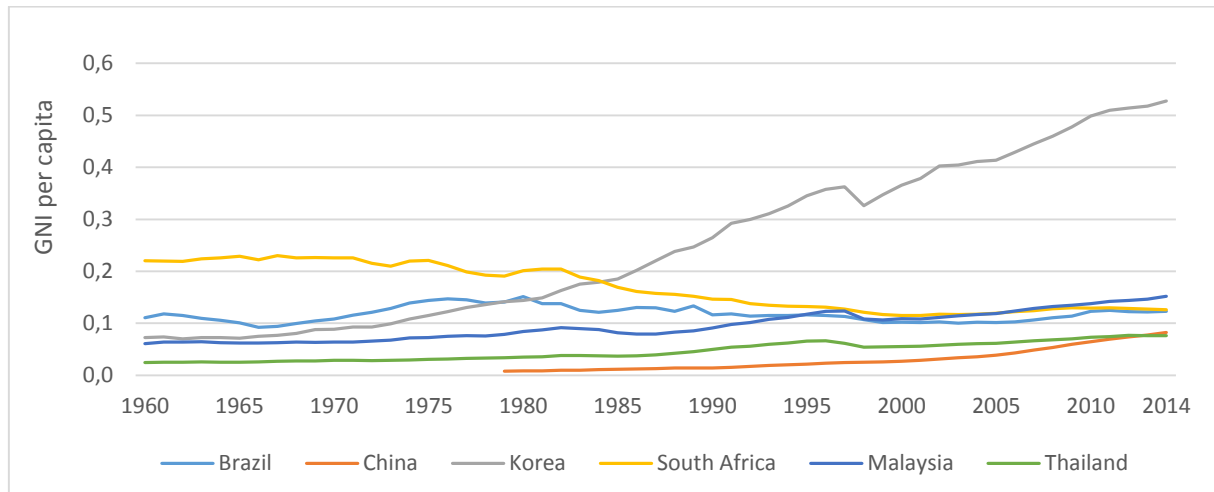
Figure 2. Countries escaping and caught in a middle-income trap, relative to the U.S., (World Bank, 2016d)

Figure 2 plots GNI per capita in 2005 constant U.S. dollars relative to the U.S. from 1960 to 2014 in Korea, Brazil, South Africa, China, Malaysia and Thailand. When illustrating the countries relative to the U.S. it is clear that Korea has had a rapid growth relative to the U.S., while the others did not follow a similar pattern. South Africa has declined in GNI per capita relative to the U.S., while the other countries have been more or less stable in relative terms. In 1960, all countries in the figure had between two and 22% of the GNI per capita of the U.S. In 1960, the same countries had between seven and 15% of the GNI per capita of the U.S., except Korea which reached 53% of the GNI per capita of the U.S.

Some researchers argue that these countries, except the U.S. and Korea, are stuck in a middle-income trap, depending on how they define the concept, as will be discussed in the following section.

2.3 Definitions of the middle-income trap

According to the paper *The middle-income trap turns ten* by Gill and Kharas (2015) there is no common definition of the concept of a middle-income trap or growth slowdown, as some term it. The term is often used to describe middle-income countries with reduced economic growth that struggle to change and grow to higher levels of income, due to poor policy decisions. To

clarify the concept, Gill and Kharas point out three broad definitions of the term used in various literature.

First, Gill and Kharas' initial definition published in the book *An East Asian Renaissance* from 2007 is descriptive and focuses on structural characteristics in a country. They describe countries falling into a trap as economies unsuccessfully meeting their structural growth strategies. Gill and Kharas identify two types of traps commonly seen in middle-income countries: First, countries that sustain diversification in production instead of specializing while continuing to produce labor-intensive products, despite the disadvantage of high wages. Second, countries trying to jump into knowledge economies lacking the institutional framework needed, with low levels of human capital and without critical barriers, such as patent rights and barriers to enter the market, in order to become innovation driven economies (Gill & Kharas, 2007; Langinier, 2004).

Second, another definition is empirical and based on countries being in a narrow band of income over a longer period of time. Spence (2011) defines a middle-income trap as countries being stuck at income levels between USD 5,000 to 10,000, and observes that few middle-income countries have managed to achieve a higher level of income than USD 10,000 since 1975[4]. Felipe et al. (2012) develop the definition further. According to them, a middle-income country is in a trap if the economy stays between USD 2,000 and USD 7,500 (lower middle-income level) for more than 28 years or between USD 7,500 and USD 15,000 (upper middle-income level) for more than 14 years.

Third, the middle-income trap can be defined as a country failing to converge to a benchmark advanced country such as the U.S. An analyses of this is done by Im and Rosenblatt (2013), where they look at a country's probability of transitioning to another income category. They find a low probability of middle-income economies transitioning to higher levels of income because the convergence towards the benchmark economy stops.

Further, there are several other definitions of a middle-income trap in the literature, and a few others will be presented in the following. Robertson and Ye (2013) define a country as in a middle-income trap if the long-term income shows no sign of convergence towards high-income countries, such as in situations with a world technology frontier (technology leader)

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[4] Constant 2005 USD, PPP adjusted.

with a balanced pattern of growth, or if it diverge towards low-income countries. Kharas and Kohli (2011) defines a trap as a situation in which a country is unable to compete with both low-income countries with low wages, and high-income economies with high skilled innovations. According to Eichengreen, Park and Shin (2013), three conditions must be satisfied for a country to have a slowdown in the growth rate of GDP per capita. The GDP per capita [5] must be higher than USD 10,000, the growth rate before the slowdown must be 3.5% or higher over seven years, and the decline in the average seven-year growth rate must be at least 2%.

Some scholars' definitions of a trap are vague and descriptive, while others have a more narrow definition with specific numbers. Depending on how the trap is defined, the researchers have different findings and conclusions in their analysis, as will be presented in the following sections.

2.4 Analysis in favor and against the existence of a MIT

In this section, a literature review providing analysis of research in favor and against the existence of a middle-income trap will be presented. Pritchett (2000) shows that the pattern of growth varies across developing countries. Researchers have used both absolute and relative income when analyzing the existence of a trap, and find evidence in favor and against the existence of a middle-income trap.

Analysis with evidence of a trap

Countries can experience slowdowns in multiple modes and it often happens in steps rather than at one single point in time (Eichengreen et al., 2013). In the paper *Growth slowdown redux: New evidence on the middle-income trap* Eichengreen et al. (2013) find two modes of slowdowns for middle-income countries, one at USD 10,000-11,000 and the other at USD 15,000-16,000[5]. In contrast, they only find one mode of slowdown in their first paper.

Researchers acknowledge different countries and number of countries when analyzing slowdowns and traps. Felipe et al. (2012) identify 35 out of 52 middle-income countries in a trap and nine additional at the risk of falling into one, while Robertson and Ye (2013) find 19 out of 46 middle-income economies in a trap. Felipe et al. (2012) use a dataset of 124 countries from 1950 to 2010 and classify countries into three income groups sorted by low-, middle- and

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[5] Constant 2005 USD, PPP adjusted

high-income levels. They analyze historical income transitions to identify if countries were in a middle-income trap according to their definition[6]. Eichengreen et al. (2013) identify at what income level a breakdown is most likely to occur in a country's economy. They compare countries that experienced growth slowdown with countries that did not during the same year. Oil exporting countries are withdrawn from the sample since they experience slowdowns in other periods than non-exporters of oil. Robertson and Ye (2013) present a statistical definition of a middle-income trap, which is tested using time series analysis, and they analyze if countries shows signs of convergence towards a technology leader.

Analysis with little or no evidence of a trap

Some researchers find little or no evidence of growth slowdowns in their analysis of a middle-income trap. A systematic slowdown of growth for countries reaching middle-income status would indicate an existence of a trap, which is not supported by using either real GDP per capita, absolute or relative income levels (Bulman et al., 2014; Im & Rosenblatt, 2013; Han & Wei, 2015). Im and Rosenblatt (2013) use cross-country data when examining the pattern of growth in middle-income countries and find little evidence of the existence of a trap. Bulman et al. (2014) use a cross-country regression to analyze growth, and distinguish between countries escaping and not escaping the trap. The escapees have high and consistent economic growth, while the countries not escaping have slow growth at all levels of income. The data does not indicate a systematic slowdown of growth when a country reaches middle-income level, which would otherwise indicate a middle-income trap (Bulman et al., 2014). Han and Wei (2015) use real GDP per capita when examining the growth rates of various income groups. When comparing GDP per capita in 2011 with 1960, they find that all East Asia economies experienced positive growth. When examining the middle-income trap, they find no evidence of that a trap exists, as countries reaching middle-income status continue to grow economically. They analyze the probabilities for an income group to move up, down or stay in the same income group over a decade. If a country initially achieved middle-income status, they find a high probability for countries to move to the next income category and eventually reach high-income status.

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[6] See section on definitions.

2.5 Reasons for falling into a middle-income trap

The reason for most countries to fall into a middle-income trap is the inability of changing strategies when reaching a middle-income status (Kharas & Kohli, 2011). Effective strategies for economic growth and transition to higher income levels vary across income groups (Bulman et al., 2014). When continuing the strategies that helped the countries growing from low- to middle-income status, this may prevent them from reaching high-income levels. An example of this is seen when comparing the countries of Latin America with those in East Asia. Where many East Asian countries rapidly shifted their growth strategies when reaching middle-income status, and continued to grow towards higher levels of income, most Latin American countries did not, and experienced growth slowdown (Kharas & Kohli, 2011). In the following, growth strategies for low- and middle-income economies will be described to show the difference between the necessary conditions for achieving growth at different economic stages. Some factors associated with slowdowns will be presented.

Many middle-income countries have achieved their economic status by focusing on the supply side of the economy. The growth from low- to middle-income is achieved by focusing on the maximization of inputs in production, while facilitating new policies and institutions (Kharas & Kohli, 2011). The low-income economies have experienced growth mainly by producing labor-intensive products, such as textiles, and by moving unemployed workers from rural areas to factories in urban areas, causing employment in factories to rise and the saving rate and investment in human capital for the next generation to increase. As the process of employing rural workers in urban factories continue, the wages increase and the marginal productivity of each worker decrease. Hence, the country becomes less competitive in the international market. To continue the fast economic growth, the productivity must exceed the wage-increase (Kasenda, 2014). The growth in these economies is often led by exports of niche products and diversification in production. To expand growth in the export sector, the countries can not only focus on increasing sales in existing markets. They are dependent on exploring new market opportunities and developing new processes. This requires an understanding of price setting, quality of goods and services as well as consumer preferences on the international market, which can be challenging (Kharas & Kohli, 2011).

Another possible source of a middle-income trap is the link between income distribution and economic growth. An increase in income inequality, with a higher level of concentration of resources and a stagnation of the middle-class, can lead to lower growth in demand for

consumption goods than the potential growth in GDP. To avoid a middle-income trap without an applicable high-growth strategy, middle-income economies must ensure the development of modern institutions and property rights, capital markets, innovations, competition and a sufficient pool of high-skilled workers. The development of institutions is crucial. This is a serious challenge to politicians since it may take generations to develop new and stable institutions (Kharas & Kohli, 2011).

2.6 Factors associated with economic growth in middle-income countries

The growth rate a country needs in order to reach a higher income level varies across income groups as well as between lower and upper middle-income levels. According to Felipe, Abdon and Kumar's calculations, lower middle-income countries need a growth rate of 4.7% a year to avoid a trap and reach a higher income-level. For upper-middle income countries, only 3.5% growth is needed (Felipe et al, 2012).

There are no common or consistent policy recommendations on strategies to avoid the middle-income trap. However, some countries has managed to transition from middle- to high-income levels, and thus avoided a middle-income trap. They have done so by successfully managing to transition during three steps. First, they have shifted from diversification in production to specialization. Second, they have transformed from high physical factor accumulation to productivity led growth. Third, they have changed from a centralized economic management to a decentralized (Kharas & Kohli, 2011). Each of the three steps will be described in the following sections.

Specialization allows for exploitation of economies of scale, which is crucial for middle-income countries to grow at a higher pace (Felipe et al., 2012). Economies of scale neutralizes the disadvantage of higher wages, which is achieved at middle-income levels, while promoting rapid innovation and the introduction of new products (Kharas & Kohli, 2011). Radical improvements, especially in the production of technical products, give rise to economies of scale (Felipe et al., 2012). Specialization is crucial to ensure the redistribution of resources from low- to high-productivity production. To ease the restructuring process of companies, it can be useful to develop social safety nets and programs for retraining (Kharas & Kohli, 2011).

Productivity in production is important to achieve higher economic growth. To ensure higher productivity, enough resources to education is necessary. To educate the population from primary and secondary schooling to tertiary levels, major changes are required. Over time, if

enough resources are allocated to plan and invest in high quality education, the country can become a knowledge economy, which is an important source for technological progress (Kharas & Kohli, 2011). Further, an increase in the level of education to at least secondary level can reduce the probability of a slowdown (Eichengreen et al., 2013). With a high level of education in the population, the labor force will be more skilled and able to innovate and develop new technological products. Since talented people are mobile internationally, it is important for the country to create attractive opportunities (Kharas & Kohli, 2011). Hence, it is also crucial to mitigate sources of negative impacts on the society, such as corruption and pollution (Eichengreen et al., 2013). To achieve higher productivity, innovation is of great importance, which requires investments and capital. For firms to expand and innovate, a well-functioning financial market is important (Kharas & Kohli, 2011). Further, economic management is crucial for a country to eliminate currency risks through stable exchange rates, in order to be able to get loans (Eichengreen et al., 2013).

