LUND UNIVERSITY
School of Economics and Management

Master's Programme in Economic Growth, Population and Development

Social Capability as a Driver for Economic Growth

A Conceptual and Empirical Study on Structural Dynamics, 1991-2016

by

Moritz Lorenz Heribert Neubauer

mo7572ne-s@student.lu.se

Abstract

To this day, the question of what factors drive economic development and catching-up remains deeply controversial in growth literature. The concept of social capability provides a useful framework to investigate the relationship of the parallel processes of transformation, inclusion, autonomy and accountability with economic performance. Nevertheless, there are few attempts to quantify social capability. By compiling and analysing a sample of 118 countries over 26 years from 1991 to 2016, this thesis contributes to this emerging discussion. The results are diverse but point to trends that are consistent with previous literature. Most importantly, the increasing productivity in the agricultural sector seems to be pivotal for long-term economic performance. Furthermore, the degree of inclusion appears to play an essential and mediating role. The results of this thesis show the need for closer coordination between cross-country approaches and historical case studies concerning social capability.

Keywords: *Social capability, economic development, catch-up growth, agricultural transformation*

Acknowledgements

Table of Contents

List of Tables

List of Figures

Appendix

1   Introduction

To this day, the question of what factors drive economic development remains both deeply controversial in academia and undisputedly crucial in peoples' everyday life. Despite or because of almost a century of growth-oriented research, findings and policy recommendations differ widely. The work of economic historians increasingly reveals that sustained economic growth is the exception rather than the rule and that its subsequent effects are subjects of continuous change. However, growth is still communicated in the political sphere as the natural course with great astonishment at its absence. Economic growth is seen as the result of market-regulated decision-making processes and short-term policy packages. Notably, this is to be observed in the debate about developing countries and their potential to catch up economically. Therefore, the question arises whether the focus of economic research should not be on social capability and structural transformation, as they build the historical environment for all specific short-term policies.

Few concepts are as central to economics as growth. Growth of production, exports or markets is seen as the positively connoted basis for the development of other target variables such as human development, the safety of supply or social self-determination. While many of these associations go back to the industrial upswing of Europe in the 18th century, the mere consideration of growth is no longer sufficient to understand current developments. Instead of asking why isolated factors are growing or not, this thesis tackles the research gap of structural conditions that simultaneously unlock the potential for growth.

The identification of structural conditions for sustained economic growth is of particular interest when isolated from country-specific endowments. Instead, it is a search for structural patterns that explain the growth of one region but not another, despite apparently similar starting points. A revealing lesson for comparative economics was the 'so-called' East Asian miracle. While the income, measured as Gross Domestic Product (hereafter GDP) per capita, rose in East Asia between 1991-2017 from 3,200 USD to over 18,000 USD, income increased in Sub-Saharan Africa during the same period from 1,700 USD to 3,800 USD (The World Bank, 2019). Neither the speed nor course corresponded to the predictions of many experts. Today, Asian economies producing high-tech products are still contrasted by weak agricultural and resource-extracting economies in many African and South American countries.

Structural transformation is one of several factors that researchers have identified to play a role in the Asian catch-up growth. Also known as the *theory of convergence*, catch-up growth assumes that productivity growth rates among economies are inversely related to their productivity level (Barro & Sala-i-Martin, 1992). Structural transformation refers to sectoral shifts of labour, capital and productivity between sectors and their underlying processes

(Lewis, 1954; Solow, 1956; Gerschenkron, 1962). These classical views experience a renaissance as the analysis and policy advice based on isolated factors are in themselves contrary and not uncontested.

Explanations based on seemingly decisive factors are numerous. Within the literature, openness to trade and high export are seen as drivers in the case of the East Asian growth (Quibria, 2002; Wang, Wei & Wong, 2010). However, others refer to the essential role of investment (Rodrik, 1994) or linkages within domestic markets (Haraguchi & Rezonja, 2009). Also, the role of technological upgrading (Lin, 2011) or political and social institutions (Acemoglu, Johnson & Robinson, 2002, 2004; Rodrik, Subramanian & Trebbi, 2004) are cited as decisive factors in the case of Asia and beyond. A potential weakness of this literature, however, is that the focus on specific developments of aggregated indicators ignores the focus on slow and long-term subliminal transformations. Moreover, the institutional approach is criticised for seeking the cause for today's economic performance in historical events at specific points in time. Austin (2008) criticises this reasoning as a compression of history that does not do justice to the complex development processes and denies the countries concerned the ability to determine their destinies.

In the search for structural approaches towards these long-term transformations, the role of social capability is becoming increasingly important. Abramovitz theorises that "[…] a country's potential for rapid growth is strong not when it is backward without qualification but rather when it is technologically backward but socially advanced" (Abramovitz, 1986, p.388). In a broader sense, he defines social capability as the *social and political environment and attitudes* and the ability to *exploit technological opportunities*. While a narrower definition is thereafter given, it is initially this open definition of social capability that has led to multiple take-ups in various fields of research.

Also, the concept of social capability was understood with a focus on the second characteristic, namely the ability to exploit modern technologies. The role of technology was considered as well as the connection of innovation and its adaptation (Fagerberg, Srholec & Knell, 2007; Verspagen, 1991). Another group attributes both aspects, the ability to exploit the technological opportunity and the social and political attitudes, to structural transformation (Andersson & Andersson, 2019; ed. Andersson & Axelsson, 2016; Andersson & Palacio, 2017; Palacio, 2018).

To investigate the relationship between economic performance and social capability, this work follows the second group and in particular Andersson and Palacio (2017) by adopting the four dimensions *transformation*, *inclusion, autonomy* and *accountability* to quantify the predominantly theoretical approach. Therefore, the thesis will quantify social capabilities within the theory of catch-up growth. Rather than asking whether countries are catching up as established by Barro (1991), this paper is interested in whether the social capability approach is useful to investigate economic performance.

1.1 Research problem

The background and specific research problem of this thesis lie in the discrepancy between country-specific historical studies on the one hand and econometric cross-country analysis on the other. From a methodological perspective, social capability research has to weigh the specificity and generalisability of the results against the number of variables involved and existing observations. Economic historians often investigate specific local causalities by looking at a high number of influential factors. On the other hand, development economists overwhelmingly seek generalisable relationships and therefore, less specific causality.

To combine both approaches seems necessary if looking at the broad variety relevant literature, ranging from historical case studies (Andersson & Andersson, 2019) to conceptual approaches (Timmer & Akkus, 2008) to cross-country analyses (Berg et al., 2018; Hartmann et al., 2017). Besides differences in the scope of causality and the empirical foundation a third difference is the process of modelling growth. Other than economic history, development economics often starts with a set of theoretical assumptions and fills them with the available data. Alternatively, historians begin on the observational path and fit their models based on a historically derived theory.

Despite the many attempts to quantify growth-related factors and possible drivers of catching-up, there are so far only a few empirical analyses of social capability. Exceptions are the factor analyses of Adelman and Morris (1965) as well as Temple and Johnson (1998), whereby only the latter explicitly address social capability. Research, especially the operationalisation and falsification of conceptual approaches, remains highly relevant. Nonetheless, theoretical models can only be tested by applying them to historical development paths which can lead to a preliminary confirmation or improvement of the theories. Conversely, the relevance of structural parameters is high because they could have a significant influence on income levels as well as the rates of economic growth and shrinking. Broadberry and Wallis (2017) explain a large part of long-term growth with low shrinkage level and frequency and stress the need to examine the underlying factors further. An additional aspect to be considered is the mentioned econometric analysis of innovation environments and the interaction of social capability, technology and economic development (Fagerberg & Srholec, 2017; Fagerberg, Srholec & Knell, 2007). However, the factor analysis method applied here does not allow the structural development patterns to be traced retrospectively.

The research problem, the gap between historical case studies and econometric cross-country research, and more precisely, the exploration of long-term factors influencing economic performance, remains relevant. To tackle this research problem, the thesis examines conceptual approaches of social capability in a cross-country setting, yet with a strong theoretical reference to already established causal relationships of the structural transformation and catching-up literature.

1.2   Aim and scope

The framework of social capability provided by Andersson and Palacio (2017) can be regarded as the conceptual point of departure. The authors revise previous attempts to measure social capability and propose the four conceptual dimensions *transformation*, *inclusion*, *autonomy* and *accountability* for quantification. The thesis is quantitative in nature and connects the theoretical research on social capability with cross-country empirics. Despite all similarities with existing conceptual approaches, this work emphasises the pivotal role of agricultural change and inequality. Changes in sector distribution and productivity, and the distribution of economic progress, are thus not seen as one of many factors but as fundamental whilst others tend to play an accompanying role.

This study aims to provide an empirical perspective on social capability to deepen the understanding of structural patterns behind long-term economic development. More specifically, it involves the methodological translation of conceptual proposals into quantifiable and comparable model. Furthermore, it is about the compilation and visualisation of the data in a form that allows structural analyses. To this end, the thesis mixes classical bi- and multivariate analyses as well as descriptive techniques. All efforts aim to reduce the existing research gap concerning the possible relationship between social capability and economic performance from 1991 to 2016.

The research question emanates from the broader issue of the relationship between social capability, structural transformation and economic performance. Anticipating knowledge about the data used at this point, the thesis answers the following question: *To what extend can the social capability approach with its four dimensions transformation, inclusion, autonomy and accountability help to explain the dynamics of economic growth in a cross-country setting from 1991-2016?*

Since the research question contains a multitude of interesting aspects, it is broken down into general answers as well as into four hypotheses. These hypotheses are developed in theory part 2.2 and are anticipated here.

H1: The four dimensions of social capability, *transformation*, *inclusion*, *autonomy* and *accountability*, have a positive and relevant impact on economic performance.

H2: Agricultural transformation plays a bigger role than the other dimensions.

H3: Social capability has a higher impact in countries during the early stages of economic development.

H4: Equal income distribution has a positive mediating role in the relationship between structural transformation and economic performance.

As a result of the aim, the research question and the hypotheses, this thesis meets three different objectives. First, derived from recent theory, the dimensions of social capability have to be translated into a feasible econometric model. Second, sufficiently accurate quantification of these dimensions has to be achieved. Third, the empirical results need to be presented in a comprehensive form and be discussed in light of previous findings. By doing so, the thesis contributes to the growing research on social capability and economic performance while acknowledging the methodological limitations. These objectives are met by adopting different methods of panel regression as well as bivariate analysis and define the structure of the thesis.