Policy changes are required to develop new strategies for middle-income countries to reach high-income levels. A decentralized political system is important for making quicker decisions. Politicians need large and complex amounts of information and by decentralizing the process, it is easier to address local issues and to customize the decision-making for different parts of the society that need to be transformed (Kharas & Kohli, 2011).

Multiple economies have invested in research and development (R&D) and education, and has achieved high economic growth[7]. However, this has not been the case for countries such as the Soviet Union and other Eastern European countries, who have not achieved positive results on economic growth. They experienced rapid growth, but it was not sustainable. Some economists believe this can be due to the lack of democracy and free markets. Hence, even with a strong focus on increasing human capital and investing in R&D, a middle-income country will need a stable democratic government to be able to move to a high-income level (Kasenda, 2014). The correlation between democracy and economic growth will be discussed more in detail in the next chapter.

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[7] See data on education and R&D in Korea in section 5.3.

Summary

The term "the middle-income trap" is used to describe the phenomenon of countries trapped at levels of middle-income. Researchers do not agree whether a middle-income trap exists or not, and there is no common definition of the concept. In this chapter, we presented some of the definitions used among researchers. The concept is often used to describe middle-income countries with reduced economic growth that struggle to change and grow to higher levels of income due to poor policy decisions. Reasons for experiencing growth slowdowns can be the inability of changing strategies when reaching a middle-income status. However, there are no common or consistent policy recommendations on strategies to avoid a middle-income trap. We can learn from countries who shifted from diversification in production to specialization, transformed from high physical factor accumulation to productivity led growth, and changed from a centralized economic management to a decentralized.

3. Democracy and economic growth

In this chapter, we will discuss the existing literature on the relationship between democracy and economic growth. We will look at different ways to define a democracy and arguments in favor and against the importance of democracy for economic growth.

It is widely agreed among researchers that politics does matter for economic performance. However, scholars do not agree if there is any specific regime that fosters growth. There are several arguments in favor of democratization as a source of economic success (Limongi & Przeworski, 1993). However, disagreements and skepticism about democracy and the performance of its institutions have taken place since the founding of the political system (Acemoglu, Naidu, Restrepo & Robinson, 2014). Plato argued that democracy is the second worst form of political regime after tyranny and Aristotle is famous for not trusting a small group of people to make the right decisions (Plato, 1908; Aristotle, 1912).

3.1 Definitions of democracy

A democracy can be defined in many ways, but there are four main classifications: *constitutional, substantive, procedural and process-oriented* (Tilly, 2007). A *constitutional* perspective uses criteria focusing on laws concerning political activity, and it distinguishes between political systems such as oligarchies and monarchies. An advantage of this approach is the relative visibility of constitutional forms. However, there can be variations in the written constitutions and the daily practice of the regimes. A *substantive* approach focuses on political and human conditions such as welfare, freedom of life and security. By this definition, countries can be defined as democratic, regardless of their constitutions. A *procedural* perspective analyzes a set of governmental practices to determine the regime, such as elections and whether the majority in the population engage in the election process to change policies and replace politicians. Under this definition, a country with a high voter turnout can be defined as democratic, despite registered assaults and lack of freedom. A *process-oriented* definition differs substantially from the other classifications by identifying a set of processes that have to take place in order for the country to qualify as democratic. An example of such is effective participation, in which members of an association presents their opinion to the other members, who get the opportunity to learn about all relevant policies before voting. Depending on how the regime is defined, different countries classify as democratic (Tilly, 2007). Another definition of a democracy is "a system of government in which power is vested by the people, who rule either directly or through freely elected representatives" (The American Heritage,

[n.d.]). This definition is broad, and many countries can be classified as democratic according to this approach, while definitions that are more specific may not yield the same list of countries.

3.2 Arguments in favor of democratization

The literature provides several examples of advantages of democracy for economic performance (Glaeser, La Porta, Lopez-de-Silanes & Shleifer, 2004). According to the proponents, democratization can lead to increased investment in education and public goods and thereby induce economic growth (Saint-Paul & Verdier, 1993; Lizzeri & Persico, 2004; Acemoglu et. al, 2014). Educating the public has two important implications. First, it can be a source of economic redistribution among the population. Second, it creates human capital and therefore increases economic growth in the long-run (Saint-Paul & Verdier, 1993). Democracy may also induce growth by increasing the probability of economic reforms, the levels of investments and taxation, and the level of general health in the population, while preventing social tension, constraining exploitive dictators and limiting the ability of politically powerful groups from extracting lucrative economic benefits (Acemoglu & Robinson, 2012; Acemoglu et. al, 2014). Fjelde and Hegre (2007) find that a high degree of corruption deters investment. Since democracy probably reduces corruption, it is important for economic growth. Democratization can increase the growth by 20-25% in a country over time in the following 25 years after democratization, by some estimates (Acemoglu et. al, 2014).

According to Glaeser et al. (2004) political institutions with secure property rights, such as a democracy, is expected to increase the investments in physical and human capital and thereby induce economic growth. On the other hand, democracy and institutional improvements can be seen as a consequence of increased human and physical capital accumulation. Hence, it can be difficult to conclude whether countries democratizing thereby achieve stable institutions and higher human capital, or if the causal direction is opposite.

3.3 Arguments against democratization

Several researchers argue that democracy and economic growth are paradoxical (Lindblom, 1977; Wood, 2007). Barro (1999) and Tavares and Wacziarg (2001) find a negative, but inconsistent empirical correlation between democracy and economic growth. According to these, the biggest negative impact of a democracy on a society and economy is the high influence of a few big corporations, run by their owners and allied with bureaucrats. Lindblom (1977) believes that in a democracy there is a greater chance of a private enterprise market

system, where decisions about production are made by private agents. In a communist system, by contrast, the heads of big enterprises are government officials, and they work in favor of the state. In a private enterprise system, large enterprises will make important decisions that may be beneficial for them, but not for the economy as a whole (Lindblom, 1997). Olson (1982) argues that democracy can slow down economic growth. Because a society consists of multiple interest groups that the government has to safeguard, the process of decision making is slower than preferable. Each group will try to influence the government to gain benefits for their group, rather than for the economy as a whole. According to Barro (1999), democratization can enhance growth in economies with low levels of political freedom, while restraining economic growth in countries with moderate to high levels of freedom. Not all growth enhancing policies will be popular among the population. In a democracy, the government is not always able to carry out policy changes that will increase economic growth, due to a dissenting population (Barro, 1999).

Summary

In this section, we present definitions of democracy and find that there is not a unified definition. There are multiple arguments both in favor and against democratization as a source of economic growth. On the one hand, some researchers argue that democratization can cause redistribution of income, higher levels of education and thereby induce higher economic growth. On the other hand, others argue that a democratic government is inefficient.

4. A model of political and economic outcomes

In this chapter, we will present a model developed by Wang (2016) in a working paper[8]. The model is one of the few models focusing on the middle-income trap. Literature on the subject is mainly empirical analysis that focuses on the quantity of countries trapped at middle-income levels. There are two types of regimes in the model; democracy and oligarchy. The model aims to explain how a country can escape, or even avoid, the middle-income trap by becoming democratic. The focus in this chapter will be on the assumptions and the main findings in the model.

An overview of the model

Wang's theory consists of three stages of political and economic development for a country. In the first stage, an autocratic country experience rapid growth, with high growth in the private sector and reallocation of resources between the state and private sector. The private sector grows rapidly and the state extracts taxes from private firms. In the second stage, the country faces state capitalism, where the government control production and the use of capital. At this stage, the state sector has reached a critically low level of employment and private businesses have grown at the cost of the state sector. For the oligarchy to sustain, the government needs a minimum amount of supporters. To maintain state employment at a sufficient level while reducing growth in the private sector, the government over-invests in the state sector and restricts financial loans to private businesses. In the third stage, there are two possible outcomes: a middle-income trap or sustained growth, where the latter can only be obtained by democratizing. If the country faces a middle-income trap, the oligarchy will continue with an output level lower than in a democracy. In this stage, the country will continue to over-invest in the state sector to maintain a sufficient number of supporters. The productivity will be low because of decreasing returns to capital and distortions in the financial market. To ensure sustained growth, the country will have to democratize, as this removes the distortions in the financial markets.

4.1 Assumptions in the model

In this section, the assumptions in the model will be presented. The sectors, agents, types of firms and political regimes will be described.

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[8] The version used in this thesis is from January 2016.

Sectors and agents

The model consists of three types of agents: the elite, entrepreneurs and workers. The elite, the government and the representative elite are assumed to be the same in the model. The three groups of agents include an infinitely amount of members, who take prices and macro variables as given. The workers are considered a large group, and the state workers have the power to change the regime. The elite and entrepreneurs are assumed to be smaller groups, implying that they take the political regime and the return on capital as given. Each worker provides one unit of output and consume all income in one period. The elite and the entrepreneurs both maximize their lifetime utility.

Types of firms

The model consists of two types of firms: private- and state-owned firms. They take prices as given and maximize profits. Private firms are owned by entrepreneurs and produce for the private sector. State firms are owned by a member of the elite and produce for the state sector. The firms produce the same final good and use labor and capital as input.

The state (s) and private (p) sectors production functions are:

$$Y_s = (z_s K_s)^\alpha L_s^{1-\alpha} \tag{4.1}$$
$$Y_p = K_p^\alpha L_p^{1-\alpha} \tag{4.2}$$

$K_s =$ State sector capital, $K_p =$ Private sector capital, [9]
$L_s =$ State sector labor, $L_p =$ Private sector labor, $z =$ Productivity parameter, $z_s < 1$.

The production functions are the same, except for the productivity parameter. The productivity parameter in the state sector, z_s, is less than one because the state sector is less efficient than the private sector.

4.2 Political regimes

The model consists of two types of political regimes: democracy and oligarchy. Banks are state-owned and can lend money from the international market. It is assumed full employment and full information, for example about workers' wage difference between the two regimes. The two regimes will be described in following subsections.

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[9] State and private sector capital will henceforth be referred to as state and private capital.

Democracy

In a democratic regime, the majority of votes elects the government, in which the representatives sit for an infinite period. The economy is in a competitive equilibrium, with taxes as the only distortion. The government subtracts taxes from both the private and the state sector, and can only make financial transfers to workers. The tax rate is given by $\tau^D > 0$, which is exogenous.

Wages in state and private firms are the same and equal to the marginal productivity of labor:

$$w^D = \frac{dY_s}{dL_s} = \frac{dY_p}{dL_p}$$

$$w^D = (1 - \alpha)(z_s K_s)^\alpha (L_s^D)^{-\alpha} = (1 - \alpha)(K_p)^\alpha (L_p^D)^{-\alpha} \tag{4.3}$$

A worker's income equals wage plus transfers (welfare benefits) from both sectors:

$$Y^D = w^D + \tau^D (\pi_s^D + \pi_p^D)$$

The transfers to workers is given by $\tau^D \frac{\alpha}{1-\alpha} w^D$. We insert this and get:

$$Y^D = \left(1 + \tau^D \frac{\alpha}{1 - \alpha}\right) w^D \tag{4.4}$$

$\pi_s^D =$ Capital income of the elite from the state sector

$\pi_p^D =$ Capital income of the entrepreneurs from the private sector

$\tau^D =$ tax rate in democracy

Oligarchy

In an oligarchy, an elite rules the government without any possibility of collective actions from the other agents in the model. The economy is not in a competitive equilibrium due to governmental interventions. The government subtract taxes from the private sector at rate $\tau > 0$, given exogenously, while the elite receives transfers from the government. The government controls the financial market through state-owned banks, by giving loans with no financial limit to the elite at a low interest rate, while the entrepreneurs face financial limitations. The entrepreneurs can also use private savings to finance new investments and do not have to invest the full loan in their firms. Hence, they can save a fraction of their income, and thus increase the private capital. The state wage in an oligarchy is higher than the wage in democracy, $w_s \geq w^D$, because of transfers to the elite. The state sector wage is given by:

$$w_s = (1 - \alpha)(z_s K_s)^\alpha (L_s^D)^{-\alpha}$$

As the state workers do not pay tax, their income will be the same as their wage, $Y_s = w_s$. The private workers' income will be lower in an oligarchy than in a democracy, because of the tax rate. If we insert for both incomes, equation (4.2) and (4.4), we get:

$$(1 - \tau)w_p < \left(1 + \tau^D \frac{\alpha}{1 - \alpha}\right)w^D \tag{4.5}$$

Equation (4.5) shows that the private workers' income will be lower in an oligarch than in a democracy, $Y_p < Y^D$.

Oligarchy: political constraints

In an oligarchy, the government faces two political constraints that are trade-offs. On the one hand, the elite is subject to a minimum support constraint. They must ensure they have a sufficient number of supporters to sustain the oligarchy and can only buy support from state workers. Hence, the number of state workers, L_s, must be equal or larger than the minimal number of supporters needed, $\underline{L}$. Hence, $L_s \geq \underline{L}$. On the other hand, the government faces a minimum state wage constraint. The government can fulfil the support constraint by setting the state wage higher than the income in a democracy, $w_s \geq y^D$. Since the state wage is high, it follows that the demand for state labor will be low, and the state employment will be low. To have a sufficiently high wage in the state sector, the number of workers, L_s, must be lower or equal to the maximum possible state labor, $\overline{L}$. Hence, $L_s \leq \overline{L}$. If not, the state wage will not be high enough to have a sufficient amount of supporters. The two constraints are trade-offs because the second constraint challenges the first. High state wages implies a lower demand for state workers. Hence, it gives a lower level of state employment and thereby a smaller pool of possible supporters. A simultaneous fulfilment of the two constraints require that the capital allocation in the state sector is sufficiently high. If both constraints are satisfied, the state wage will be higher than the private wage. If the state capital becomes too low, the regime will change towards a democracy.
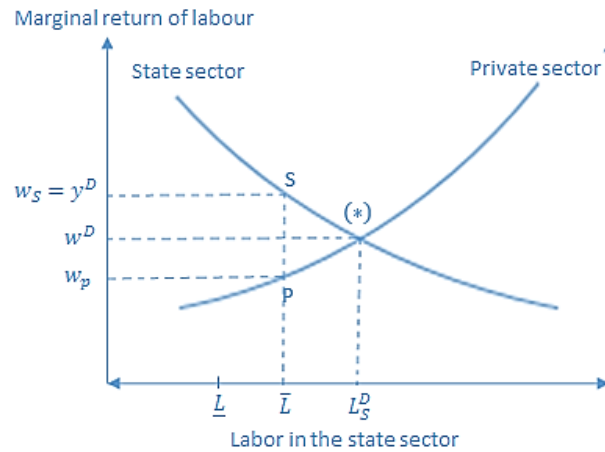
Figure 3. Wage determination and labor allocation in an oligarchy

Figure 3 illustrates the labor and wage determination in the private and state sector in an oligarchy and in a democracy. The quantity of labor in a democracy, L_S^D, and the corresponding wage, w^D is illustrated in the equilibrium point ($*$). The income in a democracy, y^D, is higher than the wage, due to transfers from the government. The income equals the wage in an oligarchy because of no transfers. In an oligarchy, we will end up in point P for the private sector, and point S for the state sector. To fulfil the minimum wage and support constraints, it follows that the state wage, w_S, will be higher and the state labor, $\overline{L}$, will be lower than in a democracy.

4.3 Results

In this section we will describe the results in the two regimes.

Results in a democracy

In a democratic regime, there is no political constraint, and the government and the workers want to sustain the regime. Hence, a democratic regime continues forever in the model. The resources are gradually reallocated towards the most efficient sector over time. For the allocation of workers to be efficient between the sectors, equal wages are required in the two sectors. However, private firms are more productive than state-owned firms and the capital return is therefore higher for private businesses. If the private capital is relatively small, the entrepreneurs will only be able to hire a small share of the labor in the market. Therefore, the state enterprises will still exist. However, if the entrepreneurs' saving rate is high enough, their capital will increase over time. Over time, the private firms will have enough capital to hire a larger share of the labor in the market. Hence, inefficient state firms will gradually exit the market in favor of the more efficient private firms.

Results in an oligarchy

In an oligarchy, the government faces a trade-off between the capital allocation between the state and the private sector. On the one hand, a large amount of private capital results in a large private sector. This contributes to a higher share of taxes to the government, which increases the elite's income. On the other hand, if the private sector is small, the elite will promote growth in the private sector through financial loans while sustaining the oligarchy. However, when the private sector grows, the elite will restrict the growth by limiting the financial loans to ensure that the state sector capital is higher than the private sector capital. If the private sector capital becomes too large, the state sector wage must increase to sustain a sufficient amount of supporters. Hence, the elite will prefer to democratize due to the large maintenance cost of sustaining the oligarchy.

Summary

The model consists of two political regimes: oligarchy and democracy. To sustain oligarchy, the elite needs a sufficient number of supporters from the state workers and a minimum stage wage. The oligarchy will sustain as long as the state sector has enough capital relative to the private sector so that the constraints are fulfilled. When the state sector's capital ratio becomes too low, the cost of sustaining the oligarchy will be too high, and the elite will choose to democratize. Wang's conclusion is that if a middle-income country does not democratize, it may end up in a middle-income trap. The productivity is higher in the private sector than in the state sector. In a democracy, the government does not intervene in the economy, which causes the private sector to grow by employing a larger share of the labor force. The economy will therefore grow faster in a democracy than in an oligarchy.

5. The history of Korea

The model presented in the previous chapter suggests that without democracy, a country will most likely remain stuck in a middle-income trap. Korea managed to avoid a trap, and therefore makes a good case study. Before discussing the model, it is important to have a look at how Korea, a previous oligarchy, performed before and after transitioning to a democracy.

5.1 Korea – an oligarchy

In 1945, Korea achieved independence, but the U.S. military government still mostly ruled the country up until the first republic was established in 1948. Although it was a republic, the president of Korea was elected indirectly by the national assembly. The state founded in post-colonial Korea was an anticommunist state with strong coercive power. Following the anticommunist state was a dictatorial regime with even stronger coercive power (Gu and Ki, 2009). Korea can, according to Amsden (1989), be classified as a late industrializing country. The initial industrialization period in Western Europe and the U.S. respectively, is recognized as a period of invention and innovation in both products and processes. Korea and other late industrializing countries have not grown by innovation, but rather by imitation. Their growth is a result of borrowing technology from already technologically advanced economies. The conventional explanation for a country's economic success is that it has followed free-market principles, though this might not be true for Korea. In Korea, the state deliberately subsidized industries to distort relative prices to increase economic activity. In exchange for the subsidies, there were certain performance standards for the firms that received them. By imposing these standards, the state created more disciplined and productive firms. There were also direct benefits for the firms. If they succeeded in increasing their performance in exports, R&D or product innovation, the government would reward them with a license to expand (Amsden, 1989).

5.1.1 The strong state

Because of its strong focus on high economic growth, the government chose to exercise complete control over which industries firms were permitted to establish themselves in. There was no free-entry and every expansion decision fell to the government. The government also controlled the price of commodities sold by large market-dominated enterprises to ensure no monopoly situation occurred. Another control was imposed on the transfer of capital. For the country to grow, it was important for capital to remain in circulation within the country's own economy. In the 1960s, legislation was passed, implementing a punishment for any overseas

transactions of over 1 million dollars. The minimum penalty was ten years in prison, and the maximum penalty, death (Amsden, 1989). In Korea's early stages as an independent republic, foreign aid was a large contributor to economic growth. Average annual inflow of foreign aid from 1953-58 was USD 270 million. This represented as much as 15% of GNP. In order to maximize capital, the interest rates were kept low and the exchange rate was overvalued. Whenever the budget was in deficit, it had to be financed by the central bank (Amsden, 1989). As an oligarchy, the state "purchased" the support they needed. In exchange for political campaign contributions, they would allocate money received through foreign aid to the supporting firms. If the number of supporters was still too small, the election was simply rigged in order to get the result they wanted. The large state-supporting firms were favored, receiving tax exemptions and loans at subsidized interest rates (Amsden, 1989). The benefits gave the elite enough capital to import materials not obtainable by smaller firms, and also the ability to sell their products on the domestic market at a monopoly price. After the first republic fell in 1960, a government audit report revealed that total outstanding loans given to elite firms by the government amounted to approximately USD 140 million (Amsden, 1989). The vast debt makes it clear that this was not the most productive choice made by the former government. One of the problems was that the government subsidized too many industries, and that the subsidies gave the owners the opportunity to move from industry to industry when the previous was no longer profitable. Because of this, industries did not have the time to mature and become competitive in the international market. During the period of foreign aid, the economy grew and the volume of production was higher than that of any other U.N. country where data was available. This did not continue for very long. In the early 1960s, the foreign aid stopped, and the future for Korea no longer looked as bright (Amsden, 1989).

Because of the strong state, one might think that the turning point for Korea's economy came from less intervention from the state, but this was not the case. Previously industrialized countries achieved success because of a liberal state, but the same strategy did not work for late industrializing countries. Due to the fact that everyone else was already so far ahead, a late industrializing country needed strong state support, in order to compete on the international market via low wages. Korea suffered from low domestic purchasing power, low productivity, low savings and high interest rates. Measures were taken to minimize the costs of being a late industrializer. A large part of the surplus from the firms, controlled by the state, was used for further investment instead of consumption in order to increase economic growth (Amsden, 1989).

An example of state intervention – the electronic industry

On January 28th 1969, the government issued the Electronics Industry Promotion Law. This was to stimulate investment in the industry that assembled televisions. The plan was to go further than assembly, and eventually produce their own electronic products for the international market. It became clear that electronics were not a field in which Korea had a comparative advantage, because of their per capita income. In order to continue production, the state imposed import substitution along with restrictions on foreign investment. To obtain higher levels of skill and technology, the government received foreign loans of USD 221.6 million. With this vast amount of money they were able to establish an industrial estate for the purpose of producing computers, as well as a research institute to develop new products (Amsden, 1989). The import substitution was expanded to include most products related to computers.

5.1.2 Trade

The cotton textile industry received the majority of foreign aid after the Korean War (1950-1953). The industry was represented by a cartel, "The Spinners' and Weavers' Association of Korea". They created an oligopoly and gained enough power to put pressure on the government. By 1957, the industry had achieved complete import substitution on textile products. Even though the cotton industry was the largest in Korea, exports were low. The government tried to save the situation by devaluing the currency, the won, but this did not seem to help. In 1961, the won was devalued by 50%, and nearly destroyed the cotton industry. This was due to the fact that the supply of raw cotton was extremely dependent on imports, as high as 99%. President Park's final attempt to solve the crisis was to give subsidies to exporters. He increased the subsidies from USD 4.1 million in 1960 to USD 106.4 million in 1965. The subsidies worked, and the share of manufactured exports increased. Manufactured exports, as a percentage of total exports, rose from 12.5% in 1960 to 60.8% in 1965. Given how successful the subsidies were, President Park decided on export targets for the firms in exchange for subsidies. In some periods when exports were not profitable, the government imposed import barriers to minimize losses. The policies can be said to have been successful. Exports continued to rise, and as a percentage of GNP it rose from 5% in the 1950s to 35% in the 1980s. One problem was that Korea became heavily dependent on foreign trade. As their exports rose, so did their imports of raw materials. In the 1980s, the proportion of foreign trade to national product was 69.2%. Compared to the U.S., who only had 14.9% in the same period, it is safe to say than Korea's dependency on trade was extremely high (Amsden, 1989).

5.1.3 Investment

An important part of Korean investment policies is the "Law for Dealing with Illicit Wealth Accumulation", which was introduced in 1960. In the time that followed, the government arrested those who were accused of illegal actions and threatened to confiscate their assets. Although this sounds like a measure to control corruption, it was the opposite. Instead of having their assets confiscated, the business owners were forced to invest in new industrial firms as well as donating some shares to the government. Due to this, the alliance between the state and the rich business owners began to form and would continue for decades (Shin, 1998). To further increase their control, the state decided to nationalize the banks, and with that they were able to control how much to invest in each industry. Unfortunately, the banks soon faced bankruptcy and measures had to be taken. The focus on keeping a high investment rate was so great that in 1962 they passed the "Foreign Capital Inducement Law", giving foreign lenders a government credit guarantee. The government now controlled all aspects of the financial market and was able to make all investment decisions. They favored some industries controlled by the chaebols, like shipbuilding and steel manufacturing, by giving lower interest rates and tax exemptions. These industries would later be of great importance to Korea's economy (Amsden, 1989).

5.1.4 The chaebols

Large diversified business groups, known as chaebols, owned a large share of Korea's firms. There is no clear definition of a chaebol, but Chang (1988) defines them as large business enterprises composed of many different corporations. A firm who chose to enter a risky industry was rewarded by the government with licenses to engage in other safer industries. This form of state intervention caused the chaebols to grow and become even more diversified. Another reason the chaebols grew were the bail-out policies the government had for private businesses facing bankruptcy. Even in a successful industry, there was no bail-out for failing firms. When faced with bankruptcy, the firm was forced to give over the enterprise to whomever the state decided. The receivers were often close friends with the government and closely connected to a chaebol. The reason for this policy was that the state did not allow production facilities to lose their value (Amsden, 1989).

Because of the chaebols, there has been a lack of competitiveness within the Korean boarders. Data from 1982 shows that out of all the commodities, only 18% was produced under competitive conditions. This means that 82% was produced by firms controlled by the chaebols and were monopolies, duopolies or oligopolies (Amsden, 1989). In 1984, ten of the largest

chaebols accounted for 67% of total sales and 70% of GNP in Korea. Because of their macroeconomic policies, Korea became one of the world's most concentrated economies. The high degree of economic concentration is true for most late industrialized countries due to a small number of large firms that diversify their production. Successful corporations tend to have a high degree of diversification as well as a high degree of coordination in their production. Two of the largest and best known chaebols in Korea are the Hyundai group and the Samsung group, who both had an extremely high degree of diversification and coordination. The Hyundai group played a key role in the recovery after the civil war, where they worked in construction and housing programs. Other fields included cement manufacturing, shipbuilding, shipping and steel structures, while the Samsung group had broadcasting companies, newspapers and hotels (Founding universe, 2016).

The chaebols were able to grow by buying technical expertise from foreigners, as this was easier and less expensive than innovation. With subsidies and credit guarantees from the government, they were able to borrow abroad and continue growing whilst still having family ownership. Because of their size in multiple industries, the chaebol firms had the best opportunities for promotions and attracted the most skilled and experienced workers (Amsden, 1989). The wage for the workers in the chaebol's in Korea was higher than in private firms. High wage rates were used as an incentive for workers to work harder and thus make use of the imported technology (Muggeridge, 2015).