1.3   Outline and results of the thesis

This work is divided into five main sections, which have the following contents. *Chapter 2* reviews the existing growth literature with a focus on structural transformation and social capability. Conceptual considerations of Andersson and Palacio (2017) are augmented to derive a theoretical framework for the following quantitative analysis. This framework ascribes an outstanding role to agricultural transformation, mediated by the distribution of growth and leads to the four hypotheses of interest. *Chapter 3* describes the collection and structuring of empirical data. Economic performance and its influencing factors transformation, inclusion, state autonomy and state accountability are quantified. It describes the data and contains first bivariate analyses indicating the relevance of the research question. *Chapter 4* elaborates on the deployed Fixed Effects models and their limitations. *Chapter 5* analyses the results of the regressions and comments on the hypotheses. The findings are diverse depending on income level and the region, but agricultural transformation and inclusion seem to play a pivotal role. *Chapter 6* summarises the aims, methods and results of the thesis and emphasises existing imitations. Both practical implications and necessary future research are identified.

2   Theory

Both the term and the concept of social capability have found application in various areas of economic research and are strongly related to the convergence debate. The development of a theoretical and econometric model requires a clear definition of the terms used. To this end, the previous strain of the literature in the field of social capability and convergence will first be critically examined, leading to the conceptual framework of Andersson and Palacio (2017). Building on their proposal, the second section develops the theoretical model on which this thesis is based.

2.1   Previous research

In approaching the question of what the relationships between social capability, structural change and long-term economic convergence are, developments in both content and methodology can be observed. To simplify the survey, a rough classification into four categories is made, which are to be called *Old Structuralists*, *Development Economists*, *Innovations Economists* and *New Structuralists* in the following paragraphs[i]. The literature review summarises streams in the research on social capability and compares results where they are available. So far, the focus of social capability research is more on conceptual than numeric findings. Table 2-1 gives a first summary of the considered literature's directions.

Table 2-1: Summary of the considered literature

	Old Structuralists	Development Economists	Innovation Economists	New Structuralists
Drivers of convergence/ catch-up growth	Structural potential to catch up	Beneficial capital/ labour ratios; human capital, TFP	Disruptive evolution; Innovation Environments	Structural evolution; Social capability
Growth-enhancing mechanism	Adoption of technology; transformation of sector-productivity	Efficient allocation of capital; technological progress	Good innovation environments foster technological progress	Social capability determines the ability to exploit economic opportunities
Selection of contributors	Lewis Gerschenkron Abramovitz	Solow Barro Sala-i-Martin	Freeman Verspagen Fagerberg/Shrolec	Temple/Johnson Andersson/Palacio Andersson/Axelsson

2.1.1 Convergence and its drivers

The theory of convergence, also known as *catch-up growth*, assumes that productivity growth rates among economies are inversely related to their productivity level. Under the term *iron law of convergence*, the rate by which the gap in levels of real GDP per capita closes is found to be around 2 per cent per year (Barro, 1991, 2012; Barro & Sala-i-Martin, 1992). However, the convergence paths look very different from region to region and do not take place automatically but only when there is continuous structural change that improves productivity structures (Rodrik, 2011). In addition to this empirical observation of convergence, there is also a rather classical structural theory that explains convergence under appropriate conditions.

2.1.1.1 Old Structuralists

The research on convergence, understood as a diminishing distance in the economic properties between countries over time, was pioneered by Gerschenkron (1962). As an economic historian, he observes pivotal differences during the economic development of Britain, Germany and Russia in the late 19th century. Using the term *economic backwardness*, Gerschenkron describes the differences in speed and character of industrialisation as well as the application of institutional instruments and its "[…] intellectual climate […]" (Gerschenkron, 1962:7). According to Gerschenkron, these dimensions would provide opportunities for technologically lagging countries to overcome their backwardness and move towards economically leading nations. This process, often referred to as catch-up growth or convergence, is made possible by the fact that technologies already developed in other economies can be adopted more cheaply and industrialisation takes place at a faster pace than in the pioneering countries (Gerschenkron, 1962). Gerschenkron combines descriptive history and generalised propositions with a thematical focus on structural changes and differences between economic systems over long periods of time. His insight that it is the underlying structural changes that enable the long-term catching-up process that is the basis of the Old Structuralists' research.

Besides the advantage of backwardness, the ratio of workers in different sectors can be regarded as possible structural determinant behind the speed and character of development processes. This approach is based on Lewis (1957) and assumes an agricultural sector with low productivity and an industrial sector with higher productivity. Wages and productivity are very low due to the almost unlimited supply of labour for the agricultural sector. This offers the growth potential for the industrial sector if cheap labour can be obtained and combined with capital investment (Lewis, 1957). As a result, the existing labour force potential in economically lagging countries would accelerate industrialisation at a higher rate than in already economically stronger countries. This in turn could generate convergence between countries with different labour reservoirs.

Although the methods are different, in the case of Gerschenkron the historical analysis and in the case of Lewis economic reasoning, both point to the structural opportunities and challenges. While Gerschenkron considers banks and the state to be central, Lewis assigns an

important role to market mechanisms as a coordination tool for labour. The former points at the capability to catch up technologically as a latecomer and the latter sees sectoral shifts as essential. Together they stand for a theory development of the structural relationship between different sectors and technologies and build the environment for Abramovitz's concept of social capability.

Both Lewis' and Gerschenkron's and later Abramovic's work on structural transformation as the transition from agriculture to industry as main contributor to growth are linked to the concept of *modern economic growth*. Modern economic growth describes a steadily growing production of goods with an increasing degree of sophistication, based on advancing technological as well as accompanying institutional and ideological adjustments (Kuznets, 1973). However, the process of productivity gains in the agricultural sector leading to labour and demand shifts to the industrial sector cannot be observed in all countries. Kuznets (1973) warns against generalisation and points to institutional and local influences, especially with regard to the common failure of less developed countries to realise their potential for modern economic growth. This reference to the local and social influencing factors that Kuznets presents as potential obstacles to the realization of modern economic growth leads to a pivotal component: The social capability approach by Abramovitz.

Abramovitz interest lies the preconditions for catch-up growth. He questions the catch-up hypothesis' assumption that the backward level of productivity *itself* carries the potential for rapid advance (Abramovitz, 1986). In his view, followers are likely to catch up only if they manage to alter the surrounding characteristics that hindered strong growth in the first place. He calls these characteristics *social capability* with reference to Kazushi Ohkawa and Henry Riosovsky, two analysts of Japanese economic history. In his own words "[…] a country's potential for rapid growth is strong not when it is backward without qualification but rather when it is technologically backward but socially advanced" (Abramovitz, 1986, p.388). In his seminal paper (1986), the author already acknowledges the conceptual ambiguity and the resulting difficulties of measurability and elaborates on the concept in greater detail using increasing data basis in the field of growth research (Abramovitz & David, 1996; Abramovitz, 1995).

Social and political environment and attitudes as well as the ability to *exploit technological opportunities* are broad dimension to think about the role of social capability for long-term economic performance. More specifically, the following mechanisms are mentioned in the original paper (Abramovitz, 1986). Education is the first component of a country's social capability and in a constant trade-off between specialization and adaptability. According to the author, this leads to the fact that the organisation of education can be very well aligned to exploit existing technology but weak in terms of its capacity to adapt to technological change. Second, firms act as organisational structures transmitting individual knowledge towards technological opportunity.

Both the available knowledge and the institutional framework influence social capability, more precisely the adoption of advancing technology. In this sense, the social capability of a country acts as a constraint for the exploitation of technological potentials. Besides the

content of education and the organisation of firms, social capability depends on the country's openness to competition, new competitors and services. On the opposite, vested interest and established customary relations between economic organisations hinder economic development. Later, Abramovitz specified social capability more clear as containing *education*, *competence in the organisation and administration of large-scale enterprises* as well as *capital markets and intermediates* (Abramovitz, 1995, p.27).

Intuitively it is understandable that changes in these dimensions are very slow and difficult to measure. Abramovitz (1986) finds strictly monotonously falling variance among the productivity levels for 16 countries from 1870-1979. Furthermore, the rank correlation between initial levels and subsequent growth rates of labour productivity becomes stronger over the 109 years with the years of World War II as the only exception. The author concludes that delayed growth at an earlier time builds up potential for more rapid growth at a later time. However, this potential could only be realized if social capabilities are appropriate (Abramovitz, 1986).

2.1.1.2 Development Economists

The researchers referred to here as Development Economists differ from the Old Structuralists both in their methods and results. First, it can be said that the focus shifts more to the empirical application of economic models with the aim of unveil causal relationships between different factors. To this day, the most common models incorporate labour, physical and human capital as well as technological progress. The workhorse model for economic growth assumes movements toward steady states based on capitals, savings and depreciation (Solow, 1956). Thus, the production rises with the amount of capital per unit of until an efficient steady state is reached. Beyond this steady state, growth in production can only be achieved by external technological progress that shifts the production function upwards (Perkins, Radelet & Lindauer, 2008, pp.128–129). Initially, these models were limited to the above factors and were less concerned with the exogenous technological progress. However, the empirical development paths of many countries show few similarities with this model.

Development economists, therefore, in a second stage separated between physical and human capital in theoretical considerations, the 'so-called' New Growth Theory. In these models, human capital can include previously exogenous technical progress (Lucas, 1988; Romer, 1990). This led to empirical studies and policy recommendations for development that focused on the role of education, teachers and educational infrastructure. However, the problem with educational indicators is that it is not so much the achievement of numerical values that is at stake but the knowledge and competences that are actually imparted. Regression results on the basis of human capital variables are therefore only suitable to a limited extent for measuring social capability and future adaptability. However, human capital seems to play a robust role in the concert of innumerable variables across many models (Sala-i-Martin, 1997).

2.1.1.3 Innovation Economists

Innovation Economists are closely interwoven with the ideas of human capital, adaptability and Abramovitz's concept of social capability (1986, 1995). Innovation, adaption and diffusion of new technologies and methods are seen as crucial for economic performance. On the one hand, including technology into models of capital accumulation increases their informative power and raises questions about the process of technological change (Bernard & Jones, 1996). On the other hand, the diffusion of knowledge, understood as a preliminary stage to technological innovation, shield local differences changes its patterns only in s very slow manner (Jaffe, Trajtenberg & Henderson, 1993). Other authors find that the character of the successful innovation and value creation depends on the spill-overs of knowledge rather than the geographic dimension (Audretsch & Feldman, 1996).

It should be noted that although innovation research partly mentions Abramovitz's social capability approach by name, the concept is covered by other terms. There is a focus on the second characteristic mentioned by Abramovitz (1986), namely the ability to exploit modern technologies. Cohen and Levinthal (1990) make an important contribution by addressing the ability to adapt, incorporate and change new technology at company level. The authors see these qualities as central to being innovative and growing and call them *absorption capacity*.