5.1.5 Education

From an early stage, Korea has focused on education and the creation of human capital. In 1982, the percentage of GDP spent on education was 6.1%. In comparison, a highly developed country like the United Kingdom only spent 5.2% the same year (World Bank, 2016e). One of Korea's major focus areas has been to educate engineers. Because of the quantity of engineers, competition amongst them was immense. Competing for the best jobs and promotions increased productivity. A highly educated society often has more innovation and entrepreneurs than others, but this was not the case in Korea. Education became important because large firms were in need of qualified workers and created a high demand. One of the reasons for success was the high salary for teachers. In the early 1980s, an elementary school teacher's salary was about the same as a captain in the army, and university teachers were even better off. Korea invested so much in education that there became an excess supply of highly educated workers.

In 1972, 40% of graduates struggled to find employment. For the chaebols, this was good news. With an excess supply of high-skilled workers, it was easy to hire only the best (Amsden, 1989).

Summary

In this section, we have discussed Korea's political and economic history in the three decades before democratization. A strong state with focus on economic growth was the main reason for their success. With high investment in education and R&D, amongst other things, Korea grew rapidly in a short amount of time.

5.2 Democracy and the democratization process

In this section, we will discuss Korea's transition to democracy. The main focus will be on the mechanisms behind the transition and the economic performance as a democracy.

5.2.1 Mechanisms behind the transition to democracy

The first direct presidential election took place on December 16th 1987. After several years with an authoritarian regime, Korea was on their way to becoming a democracy. The president representing the first democratic republic was Roh Tae-woo. Although there was a direct presidential election, Korea was in no way a strong democratic state (Kim, 2003). Roh had been a key member of the former authoritarian regime and proved to be beneficial in the 1987 presidential election. After the assassination of President Park Chung Hee in October 1979, military general Chun Doo Hwan, along with other officers, stated a coup against the civilian government. In the following year, when Chun was president, Roh Tae-woo was a member of the junta that ordered the suppression of one of the largest demonstrations in Korea's history, the uprising in Gwangju in May 1980 (Gu & Ki, 2009). He resigned from the military in 1981, and due to his strong connection to Chun, he was assigned a series of ministerial posts (Heo & Roehring, 2010).

In June 1987, in the preparations for the next presidential election, Chun chose Roh to be the candidate for the Democratic Justice Party (DJP). Due to the existing constitution and the election process, Roh was almost guaranteed to win. The undemocratic upcoming election caused discontent within the population, and they demanded a new democratic constitution. The fear of a revolution before the upcoming presidential election was one of the reasons Roh and Chun chose to propose several democratic reforms (Heo & Roehring, 2010). In the years leading up to 1987, the threat from the Democratic People's Republic of Korea (Henceforth

North Korea) had escalated and caused concern in the U.S. Korea was highly dependent of international trade, and the U.S. was an important trading partner. The U.S. had previously tried to persuade Korea to democratize, but had in reality been more interested in whether they were anti-communist or not. Because of the increasing threat from the north, the U.S. decided that Korea would be a safer trading partner as a democracy than with an authoritarian regime. In 1987, President Reagan sent a personal letter to President Chun insisting that measures had to be taken to secure peace (Adnesik & Kim, 2009).

Chun had begun his presidency in an economic downturn, and was therefore determent not to pass it on in the same state. He wanted the world to see that he was a success, not a failure. One way to showcase his success was to arrange the Olympic Games in 1988. With a fear that the games would be moved elsewhere if the demonstrations continued and became violent, he accepted some demands from the public and the U.S. (Adnesik & Kim, 2009). Due to both internal and external pressure, President Chun and presidential candidate Roh decided to change the constitution before the election. The new reforms included a free and fair election, protecting basic human rights and a free press (Heo & Roehring, 2010).

Even though the democratic reforms before the election were made due to pressure, Roh continued to democratize Korea after he became president. In 1990 the DJP merged with two moderate opposition parties and formed the Democratic Liberal Party. Roh continued leading the country with the same focus it had for years; economic growth. During Roh's five year presidency, the GDP growth rates were about 10% (Heo & Roehring, 2010). Roh also understood the importance of being connected to the world and obtained admission to the U.N. in 1991. The same year, Korea and North Korea signed an agreement on nonaggression between them (Chung, 2003). Korea cannot be said to have been fully democratic in the years that followed the 1987 presidential election. Under the next presidential election in 1992, the opposition party won with Kim Young Sam as the candidate. He wanted justice, and accused former president Roh for corruption during his presidency, as well as mutiny and treason for his involvement in the 1979 coup. Roh was convicted in 1996 and sentenced to 22 years in prison and fined USD 300 million (Heo & Roehring, 2010).

5.2.2 Economic development

Korea's transition to democracy in 1987 had a substantial impact on their economic development. One that may have been the clearest, was the rapid growth of labor unions. As the unions grew larger and more powerful, strikes became more frequent and the wages higher.

From 1987 to 1989, wages went up by 45%. In 1985, the number of workdays lost due to union strikes were 64,000, and in 1990 it increased to 4,487,000. The loss of workdays reduced productivity and caused exports to decrease, whilst higher wages damaged their international competitiveness. In addition to liberalizing the labor market, the Roh government increased freedom of speech and press. The new found freedom began a debate on income inequality and caused public discontent. As a democratic country, Korea decided to open financial markets. This allowed international capital inflows to increase, causing short term foreign debt to soar in the following years. The democratic reforms were supposed to help the country further along and increase economic growth, but the changes were too sudden, and the consequence was poor economic performance. Inflation soared in the following years. In 1990, a country who, for numerous years had enjoyed a trade surplus, now faced a USD 5 billion trade deficit. Korea struggled with the transition to a democracy, and this may have been a contributing cause of the financial crisis of 1997 (Heo & Roehring, 2010). In the early 1990s there was a recession in the world economy, which affected Korea as well. Combining this with high inflation and appreciation of the won, their current account experienced a large deficit. One way to reduce the deficit was to encourage capital inflows, and in 1991, the Foreign Exchange Management act was introduced (Chang, Park & Yoo (1998). In the time that followed, capital inflow increased, but resulted in financial instability. Capital inflows did increase the competitiveness of Korean exports by appreciation of the won, but there were not enough regulations. The Korean government continued to liberalize the financial sector over the next few years, but held back on the regulations. By removing restrictions on asset and liability management of financial institutions, the financial institutions experienced an increased short term foreign debt (Kihwan, 2006).

The transition to a democracy may have been a contributing reason for the recession in 1997, but it was most likely the reason they were able to get through it as well. On November 21 1997, Korea saw no other option than to ask the International Monetary Fund (IMF) for help. Because of their massive foreign short term debt, funds offered by the IMF were not sufficient. Korea's strong ties with the U.S. came to the rescue. Because Korea had democratized partly due to a request from the U.S., the government may have been more willing to help out. The U.S. government persuaded the IMF to engage in new negotiations with Korea. By Mars 18th 1998, 95% the country's short term debt in foreign banks was under control, though with an 8% interest rate, 2.5% higher than before (Kihwan, 2006).

Summary

There are several reasons for the democratization of Korea, as we have discussed in this section. Demonstrations and pressure from the public played a major role. As Korea was highly dependent of trade, the pressure from the U.S. may have persuaded President Chun to change the constitution to be more democratic. Democratization may have been an important factor when Korea received help from the IMF.

5.3 Data on Korea

In this section, we will present selected data on macroeconomic variables and investment decisions in Korea before and after democratization. We compare the data with two countries, one middle- and one high-income country.

Gross National Income

In the 1960s, Korea and Malaysia had about the same level of GNI per capita[10]
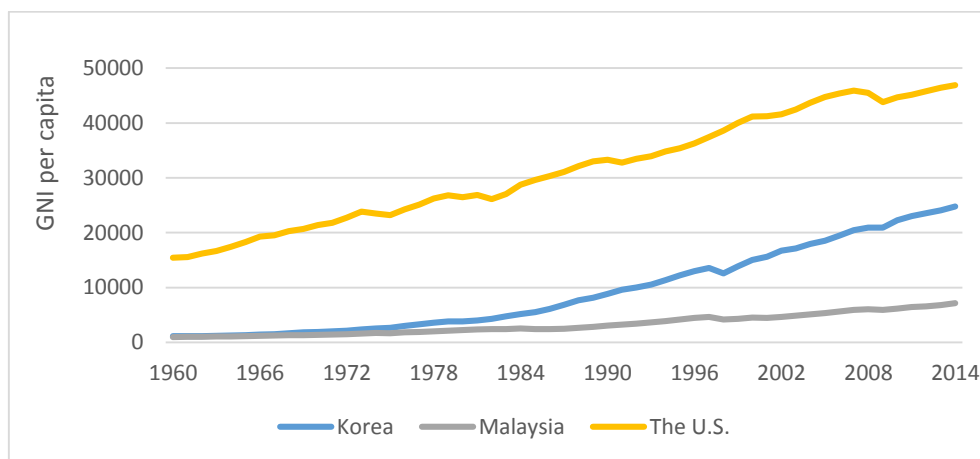
Figure 4. Gross national income per capita in Korea, Malaysia and the U.S.
(World Bank, 2016d).

From figure 4, we see that Korea had a higher growth than Malaysia in the 1970s, but not significant until the mid-1980s. The financial crisis that hit most of East Asia in 1997, caused Korea's GNI per capita to decline for a short period. With help from the IMF, Korea have had a steady increase in GNI in the years that followed.

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[10] Measured in constant 2005 USD.

Research and development

Korea's investment in research and development (R&D) was a priority long before they transitioned into a democracy, but has increased significantly in the years following 1987. In the early 1980's, developed countries started to see Korea as a competitor in the international market. Their industrial development had been going on for years, and the need for technological innovation had grown. Because the rest of the world was concerned about the new competitor, foreign companies decreased their technology transfer to Korean firms. As a response, the government loosened its foreign direct investment (FDI) regulations and liberalized foreign licensing. The policy changes had some effect, but not significantly (Lee, 2012). The stagnation caused the government to start its first R&D program in 1982, as discussed earlier in this paper.
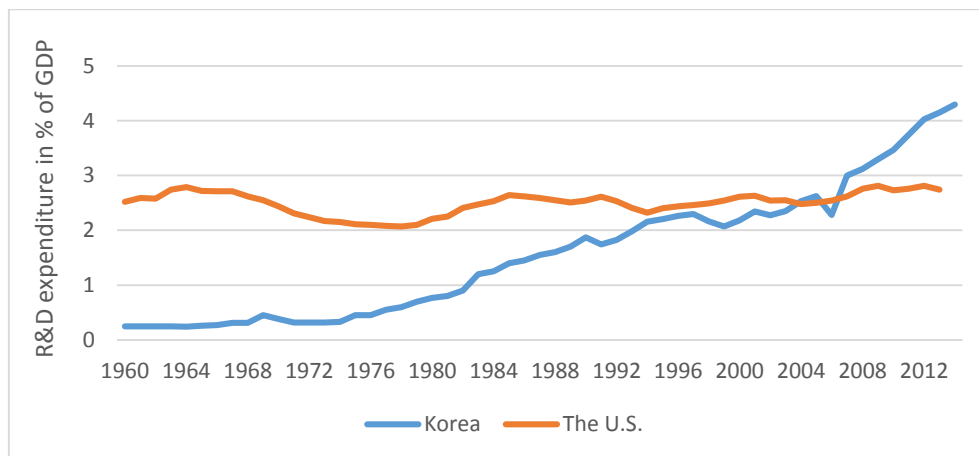

Figure 5. Research and development expenditure (Lee, 2012; OECD, 2015; NSF, 2015).

In figure 5, we see the R&D expenditure in Korea and the U.S. from 1960 to 2012. From the transition to democracy in 1987, there has been substantial growth in R&D expenditure as a percentage of GDP. The investment in R&D started long before the democratization, and grew from around 0.5% to 1.5% from 1977 to 1987. This is significant for a country with an authoritarian regime, but compared to the U.S., Korea did not reach the same levels until 2004.

Education

Education has been a priority for the Korean government both before and after democratization. In the 1970s and 80s the demand for human capital came primarily from the chaebol-owned firms.
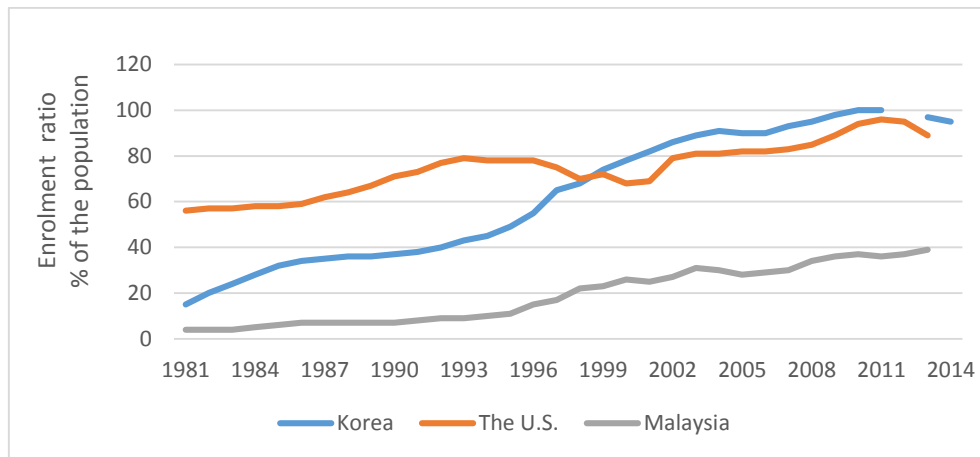
Figure 6. Enrolment ratio in tertiary education (World Bank 2016h).