In addition to Cohen and Levinthal (1990), who look at investments in research and development, Verspagen (1991) is central to current research. He understands the convergence debate as a catching-up process based on international knowledge spill-overs but cannot find any global evidence of this. Rather, the author emphasizes a convergence movement within the developed countries and within the less developed, but not between the two groups. Verspagen labels this capability to absorb and adapt new knowledge and methods *learning capability (Verspagen, 1991)*. Drawing from this concept, he finds for a OECD sample that research and development as well as that technological competencies measured by patents becomes more crucial for a country's economic progress (2001).

Current research by the Innovation Economists on social capability and economic growth is increasingly using evolutionary models and a variety of variables (Fagerberg & Verspagen, 2002; Verspagen, 2001). The goal is to find out which characteristics make an innovation environment successful. This concept of National Innovation Systems (NIS) shows many parallels to the original social capability approach. Freeman (1995) lists national education system, industrial relations, technical and scientific institutions as well as government policies and cultural traditions as dimensions to consider in NIS. The author argues that unlike neoclassical production functions, NIS help to explain why innovation processes are so dependent on the local context and why convergence seems to be the exception rather than the rule.

Within the evolutionary framework of innovation, Fagerberg and Verspagen (2002) find that the imitation of technology became harder lately. This emphasises the role of the setting in which latecomers adopt new knowledge technology and is in line with and raises questions about how structural transformation can be compared if the surrounding circumstances change. However, the problem remains that information about innovation, patents and

technological progress are often only available for already technologically and economically advanced countries. This limits the informative power of these models for the developing world.

From the diverse and scattered convergence discussion, two current directions emerge in the multi-dimensional research on social capability, technological transformation and economic growth. Firstly, advanced models of factor analysis within evolutionary frameworks try to derive undermining characteristics of economically successful regions. Fagerberg and Srholec (2017) compile a sample covering 114 countries for the period 1995-2013 and apply factor analysis to derive the three components technology, education and governance. The authors find a positive and significant influence of these three factors on GDP, GDP per capita as well as on the adjusted net national income per capita. A similar method and a sample of 90 countries for the period 1980-2002 had been used by Fagerberg, Srholec and Knell (2007) to establish the relationship between technology, capacity, demand, price and economic development. The authors highlight the exceptional path of the Asian Tigers and the missing capability building in Sub-Saharan Africa.

Even though factor analysis and principal component analysis enjoy great popularity in academic research, they can only provide helpful statements or recommendations on the development processes of individual countries to a limited extent. In addition, they often neglect the structural transformation from agriculture to industry to service. The data situation also restricts this type of research, as many less developed countries are systematically excluded due to lack of patent registration, incomplete recording of research and development or scientific publication figures. Nevertheless, the method offers an enrichment for the research of social and technological capability by reducing the number of dimensions of analysis.

Secondly, a new flow of structuralists has formed, which, with a return to Gerschenkron (1962) and Abramovitz (1986, 1995), is devoted to the underlying factors of long-term development. Here it is less a matter of the multitude of variables than of the theoretically sensible selection of variables. Fewer but important indicators also make it possible to include more countries in the analysis. Structural transformation, in particular, plays a major role (ed. Andersson & Axelsson, 2016; Andersson & Palacio, 2017; Timmer & Akkus, 2008). As a basis for this thesis, the structural approach on social capability and its various finding will be elaborated on in the next section.

2.1.2   Structural approach of social capability

The framework explained in more detail below is used as a theoretical starting point because it is flexible enough to carry out cross-country considerations in addition to historical case analysis. The previous part has shown that many individual factors have an impact on economic performance. The challenge, however, is to isolate only a few factors that can also be influenced by policies and to search for structural patterns.

Promising patterns could provide information about how industrialisation processes differ over time and what value the theoretical concept has in recent empirical reality. Since structural change and industrialisation always take place in historical, political and social contexts, patterns of premature deindustrialisation might appear. In view of the fact that deindustrialisation begins at ever lower income levels (Rodrik, 2016), the relevance of the question to what extent social capability can contribute to resilience to change, and thus economic performance increased.

If one follows the view that convergence is not a self-evident process but is conditioned by ongoing rapid structural change towards more productive sectors (Rodrik, 2011), Andersson and Palacio (2017) offer a sound conceptional framework. Referring to the concept of social capability by Abramovitz (1986, 1995) discussed above, the authors define social capabilities as "[…] the qualification of the 'theory of convergence' […]" (Andersson & Palacio, 2017, p.7). With the aim of developing a clear framework of the main components of social capability and how they can be made measurable, they propose a procedure following four processual dimensions: *transformation*, *inclusion*, *autonomy* and *accountability*.

Andersson and Palacio (2017) criticize that the 'flying geese' model, which was shaped in the Asian context, for perceiving catching-up as "[...] linear, uniform and deterministic […]" leading to a lack of "[…] analytical value […]" (Andersson & Palacio, 2017, p.9). Therefore, the authors' proposed framework aims a more dynamic model that focuses on the structural adaptability of a society and economy to respond to investment and innovation incentives. However, the extent to which their conceptual model can represent dynamics in real development processes remains open at this point.

Transformation is the first dimension of social capability and can be measured through the agricultural gap share. Based on Timmer (1988) the inter-sectoral gap in productivity reflect how much the total employment and the total income is accounted for by the agricultural part of the population. Thus, reducing the intersectoral productivity gap equals a decline in agricultural labour. In line with the structuralist theories of Lewis (1957) and Gerschenkron (1962), intersectoral productivity is a promising measure for structural transformation. This thesis holds the view that inter-sectoral productivity is more than only one dimension among the four. The next section will develop this idea in detail.

The dimension of *inclusion* is to be considered a pro-poor growth process and necessary given the extreme inequality in most developing countries (Andersson & Palacio, 2017). Intuitively, the participation of as large a section of the population as possible in the growth process appears to make sense if it is to be sustainable in the long term. As measures, Andersson and Palacio (2017) propose the rate of change of poverty in a country, the openness of the economic system to social and economic advancement, access to education as well as labour outcomes and access to credits. Unlike the authors, this thesis assumes several channels of influence of inclusion, which will be developed in more detail in the next section: A direct influence of inclusion and an indirect mediator effect on transformation.
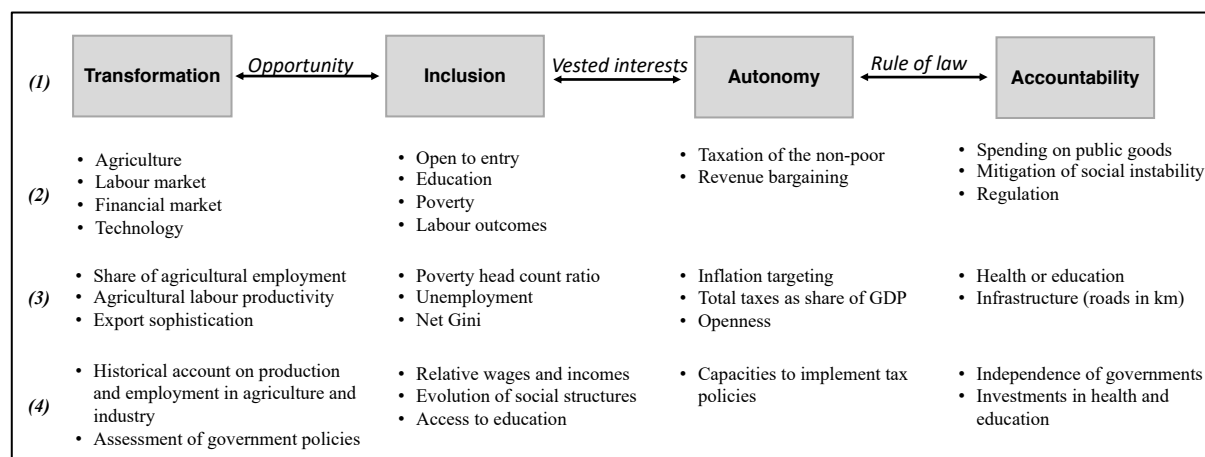
In the conceptual framework of the authors, the term *autonomy* is understood as the autonomy of the state from vested interests. In addition to the ability of a state to levy direct and progressive taxes, the public assets available for redistribution should also be taken into account (Andersson & Palacio, 2017). This measure also provides an insight into the informal economic structure of a country. The larger the share of informal markets in the economy as a whole, the lower the share of income taxes in revenues (Besley & Persson, 2013, p.80).

Intuitively, the levying of taxes on high incomes, profits or capital gains provides a better basis for measurement of autonomy than a general consumer tax. The latter would be easier to enforce in the existence of vested interest than progressive taxation. Rothschild (1973) also stresses the behaviour of individuals during the development process with regard to tax payments, which can have both a growth-enhancing and an inhibitory effect. Taxation would become more important as a country's economic success grows, and individual perception of unfair taxation could destabilize the process (Rothschild, 1973). In addition, as was the case in East Asia, pioneering firms in promising sectors can only be supported with tax incentives (Lin, 2011) if tax resources are available. The exact choice for two kinds of taxation for the model is discussed in the following chapter.

As a final dimension, *accountability* represents the ability of a state to act according to the demands and expectations of the population. Andersson and Palacio (2017) particularly mention the provision of public goods like education and infrastructure. These reflect budget decisions and thus interactions between politics and society. The authors furthermore propose social spending as a measure of a government's ability and will to absorb the impact of market fluctuations on economy and society. Public safety, understood as a public space free of violence, arbitrary controls or restrictions, is not addressed. While this seems intuitively important for investment and innovation decisions as well as for labour productivity in general, the measurement of public safety in the structural framework remains difficult.

Despite some efforts of the authors, the definition of social capability is not exactly clear. Rather, they offer a framework within which four procedural processes are given, each with different but partly overlapping indicators. Figure 2-1 on the next page summarizes the discussed framework and the application by Palacio (2018) and Andersson and Andersson (2019).

Figure 2-1:Conceptual framework and indicators of social capability

	Transformation	Opportunity → ←	Inclusion	Vested interests ↔	Autonomy	Rule of law ↔	Accountability
(2)	• Agriculture • Labour market • Financial market • Technology		• Open to entry • Education • Poverty • Labour outcomes		• Taxation of the non-poor • Revenue bargaining		• Spending on public goods • Mitigation of social instability • Regulation
(3)	• Share of agricultural employment • Agricultural labour productivity • Export sophistication		• Poverty head count ratio • Unemployment • Net Gini		• Inflation targeting • Total taxes as share of GDP • Openness		• Health or education • Infrastructure (roads in km)
(4)	• Historical account on production and employment in agriculture and industry • Assessment of government policies		• Relative wages and incomes • Evolution of social structures • Access to education		• Capacities to implement tax policies		• Independence of governments • Investments in health and education

Note: Own visualisation of Andersson and Palacio (2017), Palacio (2018) and Andersson and Andersson (2019).

The first row (1) shows how the individual dimensions are connected to each other. Transformation and inclusion are linked by the fact that a large part of the population can seize economic opportunities in the development process. Only if the state has a certain degree of autonomy can vested interest be restricted. Lastly, accountability determines the extent to which the state makes its citizens accountable according to their needs.

The second row (2) lists the indicators proposed by Palacio and Andersson (Andersson & Palacio, 2017), and row three (3) shows the indicators used by Palacio (2018).The author is interested in patterns of income convergence and forms a so-called Social Capability Index. Using data from 27 countries over the period 1990-2010, the upturn in East Asia and the below-average performance of sub-Saharan Africa with respect to income growth and manufacturing can be confirmed (Palacio, 2018). Methodically, however, it seems questionable whether an index can be formed based on an equal weighting of the four dimensions. This already assumes an implicit equivalence of transformation, inclusion, autonomy and accountability and will be examined in more detail below.

As summarised in the fourth row (4), Andersson and Andersson (2019) follow the methodology of historical case analysis and have to adapt the dimensions of the data situation in their study of Côte d'Ivoire and Senegal. Despite many differences, between 1930 and 1980 both countries were able to expand social capability and change their state structures, which would remain hidden if the development indicators were considered superficially (Andersson & Andersson, 2019). The authors continue to emphasize the largely lacking access to economic opportunities, which prevented sustained economic development. From a methodological point of view, they set an opposite pole to Palacio's Social Capability Index (Palacio, 2018) by increasing the specific explanatory content for two countries at the expense of generalizability. Thus, more research on the quantification of the conceptual framework is needed, as it will be developed in the next Section.

In summary, new structural approaches face the challenge of making general valid statements on social capability that are consistent with context-specific inquiries. While the authors call

for a broader consideration of social capability in the analysis of previously unsuccessful or weakening development paths, there is currently also a methodological research gap in this testing of the social capability approach.

2.2   Theoretical model

Building on Andersson and Palacio (2017), this thesis adopts the existing framework and extends it to the approach of *equality-mediated structural transformation* later on. The first section explains why the different dimensions cannot be evaluated equally and why an index directed in the same direction appears insufficient. To answer the question of whether the social capability approach with its four dimensions helps to explain the dynamics of economic growth in cross-country setting, the model is schematically developed in the second step.

2.2.1   Augmenting and measuring the four dimensions

Transformation is seen as more than one of four equal dimensions than the necessary condition for the rest. Agricultural transformation shifts incentives and wages towards a more productive economy (Lewis, 1957) and changes the social structures of administration, ideology, and perceived power (Gerschenkron, 1962). However, both authors consider agriculture as an indirect contribution to growth and play down the sector itself in contrast with the modern industry. It is worth considering the agricultural transformation since it is unique in its characteristics of the high share of domestic consumption in agricultural production and the function of agriculture as a resource store (Timmer, 1988). Even though the labour force share of agriculture in relation to the total workforce is declining with increasing industrialisation, it remains the sector with the highest employment for a long time. Agricultural ownership and practice as well as the management of individual and collective risks continue to have an influence on structural change (Timmer, 1988, pp.288–289).

While it can be empirically stated that all successfully developing economies have undergone structural change, they exhibit many different characteristics. Nevertheless, Timmer and Akkus (2008) argue that the *pathways* are comparable. According to the authors, the effects of agricultural transformation are significant, and in addition to rising productivity in rural areas, poverty reduction also play a role. These patterns of development are robust over many countries and additional indicators and in line with other research, especially on the poverty-reducing effect of agriculture (Christiaensen, Demery & Kuhl, 2011).

Since Solow (1956), the role of income inequality in the development process has been discussed. This thesis expands Andersson and Palacio (2017) and adopts inclusion as a central dimension of social capability that plays a mediating role. This means that transformation and inclusion each have a direct influence on economic development, but the impact of transformation in its manifestation depends on the degree of inclusion. Inclusion should not

only be seen as a measure of inequality, but also as a fight against poverty and is closely linked to the agricultural reality of many developing countries (Adelman, 1984). Referring to Timmer and Akkus (2008) only if the poor are linked to structural change and political distribution issues through inclusion, rapid economic change can be shaped successfully both socially and politically. Inequality can be seen as embedded in a three-way relationship with poverty and growth (Bourguignon, 2004), but a distinction should be made between income and wealth in terms of redistribution. The thesis follows Bourguignon and evaluates the redistribution of profits and capital gains as more advantageous for economic growth than that of income.

Furthermore, the literature suggests that lower net inequality is correlated with more rapid and sustained growth (Abramovitz, 1995, p.27). The author particularly emphasises the negative effect of inequality when considering growth spells rather than individual annual values. This would support the theory of social capability as a resilience-building force to economic shrinking. Therefore, inequality will be considered with a direct and a mediating effect.

Since the influence of social capability on long-term economic performance is to be investigated, the question arises as to whether this performance is to be measured. Growth rates that often fluctuate from year to year would create a misleading picture. In the sense of the classical debate on income convergence, the outcome variable should therefore be measured as the changing level of economic performance.

2.2.2 Modelling economic performance and social capability

Economic performance, understood as the Gross Domestic Product, is measured as a level and not as a growth rate. In addition, population growth is included, and GDP is scaled by the natural logarithm. The dependent variable will be from now on denoted as *economic performance* (EP), formally written as

$$EP \stackrel{\text{def}}{=} \log (GDP \ per \ capita)$$

Structural change in agriculture is measured as the gap between the share of the agricultural workforce and the share of agricultural-produced GDP (Timmer & Akkus, 2008). A higher agricultural gap is associated with lower levels of economic development. Thus, *agriGAP* captures a closing ratio and has a negative sign for a positive trend. It represents the central explanatory variable of economic performance and can be formally described as

$$Transformation:$$
$$agriGap = Agricultural \ Employment \ Share - Agricultural \ GDP \ Share$$

Autonomy and *accountability*, understood as a state's power to raise taxes and provide public goods, are modelled as direct influences on economic performance. The question of what interactions there are between taxation and economic growth is controversial both theoretically and empirically (Besley & Persson, 2013). Based on the state-led development in

the context of the rise of East Asia, this thesis assumes taxes to be positively related to economic performance. Figure 2-2 shows the theoretical model that will be the basis for the econometric model, before the role of inclusion will be discussed.

Figure 2-2: Schemata of the theoretical model
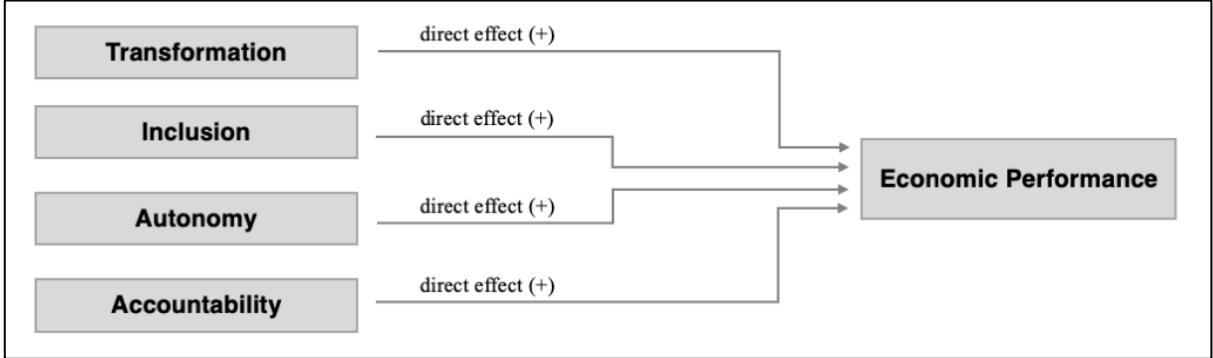
Note: Positive effects (+) do not indicate positive coefficient values in later regressions but the theoretical influence of the four dimensions on economic performance as derived from the discussed literature. Graph by author, motivated by Andersson and Palacio (2017).

*Inclusion* is seen on the one hand as a direct influencing factor on economic performance and on the other as a mediator for transformation. The mediating role is shown in figure 2-3, in contrast to the previous model. The theoretical model assumes a dependency of the influence of transformation on economic performance based on the degree of inclusiveness of the development process. Based on the theory discussed above, a positive relationship is assumed: An increase in inclusion should be accompanied by an increase in the effect of transformation on economic performance. Since for Gini coefficients, a low value is positive and a high value is relatively negative, a negative coefficient is expected for a positive relationship between inclusion and economic performance. To what extent a statistical interaction term can represent this mediator role, and which conclusions can be drawn for causal interpretability, will be discussed in the limitations.

Figure 2-3: Schemata of the theoretical model with mediator
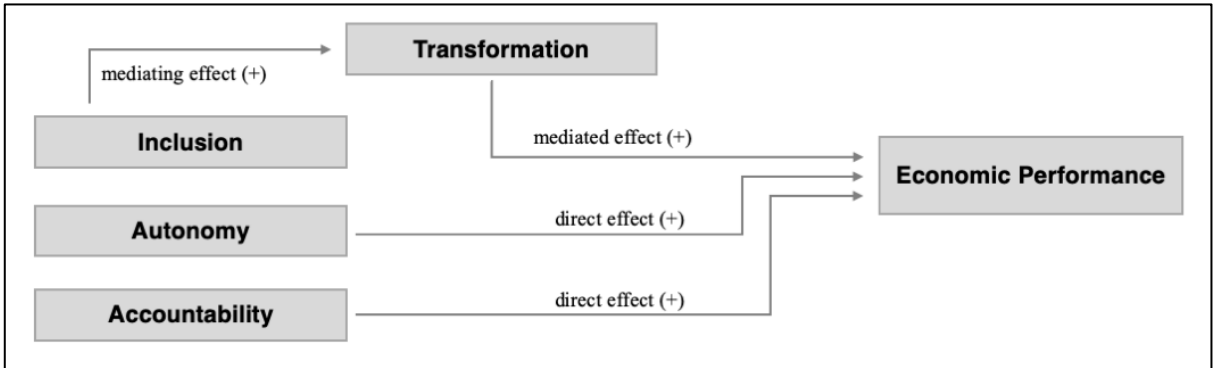
Note: In the inclusion-mediated model, inclusion has no own direct effect on economic performance that can be interpreted in a causal way. Therefore, only the theoretically relevant relationships are shown. Graph by author.