Figure 6 shows enrolment in tertiary education as a percentage of the total population. Today, Korea has one of the highest tertiary enrollment rates in the world. In 2012, there were more adults that had attained tertiary education than only secondary. Of the population aged 25-64, 42 % had attained a tertiary education. This is the fifth highest among the OECD countries. In the 25-34 age-group, 66% had a tertiary degree (OECD, 2015). This is significant when compared to the OECD average of 39%, or the U.S. average of 40% in 2014 (Nature, 2015).

Summary

In this section we have studied the development in GNI per capita, education and investment in R&D. Korea has for a long time focused on both the creation of human capital, via education, as well investment in R&D. This may have been important factors to achieve a high-income level.

6. Korea and the political economic model by Wang (2016)

In this section, we will discuss the consistencies and inconsistencies between the model by Wang (2016) and Korea. The model by Wang presents two sectors, the state sector and the private sector. In Korea, the chaebol's can be seen as the state sector, because of their strong connection to the government. In the model, as well as in Korea, the state sector wages were higher and the benefits for the state firms were greater than for the private firms. As we have discussed, workers preferred to work in chaebol firms, as wages were higher and the possibilities for promotions were greater. Benefits in the state sector included tax exemptions, lower interest rates and permits to enter new industries (Amsden, 1989).

6.1 Comparison

There are many similarities between the model by Wang and the empirical evidence from Korea. Wang claims that a country cannot achieve high-income levels without transitioning to democracy. Korea was never in a middle-income trap, but was at a middle-income level when they democratized. They may have ended in a trap if they continued with an authoritarian regime. When they democratized, Korea was classified by the World Bank as an upper middle-income country, and did not achieve high-income status until 1997, ten years after democratization (World Bank, 2011).

Collective actions

In the model by Wang (2016), collective actions are not considered and therefore does not cause a threat to the government. He explains that this is because of the assumption that entrepreneurs are considered as a small group that take the political regime as given. Pressure can only come from the state workers, which will only occur if the state capital is below a critical level. As seen from our study of Korea, this assumption may not be accurate. As previously discussed, the mechanisms behind the transition from an authoritarian regime to a democracy in Korea were many. Pressure from the public was one of the most important factors. The pressure mainly came from students, labor union, churches and the parliamentary opposition, and was not caused by the state workers (Adesnik & Kim, 2009). Hence, this is one of the inconsistencies between the model and Korea.

International pressure

In the model, international pressure is not discussed. However, this may have been a contributing factor for the democratization process in Korea. Korea had for long focused on

exports, and had become an important trading partner for countries around the world. One of the main trading partners was the U.S. There had for years been strong ties between Korea and the U.S., even though Korea was an authoritarian regime. The U.S. had chosen to favor anti-communist countries, and had previously not been concerned whether it was an authoritarian or a democratic regime. The increasing threat from North Korea, caused the U.S. to view the matter differently. It was decided that Korea would be a safer trading partner as a democracy. Hence, President Reagan demanded Korea to move towards democracy to sustain peace. This had a large impact on Korea, due to their dependence on exports, and may have been a contributing factor to the transition to democracy (Adesnik & Kim, 2009).

State and private capital

The difference between the state and the private capital is of great importance in the model. The state sector capital needs to be sufficiently large to sustain the oligarchy. According to Wang, the entrepreneurs can increase the private sector capital by increasing their saving rate. A high savings rate in the private sector will increase the private capital relative to the state capital and thereby increase the probability of democratization. The allocation of capital between the two sectors was also important for the transition to democracy in Korea. We will look at two different ways Korea reallocated the capital between the state and private sector. First, they increased the private sector savings rate and thus made the private capital relatively larger than the state capital. Second, the government increased the tax rate in the state sector.

If we look at the savings rate in the private sector in Korea, we see that it was relatively high. Between 1962 and 1971 the savings rate was 28%, which accounted for 10.4% of GDP. Savings in the private sector amounted for 65.2% of domestic saving. Hence, the private sector saved more than the state sector. In the first half of 1970s the savings rate reached 15.3% of GDP, which was 80.8 % of domestic savings. Between 1976 and 1986, it grew to 21.8% of GDP (Chung, 2007). For comparison we will look at the U.S. private sector savings rate, which have been relatively stable from 1960 to 1987, the period we are interested in. In the three 10-year periods from 1960 to 1987, the private sector savings rates were 17.1, 19.2 and 18.7 as a percentage of GDP, respectively (Dean, Durand, Fallon & Hoeller, 1989). In the last decade before democratization, from 1976-1986, Korea experienced a high private sector savings rate.

As discussed in chapter 5, there were benefits for the state sector, in this case the chaebols, including tax exemptions. In 1982 the new tax law reduced industries that received tax exemptions, as well as reducing the corporation tax for all private businesses. Due to the oil

crisis in the 1970s, the government wanted to protect the economy from a depression and needed smaller firms to be more productive. Hence, the tax rates for state and private firms converged (Ministry of Strategy and Finance, 2012).

A reallocation of the capital from the state to the private sector, by increasing private saving and removing the tax exemption, may have been one of the reasons for the transition to democracy in Korea.

Summary

The model by Wang does not present specific mechanisms for a transition to democracy, and concludes that democratization will only occur if support from the state workers are too low. Wang claims that a larger private sector capital relative to the state sector capital will cause democratization. As we have discussed, this was also the case in the years leading up to democratization in Korea. Whether this was actually a contributing factor in the transition to democracy in Korea is hard to determine. Pressure from the private sector, which is excluded in Wang's model, was one of the important factors. International relations is another aspect that could have been included in the model. Since middle-income countries usually depend on international trade, pressure from high-income trading partners may be an important factor when deciding whether to democratize or not.

7. Education and democracy

In the extended version of Saint-Paul and Verdier's (1992) model, we assume that a dictatorship offering public education will have a probability for democratizing equal to one, for simplicity. In this chapter, we will substantiate this assumption. There are several factors affecting political outcomes. However, our focus will be on presenting a brief overview of researchers that find a positive and a negative correlation between education and democratization.

Almost all highly educated economies are stable democracies and nearly all stable democracies have a well-educated population (Glaeser, Shleifer, La Porta & Lopez-de-Silanes, 2004). Since John Dewey (1916) claimed that high levels of education is essential for a democracy and a major cause for democratization, this has been a common view. However, not all researchers agree.

Education promotes democracy

Glaeser et al (2004) find that "economic growth and human capital accumulation cause institutional improvement, rather than the other way around" (p. 6). Lipset (1959) argues that education and economic growth generally promotes political development and specifically democracy. He finds that enrolment in education is related to the degree of democracy, while Barro (1999) finds that the probability for democracy increases with primary schooling as well as with higher GDP per capita and more equal educational opportunities between genders. Lipset argues, "If we cannot say that a "high" level of education is a sufficient condition for democracy, the available evidence does suggest that it comes close to being a necessary condition in the modern world." (Lipset, 1959, p. 80). Education also increases the stability of a democracy and thereby the probability for it to survive (Glaeser, Ponzetto & Shleifer, 2007; Przeworski, Alvarez, Cheibub & Limongi, 2000). Korea is an example of a country that increased its educational level in the population, advanced in economic terms, and eventually became a democracy (Barro, 1999).

Highly educated people are more likely to adopt democratic values and education plays an important part in creating a workable democratic system (Przeworski et al, 2000; Russel, 1939). On the extreme side, it is impossible to make the required machinery in a democracy work if the population is illiterate. Hence, an adequate amount of education is necessary before a democratic regime becomes possible. To shape democratic values, it is important for the education system to have a balance between shaping individuals, which on the one hand is able

to make its own opinions, while on the other hand is willing to let the majority take the final decision, even when it goes against the individual's opinion (Russel, 1939). By educating the population, there is a bigger chance that they will resolve conflicts through negotiations and voting than by executing violent behaviour. Education broadens a population's horizon, enables them to comprehend the importance of norms and tolerance between citizens, reduces extreme beliefs among people and increases the ability of the population to make rational decisions in democratic elections (Lipset, 1959). Education is also an important source to a well-functioning court and to engage the population with governmental institutions (Lipset, 1960).

Education can be a crucial factor for political participation (Almond & Verba, 1963). An explanation for this is that a major aim of education is teaching students about the importance of civic and political participation. Another reason can be that a primary part of schooling is socialization, by teaching the students to interact and communicate more effectively. Thus, educated people are better equipped to express themselves, inform others and persuade individuals as well as coordinating civic activities. Student activism is one place where the effect of education on politic participation can be seen. Student demonstrations have played a key role in many revolutions, as for example in Europe in the 1900s and the collapse of the Rhee government in Korea in 1966 (Glaeser, Ponzetto & Shleifer, 2007). "If the revolution had a core, it was the young educated elite" (Rander-Pehrson, 1999, p. 145).

A democracy requires support from a broad spectre of the population. A major part of the population face weak incentives to oppose a dictatorship and fight for a democracy, while a narrow part of the population have strong incentives to support a dictatorship. However, education increases the benefit of political participation by making the participants more effective. A more inclusive regime thereby have a higher probability to survive when the citizens are more educated. Thus, relatively more people will support a democracy when they are educated (Glaeser, Ponzetto & Shleifer, 2007).

If educations leads to democratization, why do some dictators invest in education?
In many cases, dictators face threats from the outside world. They must therefore invest in the army and ensure that the economy grows by investing in human capital, even if this increases the probability for democratizing. Another explanation is that selfish dictators accumulate income from economic growth, and invest in education to enrich themselves. Lastly, all dictators face the risk of losing power. For most dictators it is better to be replaced by a democracy in an educated society than to be replaced by another dictator in an uneducated

country (Glaeser, Ponzetto & Shleifer, 2007). The latter can be because the citizens can participate in politics and elections in a democracy. It is better for a fallen dictator to be able to participate and influence the democratic regime than to be ruled by another dictator. In a democracy offering education, the fallen dictator can also be given the opportunity to take education, which is less likely under another dictator.

Negative correlation and other factors affecting democracy

In contrast to the views presented in the previous section, Acemoglu, Johnson, Robinson and Yared (2005a; 2005b) find no evidence that countries increasing their educational level have a higher probability to democratize. They argue that political and economic development or the so-called "historical development paths" determines countries political institutions (Acemoglu et al, 2005a). Acemoglu, Johnson and Robinson (2000) find that settler mortality rates in previous colonies from the 17th to the 19th century have had an impact on European settlement by sailors, bishops and soldiers. This has in turn had a major impact on early institutions, which again had a strong impact on institutions today. That is, historical development have a major impact on countries current political institutions (Acemoglu et al., 2000). Other factors that may foster political and civil freedom or democratization, is economic freedom, religion, income, industrialization and urbanization (Friedman, 2002; Huntington, 2005; Papaioannou & Siourounis, 2008; Lipset, 1959). Even if education promotes democracy, no single factor can explain the transition of democratic institutions in all countries to a full extent. However, democracy can in turn have a positive impact on investments in education, as discussed in chapter 3.

Summary

Several researchers find that an increased level of education raises the probability for democratizing. This can be because education is a crucial factor for political participation, by broadening the population's horizon and increasing the ability to make rational decisions in democratic elections. Highly educated people are more likely to adopt democratic values, and education plays an important part in creating a workable democratic system. However, some researchers find a negative correlation between education and democratization. Other factors that can affect democratization are historical development, settler mortality rates in earlier colonies, economic freedom, religion and income.

8. A model of education, democracy and growth

In this chapter, we will present a political economic model by Saint-Paul and Verdier (1992), where public education and human capital promotes redistribution of income and increases economic growth.

Assumptions

In this model, there is an infinity of non-overlapping generations, where each generation lives for one period. The total population in each generation is normalized to one and constant, which means that each individual in generation *t* has one child in generation *t+1*. The individuals care about their consumption level in period *t* and their children's stock of human capital in period *t+1*. Hence, they will maximize a utility function $U(c_{it}, h_{it+1})$ where c_{it} is the consumption level in period *t* and h_{it+1} is their children's stock of human capital in period *t+1*. The utility function *U* is strictly concave with positive and decreasing marginal utility for both consumption and human capital: $U_c' > 0, U_h' > 0, U_{cc}'' < 0, U_{hh}'' < 0$. The utility function *U* is also homothetic, implying that the two variables c_{it} and h_{it+1} will always be proportional to each other, for given factor prices. Hence, if consumption in period *t* increases by one unit, human capital in period *t+1* will also increase by one unit to fulfill this assumption.

Public education is the main channel to reduce income inequalities in this model, which is financed through a proportional income tax, decided by the median voter. The tax rate can never be negative. Hence, $\tau_t \geq 0$. Public education is distributed in an egalitarian and democratic way, such that each individual will be given the same level of it. It is also assumed that the productivity is the same in private and public education.