On the basis of this framework, the research question will be answered*: To what extend can the social capability approach with its four dimensions transformation, inclusion, autonomy and accountability help to explain the dynamics of economic growth in a cross-country setting from 1991-2016?* Building on a general assessment of the patterns of social capability and economic performance, four hypotheses are derived from previous research:

H1: The four dimensions of social capability, *transformation*, *inclusion*, *autonomy* and *accountability*, have a positive and relevant impact on economic performance.

H2: Agricultural transformation plays a bigger role than the others dimension.

H3: Social capability has a higher impact in countries during the early stages of economic development.

H4: Equal income distribution has a positive mediating role in the relationship between structural transformation and Economic Performance.

In summary, the theory of social capability is about providing a holistic framework within which several parallel processes can be observed. Thus, it is not only a question of shifting labour from the agricultural sector to other, possibly more productive, sectors, but also of increasing the productivity of agriculture itself and closing the agricultural gap. Before the econometric model can be adapted to the problem, the next section deals with the used data justifies the period of the study and shows some limitations of the observations.

3 Data

This chapter elaborates on the source of all used observations and the variables measuring social capability and economic performance. This section starts with a brief overview of the used variables followed by an elaboration on missing values and descriptive statistics. The chapter closes with a discussion of the empirical limitations.

3.1 Data Source

The dataset necessary to measure social capability in a comprehensive way is compiled from the following sources as summarized by table A1 in the Appendix. Information on GDP per capita, employment rates and value-added in the three sectors as well as mortality come from the Wold Bank Indicators on development (The World Bank, 2019). As will be discussed in more detail in the next section, the Gini values of the World Bank have too many gaps to apply the planned method. Instead, the thesis uses the Standardized World Income Inequality Database in its latest version 8.1 from May 2019 (Solt, 2019). Solt's dataset provides Gini values before and after taxes and transfers. The control variables in the case of the oil price come from Statista (2019), for gold prices from DataHub (2019), the trade-dependency from the World Bank, and inflation from the International Monetary Fund.

The period from 1991 to 2016, spanning 26 years, was chosen based on the assumption of sufficient data availability for many developing countries. Furthermore, most of the reviewed studies used a time frame starting after 1990. In addition to the total period, the three periods 1991-1999, 2000-2008 and 2009-2016 are used as a subdivision. The sample contains 118 countries from six regions as shown in figure 3-1 and listed by region in Appendix A2. The regional division follows the United Nations Geoscheme. As an exception, the USA are included in Europe & Central Asia because they would otherwise form a group themselves.

All collected data are quantitative and secondary. This sample does not contain countries that did not have entries for central indicators over the entire observation period. A more detailed analysis of the missing values and how they are dealt with follows in the next part.

Figure 3-1: Map of all countries in the sample
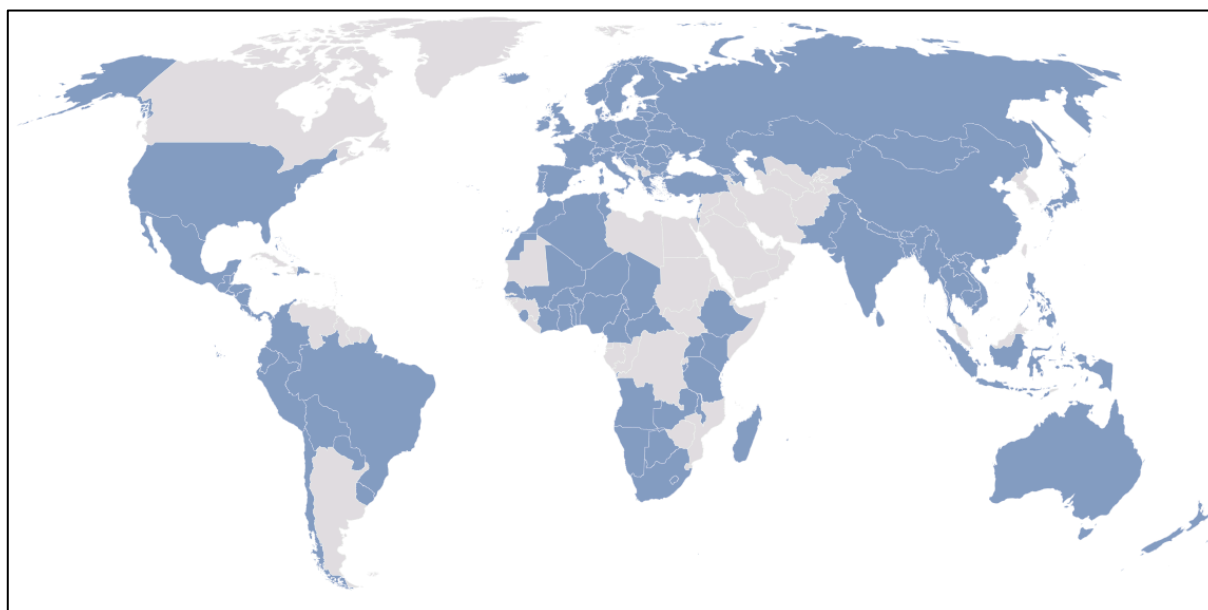
Note: Dark coloured countries are in the sample. USA are included in the regional subgroup Europe & Central Asia. Own visualisation of the full sample.

3.2 Economic performance and social capability

Economic performance measured as GDP per capita is the dependent variable of interest. The observations stem from the World Bank records and are used in the logarithmic form. This makes it easier to compare countries at different stages of development because the level of GDP itself spreads from 514 to 65,000 international Dollar. However, using a logarithmic dependent variable requires a more careful interpretation of the coefficient values later on. Other than studies interested in the influence of factors on the growth rate of GDP, this thesis looks at the changing levels. Focussing on growth rates would answer the also interesting but here not investigated question if there is a relationship between social capability and growth or shrinking patterns. Before the data of the independent variables are declared, table 3-1 gives the summary statistics.

Table 3-1: Summary statistics for the main variables

Variable	Obs	Mean	Std. Dev.	Min	Max
logGDPpc	3027	9.02	1.16	6.24	11.08
agriGAP	2946	17.29	15.58	-12.10	64.62
gini_disp	2701	38.10	8.81	18.50	63.30
unemploy_total	3068	8.12	5.93	0.16	44.16
tax_IncProf	2214	36.17	16.36	-4.47	95.67
tax_revenue	2229	17.68	7.35	0.58	62.86
education	1957	85.57	21.50	13.46	131.80
mortality	3067	32.44	32.08	1.70	154.90

Note: Own calculation based on the full sample.

agriGAP is the first independent variable and measures the difference between the share of agricultural employment and the share of agricultural value-added. *agriGAP* is a continuous variable and operationalises the proposed dimension of transformation. It should decrease until close to zero as economic output increases (Timmer, 1988). Furthermore, employment rates and value-added shares for industry and services are compiled to enable more precise analyses of the transformation at a later stage.

gini_disp is the first variable measuring the proposed dimension of inclusion. *gini_disp* is the Gini estimate of inequality in disposable household income, meaning the inequality after taxes and transfers. A low Gini indicates a relatively equal distribution. As an area ratio between the real income distribution and a theoretical equal distribution within an economy, however, different characteristics of the Lorenz curve can result in the same Gini coefficient. Therefore, *gini_disp* is only a rough measurement concept for inclusion. *gini_disp* has continuous values and comes from Solt's SWIID-dataset..

unemploy_total is the second variable for inclusion and measures the unemployment as per cent of the total labour force. Motivated by theory, economies with a lower unemployment rate can be regarded as more inclusive than economies with high unemployment. *unemploy_total* is a continuous variable compiled by the International Labour Organisation.

Autonomy is operationalised by taxation. *tax_IncProf* represents the taxes on income, profits and capital gains as per cent of the total taxes. A few negative values seem to be measurement errors, however, their impact on the calculations is neglectable. The thesis adopts the assumption that the capability of a state to tax high incomes and capital gains is a sign for autonomy. If autonomy is low and vested interests control the taxation system, *tax_IncProf* is assumed to yield a relatively smaller share of the overall taxes. Secondly, *tax_revenue* measures the total tax revenue as per cent of GDP. In order to provide services to the public, a state needs revenue. The considered literature associates higher general tax revenues with increased state autonomy. Both *tax_IncProf* and *tax_revenue* are continuous variables and compiled by the International Monetary Fund.

Accountability, the last dimension, is measured by *education* and *mortality*. The variable *education* describes the primary completion rate as per cent of the relevant age group and is collected by the UNESCO Institute for Statistics. A high education share is seen as positive while the same hold for a low mortality rate. *mortality* measures the number of infants dying before reaching one year per 1,000 births and is depicted by the World Bank.

As control variables, prices for oil and gold are included as annually averaged values. The reason for this is the often above-average dependency for developing countries on raw material exports and their volatile prices. Furthermore, trade and inflation are controlled for to account for the volatility of trade flows and inflation which often depend more on global developments and ratings than local decisions of the impacted country.

Table 3-2: Variable means by regional groups

	logGDP pc	AgriGAP	Gini	Unemploy-ment	Tax IncProf	Tax Revenue	Education	Mortality
Europe & Central Asia	9.9	8.0	30.7	9.3	36.9	19.8	97.7	9.6
East Asia & Pacific	9.0	20.0	35.9	4.0	43.9	15.2	94.6	25.0
South Asia	8.1	35.4	39.2	3.8	27.9	11.0	80.1	55.1
Latin America & Caribbean	9.2	12.0	47.1	7.9	30.0	14.7	91.7	22.6
Sub-Saharan Afrika	7.7	30.5	45.0	8.4	35.4	17.0	59.4	74.3
Middle East & North Africa	9.4	8.9	37.7	11.8	39.6	19.5	91.0	21.3
Total	9.0	17.0	38.1	8.2	36.2	17.5	85.8	31.8

Note: Own calculation based on the full sample. USA are included in Europe & Central Asia. The total measure corresponds with table 3-1.

A first look at the regional subgroups shows notable differences, summarised in table 3-2. First, the disadvantaged performance of Sub-Saharan Africa becomes evident. South Asia and Sub-Saharan Africa show high values for the agricultural gap. Furthermore, Latin America has a relatively high mean Gini. Before analysing the limitations, the next step is to examine whether missing values occur randomly or systematically and how they can be dealt with.

3.3 Missing values and descriptive statistics

As already mentioned, the Gini variable was the only one exchanged after closer examination. Initially, data from the World Bank was used, but this had a missing value rate of 65.61 per cent. The data from SWIID was then used (Solt, 2019). It turns out that 11.96 per cent are missing here, which is a clear improvement. Table 3-3 displays missing values for the main variables, a full table is given in Appendix A4.

Table 3-3: Summary of the missing values

Variable	Missing	Total	Percent Missing
logGDP pc	41	3,068	1.34
Agricultural Gap	122	3,068	3.98
gini (WBI)	2,013	3,068	65.61
gini_disp (SWIID)	367	3,068	11.96
Unemployment total	0	3,068	0
Tax Income &Profits	854	3,068	27.84
Tax Revenue	839	3,068	27.84
Education	1,111	3,068	36.21
Mortality	1	3,068	0.03

Note: Own calculation based on the full sample.

Histograms were created for all variables with more than one per cent missing variables and the remaining distributions were examined (Appendix A5). In spite of missing values, the distribution is similar to the patterns resulting from the literature and other empirical considerations and is provisionally accepted. An exact analysis of the missing values in the data set shows that the missing values are not random but systematically distributed. Especially the years 1991-1995 are missing disproportionately often. In addition, data gaps in many cases coincide with known violent conflicts.

This thesis deliberately opposes the imputation of values. Although easy to perform in the software, the data violates a basic requirement for this procedure. The missing values are not absent by chance and independent of the trend of the variable but, as already mentioned, according to certain systematics. In addition, the missing values are usually at the beginning or end of the series. Imputing these values would produce excessively linear trends that could bias the following estimates.

A simple correlation analysis gives first indications of possible relationships between social capability and economic performance. Table 3-4 shows negative correlations between *agriGAP* and *logGDPpc* (-0.7454) as well as between *gini_disp* and *logGDPpc* (-0.5169). On the contrary, education and taxation are correlated positively with income. Since *education* and *mortality*, both indicators of dimension accountability, have a high correlation of (-0.7941), it may be sufficient to use only one of the two measures. Because more than 36 per cent of the values for education are missing the usable sample for the regression analysis would shrink notably. Therefore, and due to the high correlation between education and mortality, only mortality will be included as a variable for accountability.

Table 3-4: Correlation matrix of the main variables

	logGDPpc	agriGAP	gini_disp	unemploy_total	Tax_IncProf	Tax_revenue	Education	Mortality
logGDPpc	1							
agriGAP	-0.745	1						
gini_disp	-0.516	0.442	1					
unemploy_total	0.033	-0.092	0.208	1				
tax_IncProf	0.316	-0.068	0.006	0.008	1			
Tax_revenue	0.342	-0.336	-0.204	0.312	0.116	1		
Education	0.694	-0.528	-0.278	0.040	0.177	0.256	1	
Mortality	-0.828	0.663	0.469	0.010	-0.079	-0.275	-0.794	1

Note: Own calculation.

A visualisation by a correlation plot matrix can be found in Appendix A3 as well as in high definition in the Online-Appendix. First descriptive consideration suggests that the four dimensions *transformation*, *inclusion*, *autonomy* and *accountability* proposed by Andersson and Palacio (2017) in their operationalized form are highly related to economic performance. Before moving on to the method and answering the question, the empirical limitations must be pointed out. General limitations of this thesis will be discussed later in section 6.2.

3.4   Empirical limitations

The limitations are in many ways similar to those of other quantitative studies on long-term economic development. As already mentioned, values are often systematically lacking, especially for countries with considerable development potential. For example, complete data series for many African countries, which are at the centre of the political development debate, are missing. The sample is limited to 118 countries in which economically developed countries are over- and weaker countries are underrepresented. In addition, the observation period is limited to 26 years, which penalises countries with data gaps during this period. Furthermore, although all the data used have, where possible, been taken from their original source and consistent methodology has been applied, it cannot be guaranteed that there are no inconsistencies, for example in the imputation of values that have not been labelled as such.

The character of the figures aggregated at regional or country level also deserves critical consideration, since aggregation is more suitable for some variables than for others, and there are also country differences in the survey. Both statistics on unemployment and inequality are politically sensitive and are based in part on different calculations by the national statistical authorities. In addition, each variable has idiosyncratic characteristics, such as agricultural value added: especially in developing countries, a large part of agricultural production is consumed by producers and can therefore only be estimated as an aggregated number.

The reliability of the compiled data can be assumed to be sufficient. Even though some values are already in the original sources only based on estimates, these estimates should increase in quality due to annual updates and corrections. In accordance with the laws of large numbers, it can be assumed that errors and inaccuracies in the data behave randomly enough due to the large number of countries and observation years to perform the regression analysis used. Within the high number of development indicators, those used here are nevertheless regarded as sufficiently reliable.

The sample has a high representativity. All relevant geographical regions are included, and the missing countries do not show obvious patterns. The only exception is the Arab peninsula and the Middle East where no sufficient material is available. Intuitively, violent conflicts as well as political instability during the observed time period might be seen as possible origins for this blank spot. However, since the Middle East is a special case anyway due to its exploitation of energy resources, this does not unduly affect the study.

4   Methods

The thesis contributes to the research of social capability by quantifying existing the conceptual *transformation*, *inclusion*, *autonomy* and *accountability*. Based on the literature, a generally positive relationship between the dimensions of social capability and economic performance is assumed. The applied methodology is based on methodical rationalism in line with a postpositivist worldview (Creswell, 2014; Katrin, Winter & Arentzen, 2013, p.1931). An approach of econometric regression analysis of a cross-country panel is used, and the results are interpreted statistically. This section introduces the econometric background of Fixed Effect models, describes the applied models and acknowledges the methodological limitations.

4.1   Econometric model

To estimate the effect of social capability on economic performance, the used model needs to shield the influences of country-specific characteristics. To achieve this isolation of the regressors, the study uses a Fixed Effects model and panel data with an observation dimension and a time dimension. This structure allows increasing the estimators' efficiency by following a high number of countries over time. As displayed in the data section, the set contains observations for 118 countries over the 26 years from 1991-2016.

Among others, pooled OLS models, Random Effects (RE) models or Fixed Effects (FE) models can be used to investigate panel data. As a disadvantage, pooled OLS does not merge different observations for the same grouped unit. The grouped unit in this study are the countries. Pooled OLS leads to over-specified estimators because underlying long-term trends might determine observations over many years (Andersson, 2018). RE models built on the assumption of independent values for each observation. This independence cannot be assumed in the case of countries' development because every value in period t might be highly influenced by the corresponding value in the previous period t-1.

A FE model is most suitable for the given research question and data structure. To follow specific countries over time, a quasi-experimental character is generated by holding selected variables constant. Adopted on this study, the influence of social capability on economic performance is analysed by keeping other relevant country-specific characteristics constant. FE models are a particular case of classical linear models or multiple linear regressions and follow several assumptions, as explained in detail in Appendix A7.

The investigated relationship between social capability and economic performance (EP) can be written formally as

$$EP = F(SC, CV)$$

Where the economic performance (EP) as logarithmic GDP per capita is measured as a function of a vector of social capability and a vector of control variables. Due to the focus on long-term trends of income developments, the level of GDP per capita and not its growth rate is considered. In all following formulas, α represents the constant coefficient, yet is of no specific interest for the analysis. The separation of the error term in an invariant and an idiosyncratic error is technically crucial in the Fixed Effects model and further explained in Appendix A7.

The basic econometric model can be written as

$$EP = \alpha + \beta_{SC} SC + \beta_{CV} CV + u$$

Social capability (SC) contains estimators for the four dimensions transformation, inclusion, autonomy and accountability. Due to the high number of observations, the $\hat{\beta}$-estimators, employing the variation within one country, are consistent even though the time dimension only contains 26 years. Based on the slow-changing character of the considered regressors, variation within them might be low and cause problems. This, as well as measurement errors, will be discussed in the section on methodological limitations.

To test hypothesis H1, *"the four dimensions of social capacity, structural change, inclusion, autonomy and accountability, have a positive and relevant impact on economic performance",* the following model is computed:

$$logGDPpc = \alpha + \beta_1 agriGAP + \beta_2 gini\_disp + \beta_3 unemploy\_total + \beta_4 tax\_IncProf + \beta_5 tax\_revenue + \beta_6 mortality + u$$

The six regressors are added stepwise leading to this full model. A corresponding Pooled OLS model will serve as a baseline and the control variables *OIL*, *GOLD*, *trade* and *inflation* will be included. Hypothesis H2 is tested with the specifications from the model above and further robustness checks as well as subsamples. To answer hypothesis H3, model 1 is deployed on subsamples with different stages of economic development.

To test hypothesis H4, *"equal income distribution has a positive mediating role in the relationship between structural transformation and economic performance",* an interaction term between *agriGAP* and *gini_disp* is included:

$$logGDPpc = \alpha + \beta_1 agriGAP + \beta_2 gini\_disp + \beta_3 agriGAP \times gini\_disp + \beta_4 unemploy\_total + \beta_5 tax\_IncProf + \beta_6 tax\_revenue + \beta_7 mortality + u$$

Furthermore, robust clustered standard errors are used throughout all models to control for heteroskedasticity. The standard errors' variance is crosschecked with *bootstrap* and *jackknife* estimation. To investigate possible multicollinearity, the R^2- and t-values for all variable combinations were checked. Despite all the suitability of the Fixed Effects model for answering the question and the four hypotheses, there are also methodological limitations that are discussed in the next section.

4.2   Methodological limitations

A limitation exists in the danger of the potential over-specification of the model. Over-specification can appear when applying country-Fixed Effects (Barro, 2012). However, the number of 118 countries over 26 years is not high enough to produce strongly artificially increased significances.

Secondly, the statistical interaction term between *agriGAP* and *gini_disp* can only be interpreted as causal mediation to a limited extent. It would be unreasonable to conclude that the coefficient value of the interaction term describes exactly how strong the influence of the agricultural transformation on the GDP level depend on the existing income inequality. The underlying assumption of connectivity between the two explanatory variables is driven by theory and cannot be established with statistical means. Statistical interaction is bidirectional. If one follows the theoretical assumption that there is a relationship between the level of income and income inequality, as established above in the literature review, the direction is from transformation over inclusion to economic performance. This means that the coefficient of the interaction term can be interpreted as the mediating effect inclusion has on agricultural transformation's impact on economic performance.

Furthermore, the methodological validity is challenged by the use of proxies. Since the goal of the conceptual framework is to quantify dimensions that are difficult to measure, such as autonomy and accountability, this is in the nature of the study and should not interfere further. However, it must be acknowledged that, for example, the representation of accountability via the proxy *mortality* is a strong simplification.