8.1 The basic model

The only source to income inequality in the model is different levels of human capital between the individuals. Human capital is obtained by public education and human capital inherited from the child's parents:

$$h_{it+1} = (1 - z)\delta h_{it} + g_t \tag{8.1}$$

$(1 - z)$ is time spent on transferring human capital from a parent to their child and $0 < z < 1$. δ is the productivity of human capital inheritance, which is larger than one, $\delta > 1$. This implies that there is an increasing effect in the transfer of human capital from a parent to the child. g_t is a function of public education.

$$g_t = \delta\tau_t z\bar{h}_t \tag{8.2}$$

Public education depends on the total tax income in the economy, $\tau_t z\bar{h}_t$, and the productivity parameter, δ.

The aggregate production function is $Y_t = H_t$, where Y_t is the total output of the consumption good and H_t is the aggregate level of human capital used in production of the consumption good. Hence, human capital is the only input in the production of the consumption good, where H_t is defined as $H_t = z\int_0^1 h_{it}di = z\bar{h}_t$. The aggregate level of human capital used in production is time spent and the total stock of human capital in the population at time t. As $(1-z)$ is the time spent on transferring human capital, z is the time used by the individual on production of the consumption good. $\bar{h}_t$ is the total stock of human capital in the model, but because the population is normalized to one, it is the same as the mean of human capital in the population. The income of each individual at time t is $h_{it}z$. As mentioned in the assumptions, public education is financed by a proportional income tax τ_t and is decided by the median voter. Because of the income tax, the disposable income and thereby the consumption is:

$$c_t = h_{it}z(1-\tau_t) \tag{8.3}$$

8.1.1 Equilibrium in the model

Since public education is financed through an income tax, each individual decide their preferred tax rate. However, the median voter will decide the actual tax rate in the economy. To find the preferred tax rate τ_{it}^*, each individual maximize its utility function with respect to τ_t. We insert equation (8.1), (8.2) and (8.3) in the utility function:

$$\tau_{it}^* = \arg\max U(c_{it,}\, h_{it+1})$$

$$\tau_{it}^* = \arg\max U(h_{it}z(1-\tau_t), (1-z)\delta h_{it} + \delta\tau_t z\bar{h}_t)$$

Where $\tau_t \geq 0$

We differentiate the utility function, U, with respect to the tax rate, τ_t:

$$\frac{dU}{d\tau_t} = \frac{dU}{dc}*\frac{dc}{d\tau_t} + \frac{dU}{dh}*\frac{dh}{d\tau_t} \leq 0$$

The maximization problem is negative or zero because the tax rate can never be negative[11].

---

[11] See figure 7 and 8 for more details.

$$U_c'\big[h_{it}z(1-\tau_t),(1-z)\delta h_{it}+\delta\tau_t z\bar{h}_t\big]*(-h_{it}z)+U_h'\big[h_{it}z(1-\tau_t),(1-z)\delta h_{it}+\delta\tau_t z\bar{h}_t\big]$$
$$*\,\delta z\bar{h}_t\leq 0$$

We move the first part of the equation over to the right hand side:

$$U_h'\big[h_{it}z(1-\tau_t),(1-z)\delta h_{it}+\delta\tau_t z\bar{h}_t\big]*\delta z\bar{h}_t\leq U_c'\big[h_{it}z(1-\tau_t),(1-z)\delta h_{it}+\delta\tau_t z\bar{h}_t\big]*h_{it}z$$

We divide U_h' by U_c' on the left hand side of the equation and $h_{it}z$ by $\delta z\bar{h}_t$ on the right hand side. The first order condition of the maximization problem gives:

$$\frac{U_h'\big(h_{it}z(1-\tau_t),(1-z)\delta h_{it}+\delta\tau_t z\bar{h}_t\big)}{U_c'\big(h_{it}z(1-\tau_t),(1-z)\delta h_{it}+\delta\tau_t z\bar{h}_t\big)}\leq\frac{h_{it}}{\delta\bar{h}_t}\ and\ \tau_t\geq 0 \tag{8.4}$$

If the inequality holds, $\frac{U_h'}{U_c'}<\frac{h_{it}}{\delta\bar{h}_t}$, the preferred tax rate is zero, $\tau_t=0$. If the equality holds, $\frac{U_h'}{U_c'}=\frac{h_{it}}{\delta\bar{h}_t}$, the preferred tax rate for the individual is positive, $\tau_t>0$.
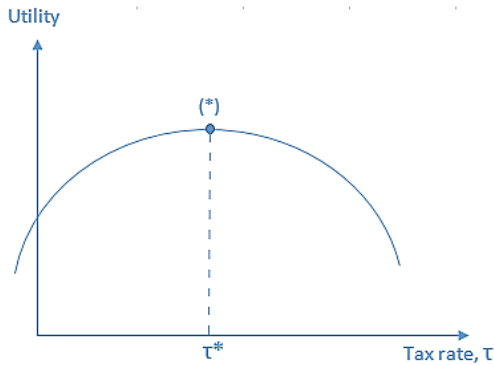

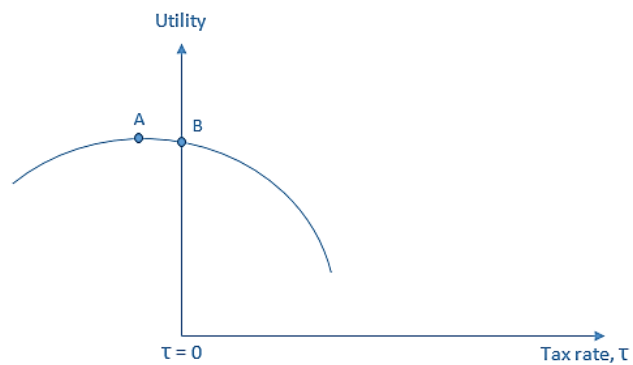***Figure 7.*** Optimal tax rate given that $h_{it}<\bar{h}_t$ ***Figure 8****. Optimal tax rate given that $h_{it}>\bar{h}_t$.

Figure 7 shows the tax rate τ^* that maximize the utility of an individual with less human capital than the mean. The preferred tax rate will be positive, $\tau_t>0$, for this individual because the tax will finance public education, which cause redistribution of human capital. Figure 8 illustrates the tax rate that maximize the utility of an individual with higher human capital than the mean. The preferred tax rate can be negative, shown in point A. However, this is not attainable since the investment in public education thereby will be negative. Therefore, the lowest possible tax rate will equal zero as in point B, which is the optimal attainable tax rate for this individual. However, the optimal tax rate of an individual depends on its utility function.

From equation (8.4) we get:

$$\tau_{it}^* = \max\left\{0, \tau_t\left(\frac{h_{it}}{\bar{h}_t}\right)\right\} \tag{8.5}$$

The tax rate will always be between zero and τ_t, which depends on the individual human capital relative to the mean $\left(\frac{h_{it}}{\bar{h}_t}\right)$, which we can see from equation (8.4). This is because as long as the individual is poorer than the mean, they will prefer a positive tax rate. When the individual's human capital approaches the mean in the population, the individuals preferred tax rate will be reduced.

We divide equation (8.4) by $\bar{h}$ to see the relationship between h_{it} and $\bar{h}_t$:

$$\frac{U_h'(h_{it}/\bar{h}_t z(1-\tau_t),(1-z)\delta h_{it}/\bar{h}_t + \delta\tau_t z)}{U_c'(h_{it}/\bar{h}_t z(1-\tau_t),(1-z)\delta h_{it}/\bar{h}_t + \delta\tau_t z)} = \frac{h_{it}}{\delta\bar{h}_t} \tag{8.6}$$

This is the preferred tax rate for individual i. The actual tax rate in the economy will be decided by the median voter. The median voter, h_{mt} is determined by substituting h_{it} with h_{mt} in equation (8.1) and inserting the expression for public education, (8.2):

$$h_{mt+1} = (1-z)\delta h_{mt} + \delta z \tau_t \bar{h}_t \tag{8.7}$$

The actual tax rate in the economy is defined by the median voters preferred tax rate:

$$\tau_t = \tau_{mt}^* = \max\left\{\tau_t\left(\frac{h_{mt}}{\bar{h}_t}\right)\right\} \tag{8.8}$$
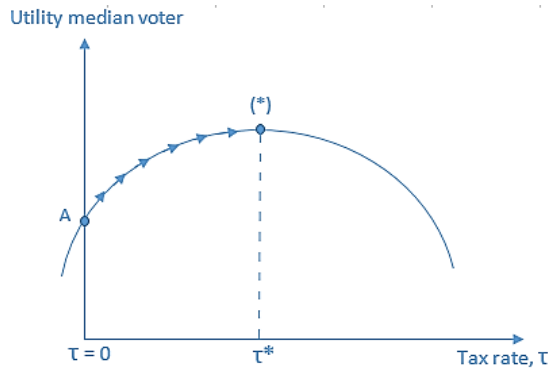

Figure 9. *The intuition behind the tax rate*

Figure 9 illustrates the intuition behind the tax rate when the median voter's human capital is lower than the mean ($h_{mt} < \bar{h}_t$). If the initial tax rate equals zero ($\tau_t = 0$), it will not maximize the median voter's utility. Since the median voter decides the tax rate in the economy by

maximizing his utility, we will move from point A to point (*), which is the median voter's optimal tax rate τ^*.

Income distribution and economic growth

By using equation (8.1), inserting equation (8.2), and aggregating over all individuals, we get:

$$\bar{h}_{t+1} = (1 - z)\bar{h}_t\delta + \delta\tau_t z\bar{h}_t, \text{ which can be written as:}$$

$$\bar{h}_{t+1} = \delta[1 - z + \tau_t z]\bar{h}_t \tag{8.9}$$

When we subtract and divide by $\bar{h}_t$, we get the growth rate of the economy:

$$\frac{\bar{h}_{t+1} - \bar{h}_t}{\bar{h}_t} = 1 + \gamma_t$$

By solving this, we get:

$$\gamma_t = \delta(1 - z + \tau_t z) - 1 \tag{8.10}$$

From equation (8.10), we can see that the growth rate is increasing in the tax rate.

To see how the income distribution changes in the model, we substitute equation (8.9) into equation (8.1):

$$\frac{h_{it+1}}{\bar{h}_{t+1}} = \frac{(1 - z)h_{it}\delta}{(1 - z + \tau_t z)\delta\bar{h}_t} + \frac{\delta\tau_t z\bar{h}_t}{(1 - z + \tau_t z)\delta\bar{h}_t} \tag{8.11}$$

Equation (8.11) describes the relationship between the individual's human capital and the mean human capital in the population.

By adding and subtracting $(1 - z)/(1 - z + \tau_t z)$, we get:

$$\frac{h_{it+1}}{\bar{h}_{t+1}} = \frac{(1 - z)h_{it}}{(1 - z + \tau_t z)\bar{h}_t} + \frac{\tau_t z}{(1 - z + \tau_t z)} + \frac{(1 - z)}{(1 - z + \tau_t z)} - \frac{(1 - z)}{(1 - z + \tau_t z)}$$

If we now define $\alpha_t = (1 - z)/(1 - z + \tau_t z) > 0$, we get:

$$\frac{h_{it+1}}{\bar{h}_{t+1}} = \alpha_t\left(\frac{h_{it}}{\bar{h}_t}\right) + (1 - \alpha_t) \tag{8.12}$$

From this we can see that when there is a positive tax rate, $\tau_t > 0$, then $\alpha_t < 1$, and income redistribution will continue. The reason is because the human capital ratio in time *t+1* will be a

share of the human capital ratio from time *t,* plus a mark-up. From equation (8.10), we also see that economic growth will continue as long as the tax rate is positive, $\tau_t > 0$. In a society where the median voter is poor, the tax rate will be high, and the stock of human capital will grow rapidly. As the economic growth continues and the stock of human capital increases, the median voter approaches the mean, and there is no longer support for public education. Hence, the tax rate will be reduced.

If we assume that the tax rate equals zero, $\tau_t = 0$, and that the median voter has a mean income, $h_m = \bar{h}$, a society will choose to spend money on education as long as:

$$\frac{U_h'(h_m/\bar{h}z(1-0),(1-z)\delta h_m/\bar{h}+\delta/z)}{U_c'(h_m/\bar{h}z(1-0),(1-z)\delta h_m/\bar{h}+\delta/z)} \geq \frac{h_m}{\delta\bar{h}}$$

If $h_m = \bar{h}$, we abbreviate, and get:

$$\frac{U_h'(z),(1-z)}{U_c'(z),(1-z)} \geq \frac{1}{\delta}$$

We divide by z, and get:

$$\frac{U_h'(1,(1-z)\delta/z)}{U_c'(1,1-z)\delta/z} \geq \frac{1}{\delta} \tag{8.13}$$

Equation (8.13) shows that the economy will continue to spend money on public education even when we have full income equality, $h_m = \bar{h}$, as long as the marginal rate of substitution (MRS) between human capital and consumption, $\frac{U_h'}{U_c'}$, is larger or equal to the inverse of the productivity parameter, δ.

If we assume that we have full income equality, $h_m = \bar{h}$, the tax rate τ will be positive for an infinite number of periods, as long as equation (8.13) is satisfied. However, the tax rate will be lower when $h_m = \bar{h}$ than when $h_m < \bar{h}$. The tax rate when time approaches infinity, τ_∞, is defined by:

$$\frac{U_h'(z(i-\tau_\infty),(1-z)\delta+\delta\tau_\infty z)}{U_c'(z(i-\tau_\infty),(1-z)\delta+\delta\tau_\infty z)} = \frac{1}{\delta}$$

As long as the tax rate is positive, $\tau_t > 0$, and equation (8.13) is satisfied, the economy will achieve full income equality, $h_m = \bar{h}$.