By looking at the between and within variation's standard deviation, displayed in table A6 in the Appendix, conclusions can be drawn about how much the variable values change for each individual over time. However, the different scales displayed above for different variables must be considered. The value 0.25 for the within standard deviation of the dependent variable *logGDPpc* indicates that there is an average variation of 0.25 units of scale at the country group level. This is a small variation and can be explained by the nature of economic growth as being more continuous than rapid if measured in a logarithmic scale. While the variable *agriGAP* has a reasonable within variation of 5.10, the within variation of *gini_disp* only reaches 1.43. All Regressors have a within variation higher 1.

All relevant indicators point to sufficiently suitable prerequisites for the application of the fixed effect model to answer the question of the extent to which social capability and economic performance are interrelated. However, also first potential challenges arose from the deployed data and methods. The results of the models described above are presented in the following section.

5   Empirical Analysis

To answer the question to what extent economic performance is connected with social capability, the methods discussed are now applied. This section first describes the results of the regression analysis and in a second step deals in more detail with the patterns of the various variables. The aim of the bivariate and multivariate analysis is both to answer the four hypotheses and to provide a general insight into the empirical reality of development patterns between 1991 and 2016 with regard to social capability. Finally, the results will be examined with regard to the literature to date on the topic as well as their quality and informative utility.

5.1   Regression results

First, the results of the stepwise regression are considered. In separate steps, the variables are added following the four dimensions *transformation*, *inclusion*, *autonomy* and *accountability*. The dependent variable for all model is the logarithmic GDP per capita, measured in 2011 Purchasing Power Parity, and the model investigates yearly changes. The logarithmic dependent variable should be interpreted with caution when considering the non-logarithmic independent variables. In the log-level schema, coefficient values must be interpreted as follows: If the independent regressor $\beta_1 X1$ increases by one unit, the dependent outcome variable increases by $100 * \beta_1$ per cent.

As reported in table 5-1, model (1) only contains the variable *agriGAP* and the control variables *OIL*, *GOLD, trade* and *inflation*. The F-statistic for the model (1) is 56.00 with a R^2-value of 0.507. *agriGAP* has a significant coefficient value of -.00668, which means that a reduction of the agricultural gap by one unit is expected to increase income by 0.67 per cent. The negative sign has to be switched as the theory argues that the variable's trend closes down to zero. Model (2) adds variables for the dimension inclusion, model (3) includes variables for autonomy and model (4) contains variables for the dimension accountability.

Table 5-1: Results of stepwise regression

	Dependent variable is log GDP per capita			
	(1)	(2)	(3)	(4)
agriGAP	-0.00668**	-0.00780**	-0.00747***	-0.00645**
	(0.00273)	(0.00307)	(0.00270)	(0.00254)
gini_disp		0.0156*	0.0135*	0.0158**
		(0.00881)	(0.00778)	(0.00711)
unemploy_total		-0.0204***	-0.0219***	-0.0197***
		(0.00286)	(0.00294)	(0.00294)
tax_IncProf			0.00264*	0.00148
			(0.00144)	(0.00125)
tax_revenue			0.00440	0.00247
			(0.00276)	(0.00271)
mortality				-0.00771***
				(0.00217)
Constant	8.827***	8.525***	8.741***	8.911***
	(0.0634)	(0.311)	(0.306)	(0.285)
Controls included	yes	yes	yes	yes
Country FE	yes	yes	yes	yes
Observations	2,769	2,469	1,878	1,878
R-squared	0.507	0.589	0.624	0.668
F-Statistic	56.00	50.36	43.17	37.62
Number of countryID	117	117	106	106

Note: Robust standard errors in parentheses. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Author's calculations based on the full sample.

The full model (4) quantifies the conceptual approach of Andersson and Palacio (2017) and allows a first analysis of social capability's effect on economic performance. In column (4) *agriGAP* has a significant coefficient value of -.0064, meaning that reducing the agricultural gap by 1 per cent is associated with an 0.6 per cent increase in GDP per capita. For the *inclusion* dimension, column (4) reports a significant coefficient value of .0158 for the Gini and a highly significant -.197 for total unemployment. These values will be discussed in more detail in the next chapter.

Both variables capturing the dimension inclusion, *tax_IncProf* and *tax_revenue*, show no significance in the full model. *mortality*, the proxy for the accountability of a state, has a significant coefficient value of -.0077. Thus, a reduction of the mortality rate is affiliated with an increase in income. By adding the tax variables, the sample reduces to 106 countries. An examination of the missing countries shows that in the full model (4) there is a certain underrepresentation of the economically least developed countries. This poses a challenge to the results and will be addressed in the discussion section.

The results are only partly robust if checked for regional subgroups. As displayed in Appendix A9, alone Sub-Saharan Africa has a significant value for *agriGAP* of -.00494. Here, the R^2-value is 0.573 and the F-statistic 56.71. *gini_disp* is only significant for the Europe & Central Asia sample with a value of -.02. *tax_revenue* has only one significant coefficient of .0103 for Sub-Saharan Africa, whereas *tax_IncProf* is only significant for the Latin America & Caribbean region.

Moreover, different income groups yield different results, as displayed in Appendix A8. *Agri_disp* is significant with negative coefficients for upper middle income and high-income groups. The dimensions inclusion, autonomy and accountability have changing levels of significance and coefficient values. All these disparities in results indicate a weaker model than expected and need further investigation in the discussion section.

As expected, the coefficients in the fixed effects model are smaller and less significant than in the pooled OLS. This is because Pooled OLS evaluates the values of a country over 26 years as independent observations. Therefore, the Fixed Effects model can be assumed to be more realistic and precise than the Pooled OLS model. *Gini_disp* changes its coefficient value from -.0160 in the pooled OLS model to .0158 in the FE model. Both tax variables lose their significance in the FE model compared to the pooled OLS model. Table A10 in the Appendix reports the full results while the most important are listed below.

Besides the full Fixed Effects Model (4), an equality-mediated version is given by model (6). The interaction term between *agriGAP* and *gini_disp* changes the interpretation of the coefficients. Without an interaction term, estimators reflect the unique effects of the associated variables on GDP per capita. By adding the mediator, statistically described by simple interaction, the effect of *agriGAP* on GDP now depends on the level of *gini_disp*. The coefficient value of -.0378 given in column (6) for *agriGAP* would now represent the exclusive effect if *gini_disp* were 0. A Gini value of 0 means complete income equality in society. This means that if income equality were complete, a reduction of the agricultural gap would be associated with an increase in income of 3.78%. This result suggests that the role of inclusion should be further investigated and that it is necessary to embed it in the previous literature to evaluate the long-term impacts.

5.2   Pattern analysis

The general character of structural transformation becomes visible when employment in agriculture, employment in industry and the agricultural gap are plotted against GDP pc as done in the following figure 5-1. This plot shows clearly declining and approaching zero curves for both agricultural employment and the agricultural gap. The latter means that the proportion of employees in agriculture increasingly corresponds to the value added generated by agriculture. This trend, which is associated with increasing GDP per capita, does not see any big outliers and therefore seems to be a feasible manifestation of structural transformation. The share of employment in industry correspondingly rises but with a decreasing slope. Appendix A10 gives a plot of the declining agricultural gap without other indicators.

*Figure 5-1: Agricultural gap and industrial employment*
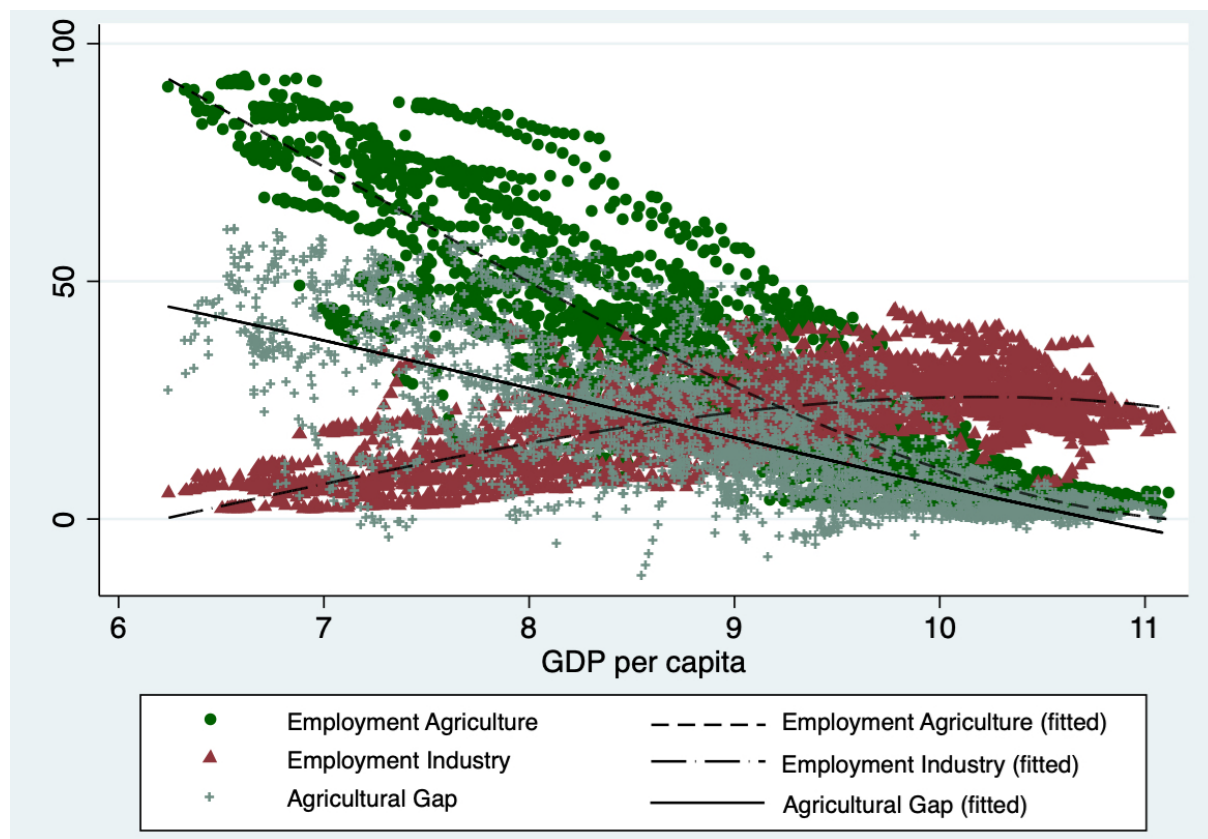
Note: The vertical axis gives percentages for all three variables. Author's graph on the full sample.