The growth rate depends positively on the tax rate. Since we now have full income equality, the tax rate will be lower. Hence, the growth rate will decline towards the following:

$$\gamma_\infty = \delta(1 - z + \tau_\infty z) - 1 \tag{8.14}$$

If there is sufficient investment in private education, meaning equation (8.13) is not satisfied, the income redistribution will stop when tax rate is equal or less than zero, $\tau_t \left(\frac{h_{mt}}{\bar{h}_t} \right) \leq 0$.

$$\frac{h_{mt}}{\bar{h}_t} \geq \delta \frac{U'_h(1, (1-z)\delta/z)}{U'_c(1, (1-z)\delta/z)}$$

When this inequality is true, there will be no more spending on public education. The human capital for the child in period _t+1_ will only be obtained by inheritance. Redistribution will stop, and the income distribution will be the same for an infinite number of periods. The growth rate will now only depend on time spent on producing the consumption good and the productivity:

$$\gamma = \delta(1 - z) - 1 \tag{8.15}$$

Hence, the growth rate will be lower when the tax rate is zero.

Summary

This model's main focus is redistribution of income, which is only achieved by public education. The poorer an individual is, the higher tax rate it will prefer, as this will bring their child closer to the mean human capital of the population. A rich individual prefers a zero tax rate, because the stock of human capital is already high, and will be transferred to its child. Poor individuals will benefit the most in this model, due to redistribution of human capital, but the rich will also have some benefits. Economic growth will be higher in a society with a positive tax rate, and this will benefit the entire population. In the next chapter, we extend the model, by making the decision to democratize endogenous.

9. An extended model: A specific utility function

In the basic model, democracy is exogenously given. In this chapter, we extend the basic model by making the decision about democratizing endogenous. First, we will find the preferred tax rate for the individual when we have a specific Cobb-Douglas utility function. We will then compare the dictator's utility in a democracy and in a dictatorship to see when he will choose to democratize. In the last section of this chapter, we will compare the growth rates in the two regimes.

9.1 Preferred tax rate

The specific utility function of consumption and human capital is:

$$U = c_{it}^{\alpha} h_{it+1}^{1-\alpha} \tag{9.1}$$

Here α can be seen as a preference parameter on consumption in time t and $(1 - \alpha)$ is the preference on human capital for the individual's child (consisting of inheritance from parents and public education).

We insert the expressions for human capital in time *t+1*, (8.1), public education, (8.2), and consumption in time *t,* (8.3) in the utility function:

$$U = [h_{it}z(1 - \tau_t)]^{\alpha} \big[(1 - z)\delta h_{it} + \delta\tau_t z\bar{h}\big]^{1-\alpha} \tag{9.2}$$

We maximize equation (9.2) with respect to the tax rate, τ_t. For an individual that prefers a positive tax rate, the maximization problem is characterized by that the first derivative equals zero.

$$\frac{dU}{d\tau_t} = \frac{dU}{dc}\frac{dc}{d\tau_t} + \frac{dU}{dh}\frac{dh}{d\tau_t} = 0$$

$$\frac{dU}{d\tau_t} = \alpha[h_{it}z(1 - \tau_t)]^{\alpha-1}(-h_{it}z)\big[(1 - z)\delta h_{it} + \delta\tau_t z\bar{h}\big]^{1-\alpha}$$

$$+ (1 - \alpha)\big[(1 - z)\delta h_{it} + \delta\tau_t z\bar{h}\big]^{1-\alpha-1}\delta z\bar{h}[h_{it}z(1 - \tau_t)]^{\alpha} = 0$$

We move the first part of the expression to the right hand side:

$$\alpha[h_{it}z(1 - \tau_t)]^{\alpha-1}(h_{it}z)\big[(1 - z)\delta h_{it} + \delta\tau_t z\bar{h}\big]^{1-\alpha}$$

$$= (1 - \alpha)\big[(1 - z)\delta h_{it} + \delta\tau_t z\bar{h}\big]^{-\alpha}\delta z\bar{h}[h_{it}z(1 - \tau_t)]^{\alpha}$$

We abbreviate the expression and get:

$$\alpha\frac{(h_{it}z)}{h_{it}z(1 - \tau_t)}\big[(1 - z)\delta h_{it} + \delta\tau_t z\bar{h}\big] = (1 - \alpha)\delta z\bar{h}$$

We multiply by $(1 - \tau_t)$ and divide by $\bar{h}$:

$$\alpha \left[(1-z)\delta \frac{h_{it}}{\bar{h}} + \delta \tau_t z\right] = \delta z(1-\alpha)(1-\tau_t)$$

$$\alpha \left[(1-z)\delta \frac{h_{it}}{\bar{h}}\right] + \alpha \delta \tau_t z = \delta z(1-\alpha) - \delta z(1-\alpha)\tau_t$$

We move τ_t to the left hand side and divide by δz:

$$\alpha \tau_t + (1-\alpha)\tau_t = -\alpha \left[\frac{(1-z)}{z}\frac{h_{it}}{\bar{h}}\right] + (1-\alpha)$$

We abbreviate and get the expression of the preferred tax rate:

$$\tau_t = -\alpha \left[\frac{(1-z)}{z}\frac{h_{it}}{\bar{h}}\right] + (1-\alpha) \tag{9.3}$$

This is the general expression for the preferred tax rate for the individual. Since the tax rate in a democracy is decided by the median voter, we substitute h_{it} with h_{mt}.

$$\tau_{mt} = -\alpha \left[\frac{(1-z)}{z}\frac{h_{mt}}{\bar{h}}\right] + (1-\alpha) \tag{9.4}$$

As we assume that the median voter want a positive tax rate, $\tau_{mt} > 0$, it follows that

$$(1-\alpha) > \alpha \left[\frac{(1-z)}{z}\frac{h_{mt}}{\bar{h}}\right]$$

We now want to see when the preferred tax rate is positive and negative.

The preferred tax rate is positive when:

$$\tau_t = -\alpha \left[\frac{(1-z)}{z}\frac{h_{it}}{\bar{h}}\right] + (1-\alpha) > 0$$

$$-\alpha \left[\frac{(1-z)}{z}\frac{h_{it}}{\bar{h}}\right] > -(1-\alpha)$$

$$\frac{h_{it}}{\bar{h}} < \frac{(1-\alpha)}{\alpha}\frac{z}{(1-z)} \tag{9.5}$$

The preferred tax rate is negative or zero when:

$$\frac{h_{it}}{\bar{h}} \geq \frac{(1-\alpha)}{\alpha}\frac{z}{(1-z)} \tag{9.6}$$

Expression (9.5) and (9.6) shows when the preferred tax rate will be positive and negative. The first part of the right hand side shows the relationship between the preference for human capital for the child, and consumption. The second part shows the relationship between time used to produce consumption goods, and time used to transfer human capital to its child. When the individuals human capital relative to the mean ($\frac{h_{it}}{\bar{h}}$) is lower than the right hand side of the equation ($\frac{(1-\alpha)}{\alpha}\frac{z}{(1-z)}$), the preferred tax rate is positive. When the opposite is true, the preferred

tax rate is negative. The actual tax rate cannot be negative because it is not possible to have negative investment in public education. Hence, the actual tax rate will be zero when the preferred tax rate is less than zero.

9.2 The utility in democracy and dictatorship

In this section, we will extend the model with the political outcome as an endogenous variable. There are two possible outcomes: a democracy or a dictatorship. We will look at a case with dictatorship as the initial regime and compare the dictator's utility with and without democracy to determine in what cases he will prefer to democratize. We will use the same specific utility function as presented in the previous section, equation (9.2) and the preferred tax rate for the median voter, given by equation (9.4).

Assumptions

In the extended model, we use the same assumptions as in the basic model, except that the political outcome is determined endogenously. We assume that the dictator's human capital is greater than the median voter's human capital, $h_{dt} > h_{mt}$. We also assume that the dictator only care about his utility, and therefore will choose the regime that maximizes this. The tax rate equals zero, $\tau_t = 0$, in a dictatorship, while it is decided by the median voter in a democratic regime, so that $\tau_{mt} = -\alpha \left[\frac{(1-z)}{z} \frac{h_{mt}}{\bar{h}} \right] + (1 - \alpha) > 0$. In a democratic regime, public education is offered and financed by the tax income. In a dictatorship, the preferred tax rate for the dictator can be positive, zero or negative, depending on his utility function. We assume that if public education is offered, the probability of democratizing is one, for simplicity. Hence, there will not be offered public education in a dictatorship, and the actual tax rate will be zero.

9.2.1 Utility

The utility of the dictator will differ in a dictatorship and in a democracy, since the tax rate differs. We insert the expression for human capital, (8.1), public education, (8.2), consumption, (8.3), and the tax rate, in the dictator's utility function in a dictatorship and in a democracy, respectively. His utility in the two regimes is given by:

$$U = [h_d z]^\alpha [(1 - z)\delta h_d]^{1-\alpha} \tag{9.7}$$

$$U = \left[h_d z \left(1 + \alpha \left[\frac{(1-z)}{z} \frac{h_{mt}}{\bar{h}} \right] + (1 - \alpha) \right) \right]^\alpha \left[(1-z)\delta h_d - \left(\alpha \left[\frac{(1-z)}{z} \frac{h_{mt}}{\bar{h}} \right] - (1 - \alpha) \right) \delta z \bar{h} \right]^{1-\alpha} \tag{9.8}$$

Equation (9.7) and (9.8) shows the dictators utility in a dictatorship and in a democracy, respectively.

We now want to see when the dictator's utility is higher in a democracy than in a dictatorship. To simplify the expression, and make it easier to interpret, we will use the notation τ_{mt} instead of the full expression of the median voters preferred tax rate $-\alpha\left[\frac{(1-z)}{z}\frac{h_{mt}}{\bar{h}}\right]+(1-\alpha)$.

The inequality that shows the dictators utility in a dictatorship and in a democracy is:

$$[h_d z]^\alpha[(1-z)\delta h_d]^{1-\alpha} < [h_d z(1-\tau_{mt})]^\alpha\left[(1-z)\delta h_d + \tau_{mt}\delta z\bar{h}\right]^{1-\alpha}$$

We abbreviate, and get:

$$1 < [1-\tau_{mt}]^\alpha\left[1+\frac{\tau_{mt}z\bar{h}}{(1-z)h_d}\right]^{1-\alpha} \quad where \ \tau_{mt} = -\alpha\left[\frac{(1-z)}{z}\frac{h_{mt}}{\bar{h}}\right]+(1-\alpha) \quad (9.9)$$

Where inequality (9.9) shows the dictators utility in a dictatorship and in a democracy.

9.2.2 Interpretations of the expression

To see when the probability of democratization increases from expression (9.9), we will discuss how changes in τ_{mt}, $\bar{h}$, h_d, h_{mt} and z, affects this.

1. The higher the tax rate, τ_{mt}, is in democracy, the lower is the probability for the dictator to democratize. This is because the dictator wants a lower tax rate than the median voter, as described in the assumptions. A higher tax rate than preferred by the dictator will decrease his utility.

2. A higher mean human capital in the population, $\bar{h}$, will increase the probability for democratization, for a given income distribution, $\frac{h_{mt}}{\bar{h}}$. An increase in the mean human capital gives a higher income level in the economy and a higher tax income, which in turn will increase spending on public education. The dictator utility in a democracy will therefore increase.

3. A higher human capital of the dictator, h_d, which increases the dictator's income, will decrease the probability of democracy. Hence, the utility in a democracy will be reduced, due to a higher amount paid in taxes. When the dictator has a higher human capital, its child will also have a higher human capital. The child therefore has a lower need for public education. Hence, the utility for the dictator will decrease in a democracy.

4. The time spent on producing the consumption good, z, has two contradictory effects. An increase in z will give a positive effect on the individual's income. Hence, there will be a higher tax income, which in turn increases spending on public education. The other effect of an increase in z is negative, since the individuals will pay a higher amount of their income in taxes. Hence, a lower disposable income will reduce the consumption. If the dictator's human capital, h_d, approaches the median voters human capital, h_m, the positive effect will dominate, and they will have the same preferred tax rate. The negative effect from z on the tax rate τ will be ignored. Hence, there will only be the positive effect from z that affects the dictator's utility.

5. The larger the median voters human capital is relative to the mean, $\frac{h_m}{\bar{h}}$, the more equal the income distribution will be. The median voter will then prefer a lower tax rate than in an unequal income distribution. This tax rate is closer to the dictators preferred tax rate. Hence, the dictator will increase his utility in democracy compared to in a dictatorship, and the probability for democratization will increase.

9.3 Economic growth in the regimes

In this section, we will discuss how the growth rate of the economy will vary between a dictatorship and a democracy, and how the tax rate will affect the growth.

Growth in a democracy

The growth rate will differ between a democracy and a dictatorship, because of the tax rate. In a democracy, the growth rate of the economy is defined by equation (8.10); $\gamma_t = \delta(1 - z + \tau_{mt}z) - 1$, where the tax rate is positive and equals: $\tau_{mt} = -\alpha\left[\frac{(1-z)}{z}\frac{h_{mt}}{\bar{h}}\right] + (1 - \alpha) > 0$. From the expression, we see that the growth rate is increasing in the tax rate. Over time, a democratic society will redistribute income as long as the preferred tax rate is positive. Thus, the median voter's human capital will increase over time, and thereby approach the mean human capital in the population. A democratic egalitarian society will choose to spend a positive amount on public education, and have a positive tax rate as long as inequality (9.5) holds, $\frac{h_{mt}}{\bar{h}} < \frac{(1-\alpha)}{\alpha}\frac{z}{(1-z)}$. When the median voters human capital, h_{mt}, approaches the mean, $\bar{h}$, there will be a positive tax rate if: $1 < \frac{(1-\alpha)}{\alpha}\frac{z}{(1-z)}$. When complete income equality is achieved,

the tax rate when time approaches infinity will be; $\tau_\infty = -\alpha \left[\frac{(1-z)}{z} \right] + (1-\alpha) > 0$, and the growth rate will decline to $\gamma_\infty = \delta(1 - z + \tau_\infty z)$.

If inequality (9.5) does not hold, meaning $\frac{h_{mt}}{\bar{h}} \geq \frac{(1-\alpha)}{\alpha} \frac{z}{(1-z)}$, there will be no investment in public education, because the preferred tax rate will be negative or zero, and thereby no redistribution of income. The growth rate will be defined by equation (8.15); $\gamma_t = \delta(1 - z) - 1$.

Growth in a dictatorship

In a dictatorship, the growth rate of the economy is defined by equation (8.15); $\gamma_t = \delta(1 - z) - 1$, which does not include the tax rate. Hence, the growth rate in a dictatorship equals the growth rate with a zero tax rate in a democracy. Over time, the growth rate in a dictatorship will not change because it does not depend on the tax rate. Since the tax rate is zero, there is no investment in public education, and the income distribution will never change.

Comparison of the growth rates

If we compare the growth rate in the two regimes, we can see that the growth rate has an additional component in democracy, which depends positively on the tax rate. Hence, as long as the tax rate is positive in a democracy, the growth rate will be higher in a democracy than in a dictatorship: $\delta(1 - z + \tau_{mt} z) - 1 > \delta(1 - z) - 1$.

Over time, the tax rate will be reduced in a democracy, but will stay unchanged at zero in a dictatorship. The equality in the distribution of human capital (income) in a democracy will increase over time, and eventually reach total equality, as long as the tax rate is positive. If this is the case, the growth rate will always be higher in a democracy than in a dictatorship. This result is also found by Glaeser et al (2004), which found that, on average, stable democracies have grown much faster than dictatorships between 1960 and 2000. If the tax rate is zero in a democracy, the income distribution will not evolve over time, but stay constant. The result will therefore be the same as in a dictatorship with a growth rate defined by equation (8.15).

Summary

In this chapter, we have extended the model by Saint-Paul and Verdier (1992) by making the decision to democratize endogenous. By using a specific utility function we have found an expression for the preferred tax rate. The dictator's utility in a democracy and a dictatorship have been compared, as well as how changes in the parameters can increase the probability of

democratizing. The parameters we have discussed are the tax rate, the human capital of the dictator, the median and mean and the time spent on producing the consumption good. We have looked at how democracy affects economic growth. From the results we see that the growth rate in a democracy will be higher than in a dictatorship, if the tax rate is positive. This result is consistent with the results from Wang (2016).

10. Korea and the extended model

In this chapter, we will compare empirical evidence from Korea with the results in the extended version of Saint-Paul and Verdier's (1992) model. Our focus will be on income inequality, income tax rate and the level of human capital in Korea. We will also examine how the income tax rate changed in Korea prior to democratization. In the last part of this chapter, we will discuss the results on growth in a democracy and in a dictatorship, and whether this is consistent with the empirical evidence from Korea. In the model, human capital and income is used interchangeably and we will therefore use income inequality as a measure of the median human capital relative to the mean. The level of human capital in the population will be measured by education in Korea.

Income inequality

As we have shown in the extended model, a high median human capital relative to the mean increases the probability of democratizing, which is consistent with the empirical evidence in Korea. Korea's industrialization in the 1960s caused a more equal income distribution than previously. In the late 1960s and early 1970s, equality decreased because of urbanization and increased urban wages (Choi, 2003). From 1973 up to democratization, the income distribution remained relatively constant. At the time of democratization in 1987, the Gini coefficient[12] was 0.37 (Ahn ,1995).
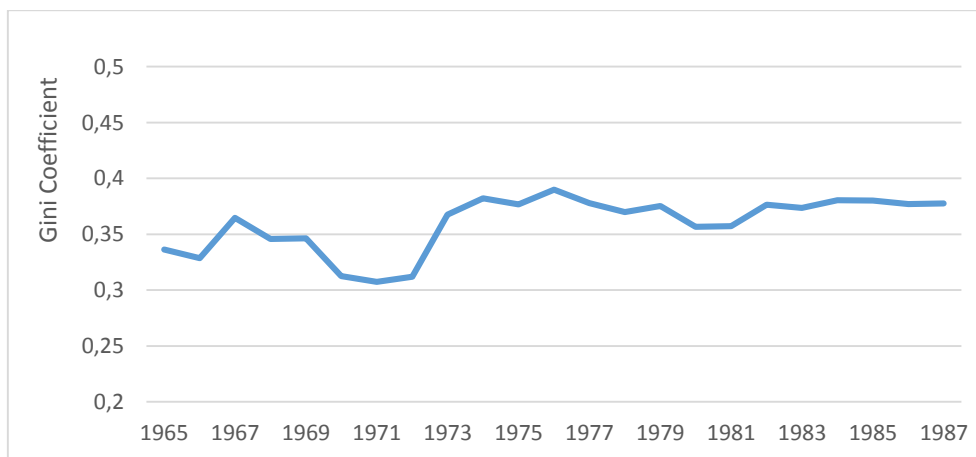

Figure 10. Gini coefficient (Kang, 2001).

In figure 10, we see the development of the Gini coefficient from 1965 to 1987 in Korea. It is possible that a relatively small gap between the median and the mean income was a contributing factor in the transitioning to democracy.

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[12] The Gini coefficient is a measure of income inequality, where 0 is total income equality and 1 is total inequality.

We will look at China's income inequality for comparison. China's industrial revolution did not occur until the late 1980s - early 1990s, more than two decades after Korea (Driver, 2015). It is therefore interesting to look at changes in the Gini coefficient after this period. After the time of industrialization, income inequality increased in China, which is the opposite of what happened in Korea. We see that at the time of democratization in Korea, about 25 years after industrialization, the Gini coefficient was 0.37. In 2012, 25 years after China's industrial revolution, the Gini coefficient was 0.47 (Statista, 2016). From this, we see that Korea's income inequality was relatively low in 1987. As the results from the extended model implies, an equal income distribution may have been a contributing cause for democratization.

The income tax rate

In the extended model, we show that a lower tax rate increases the probability for democratizing, which we also find in Korea. In 1977 and 78, Korea introduced several tax reforms. The most relevant is the reduced income tax for the middle-income class. In the years leading up to democratization, the income tax was reduced several times. There were new revisions on the tax law every year from 1984 to 1987 that focused on reducing the income inequality (Ministry of Strategy and Finance, 2012).

Human capital

A high level of human capital increases the probability of democratization, in the extended model. Investment in human capital has been an area of focus in Korea for a long time. Even before democratization, there was a high level of education, which may have been a contributing factor for the transition to democracy. In the extended model, we set the probability for democratization to one if public education is offered, by simplicity. This does clearly not correspond to the empirical evidence, but a high level of investment in human capital may have increased the probability for democratizing, which is the important mechanism in the model.

In 1981, the education tax was introduced. This tax, as in the model, was used to finance investment of public education (Ministry of Strategy and Finance, 2012). Economic growth was Korea's main focus before democratization. To achieve this, investment in education was prioritized. Investment in human capital did continuously grow in the decade before democratization. By the time they democratized, almost 40% of the students that graduated from secondary education continued on to tertiary.

Growth in Korea

From the extended model, we find that the growth rate is higher in a democracy than in a dictatorship, but declining over time in the former. However, this was not necessarily the case in Korea, which had a phenomenal economic development even before it democratized in 1987 (Heo, Jeon, Kim & Kim, 2008). The type of growth in Saint-Paul and Verdier's model is not specified, but we will look at the growth in GNI per capita in Korea. In the figures below, we illustrate the development and the average growth rate in GNI per capita from 1961 to 2014.
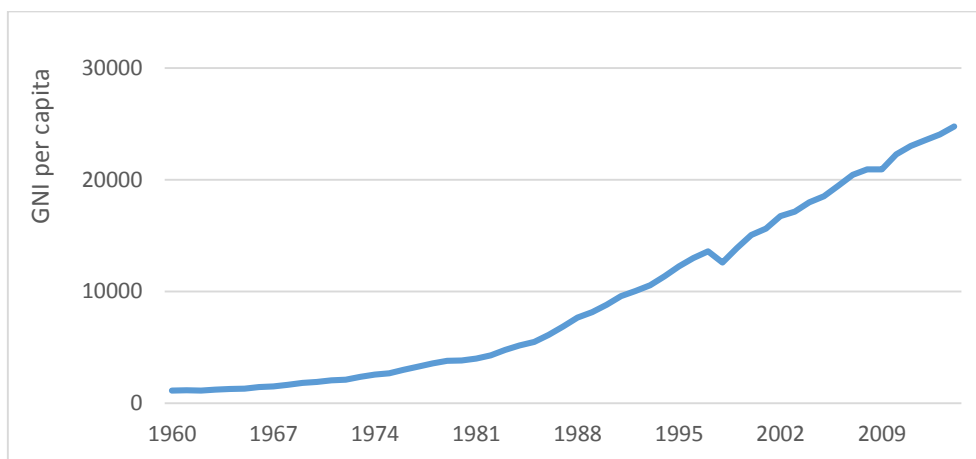

Figure 11. GNI per capita, in constant 2005 USD (World Bank, 2016d).

From figure 11, we see that the growth in GNI per capita started before the democratization process in Korea, and has grown significantly after 1987. The country has grown from a middle-income economy to a high-income country after it democratized. We do not know whether the growth would have stagnated if the transition to democracy was not made, but this is difficult to identify.

Summary

The results from the extended version of Saint-Paul and Verdier's model are to some extent consistent with the empirical evidence from Korea. In the years before democratization, income distribution was relatively equal, the tax rate was reduced and the level of human capital was high. There were other contributing factors that affected the decision to democratize in Korea, but is not included in the model. When we examine economic growth in Korea, we cannot conclude whether or not there is a positive relationship between democracy and economic growth, but we find evidence that this may be true.

11. Summary and Conclusion

Our aim with this Master's thesis was to examine factors that are important to escape or avoid the middle-income trap, and if democracy and human capital are necessary conditions to achieve high economic growth. We have conducted a case study on Korea, which avoided a middle-income trap and achieved high economic growth. The results from two economic models have been compared with the empirical evidence from Korea. Our analyses indicate that democracy induce higher economic growth, which may have prevented Korea from being caught in a middle-income trap. We find that a high level of human capital, investment in education, a relatively equal income distribution and a low state sector capital relative to the private sector capital increases the probability of democracy. The presence of these factors may assist a country in its avoidance of a middle-income trap. However, the models does not include other aspects that may have been important in Korea, which invested extensively in R&D and education, and experienced pressure to democratize from the international market and by collective actions in the population.

The model by Wang (2016) is one of the few models focusing on economic growth, democracy and the middle-income trap. When comparing the results from the model with the empirical evidence from Korea, we found some consistencies. In Wang's model, the reason for democratization is simply a low state sector capital relative to the private sector capital. However, the reasons for Korea's democratization process are more complex. This result led us to examine an economic model by Saint-Paul and Verdier (1992), which focuses on human capital, democracy and economic growth. Even though the model does not include the middle-income trap, it was interesting to examine the relationship between human capital, democracy and economic growth. The model claims that education and increased human capital in the population are the main reasons for income redistribution and economic growth, through taxes financing public education. As the model does not include the decision to democratize as an endogenous variable, we extended the model by making it endogenous. By using a specific Cobb-Douglas utility function, we compared the dictator's utility in a dictatorship and in a democracy. In the discussion of the probability of democratization, we have found results consistent with the development in Korea. A high level of human capital in the population, investment in education and a relatively equal income distribution increases the probability of democracy in the extended model. Our analyses indicates that this is consistent with the case of Korea.

From our analyses, we find that the most fitting model seems to be the extended model based on Saint-Paul and Verdier (1992). However, even with many similarities between theory and history, we cannot conclude that what we found depicts the true relationship between democratization and economic growth. Korea may have experienced the same economic growth if the authoritarian regime continued, or it could have ended up in a middle-income trap.

11.1 Suggestions for further research

One model focusing on the middle-income trap is developed by Wang (2016). His model concludes that democracy is a source to continued economic growth for middle-income countries. However, there are few economic models on the middle-income trap and the topic does to a small extend focus on democracy. Democracy, a good education system, collective actions, international pressure and a high level of R&D expenditure may have been important factors affecting Korea's economic growth, and may have prevented them from falling into a middle-income trap. It would be interesting to do further empirical research on these aspects in other high-income economies. If the empirical evidence are consistent with these results, these factors can be important for middle-income countries in their political decision making, and may assist them to escape or avoid a potential middle-income trap. Another interesting feature would be to include these aspects in economic models, for example in Wang's or Saint-Paul and Verdier's (1992) model.

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