This pattern, which at first glance, appears to correspond to Timmer (1988), Timmer and Akkus (2008), as well as Andersson and Palacio (2016), provides regional differences on closer inspection. While a further subdivision down to country level would be possible, but beyond the scope of this work, this is limited here to the large geographical regions.

In figure 5-2, one can observe that in East Asia there was an early convergence movement of agricultural gaps and that these subsequently closed on a similar path. In Europe and Central Asia, too, this trend is discernible, whereas Sub-Saharan Africa shows a higher divergence of agricultural transformation. Although here also the agricultural gaps seem to be closing and moving downwards, it remains to be seen whether this will develop into a consolidated transformation.

Figure 5-2: Agricultural gap by region
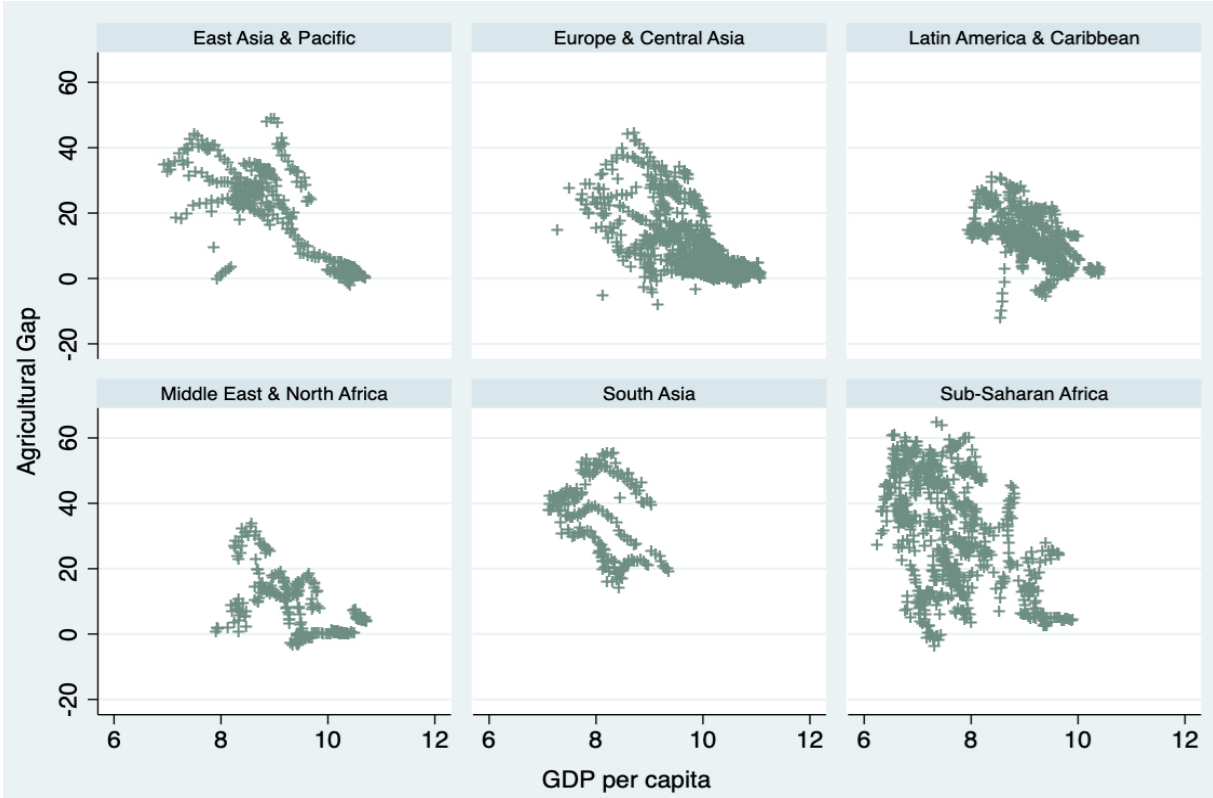
Note: USA is included in Europe & Central Asia. The vertical axis depicts percentages; the horizontal axis uses a logarithmic scale. Author's graph.

The results with regard to inclusion also go beyond regression analysis. For example, the left-hand side of figure 5 shows that the Gini of disposable household income decreases with rising income. This trend is only broken by a few outliers. On the other hand, the comparison with the Gini before taxes and transfers, the so-called market Gini, makes it clear that this decreasing inequality occurs through redistribution. The market Gini itself remains constant or grows slightly with increasing GDP per capita. The political implications of this will be addressed in the discussion.

Figure 5-3: Market and net Gini coefficients
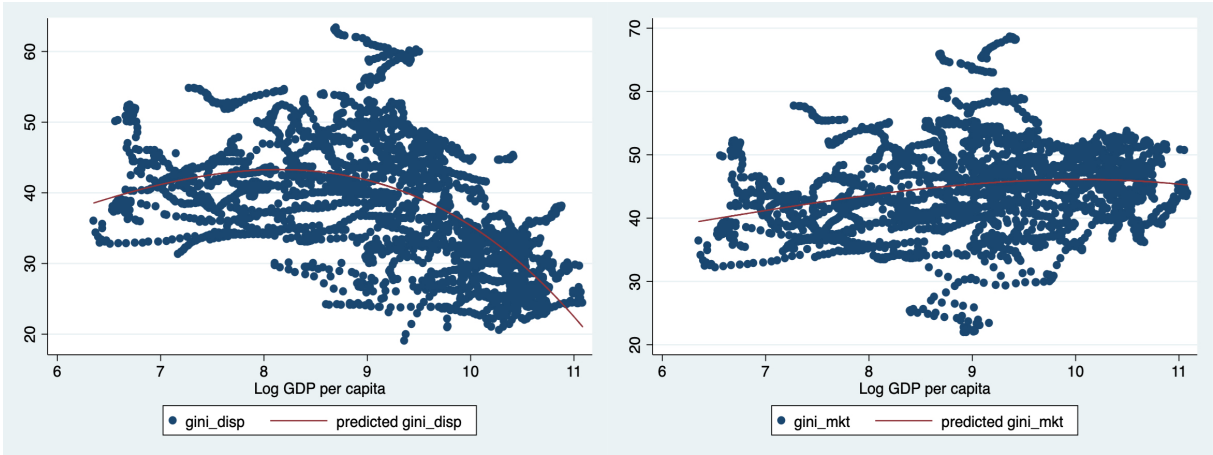
Note: Net Gini on the left side and market Gini on the right side. Own graphs based on the full sample.

Furthermore, the regional view on tax also reveals details of the states' autonomy, which remains hidden in a complete sample and can be overlooked as insignificant in regression analysis. Appendix A12 shows both the regional distribution of taxes on income, profits and capital gains as measured by total tax revenues and the aggregated picture. In general, rising GDP per capita is associated with a constant to slightly rising tax share for the better-off. Here again, the challenge of reverse causality becomes clear because changes in the tax structure and tax revenue could affect the economic performance, but also vice versa. Reverse causality cannot be dissolved ultimately in this study and would need more advanced modelling together with context-specific analysis.

Regardless of the direction of causality, substantially different trends become apparent in the relationship. South Asia and Sub-Saharan Africa tend to have declining tax rates for capital gains and income with rising GDP per capita, although more observations would be beneficial. East Asia & Pacific as well as Europe & Central Asia and Latin America & Caribbean show consistent positive relationships between the tax variables and economic performance. These results suggest that the dimension of autonomy could play an important role within the social capability approach.

Only infant mortality, here used as proxy for state accountability, always falls in all countries and for similar GDP pc levels with the same characteristics. However, this positive development raises the question of whether it is a sufficiently suitable proxy for accountability. These and other results should be discussed critically in light of the literature used before the limitations of this study are presented.

5.3 Discussion

In the following, the results are viewed critically against the background of the four hypotheses and placed in relation to the results of the literature. It can be said in advance that the framework of social capability, understood as the structural operationalisation of convergence theory, proves to be helpful. The four dimensions make it possible to bring numerous parallel processes of change into a common framework and to make them comparable. Moreover, the social capability approach repeatedly draws attention to the fact that indicators should not be regarded as stand-alone, but rather as components of a multi-level structure within whose economic development potentials may be realised.

However, when applied to the cross-country level, the approach opens up many different ways of accessing analysis. Especially the combination of regression analysis and evaluation of patterns based on income groups and regions is not yet exhaustively covered, and the following aspects are only a small part of the discussion within which social capability should be considered.

5.3.1 Social capability as driver for economic performance?

The four dimensions of social capability, *transformation*, *inclusion*, *autonomy* and *accountability*, have a positive and relevant impact on economic performance (*H1*). Based on the results of the bi- and multivariate analysis, this first hypothesis cannot be answered with a clear yes. In the Fixed Effects model, a decreasing agricultural gap is associated with increasing GDP per capita. Inclusion, represented by the Gini coefficient and total unemployment rate, has both positive and negative coefficients with changing levels of significance. The coefficients for taxes are, in most cases, not significant in the regression analysis but show regionally very different trends. Only the reduction of infant mortality is robustly significant in all models with increasing GDP per capita. However, the question arises whether accountability, understood as the ability of the state to ensure the supply of public goods to the population, could not be measured by an indicator other than mortality. Of the four dimensions, transformation, inclusion and accountability behave in the broadest sense as expected by theory.

Hypothesis *H2*, that agricultural transformation plays a greater role than the other dimensions, cannot be confirmed. A reduction in the agricultural gap is associated with a 0.64 per cent increase in the GD per capita, which can have a strong impact in the long run. This result has high relevance in the development discussion and has often been neglected in favour of trade, FDI, human capital and openness for international markets. Agricultural transformation has recently been attracting more and more attention as a fundamental factor for sustainable economic development. The realisation that both economic growth and poverty reduction can, to a large extent, be explained by agricultural transformation (McMillan & Harttgen, 2014) can thus be supported. This thesis finds the relationship a decreasing agricultural gap and

increasing GDP per capita not only for Africa but in general. However, due to the complex nature of long-term structural transformation this study cannot prove the causal linkages.

Furthermore, this study measures agricultural transformation only through the agricultural gap, the difference between employment and value-added and links it to employment in manufacturing. In order to gain a deeper understanding of structural transformation, industry and services would also have to be considered alongside the agricultural sector. With regard to manufacturing, it should be examined whether the transition from agriculture to the industry can be understood as a homogeneous process or whether the patterns change for the disadvantage of contemporary latecomers as described by Rodrik (2014).

The third hypothesis *H3*, that social capability has a higher impact in countries during the early stages of economic development, can neither be rejected nor confirmed, as the results show a mixed picture. While a reduction in the agricultural gap and unemployment rate in middle-income and high-income countries is associated with an increase in GDP per capita, this link is not observed in low-income and low middle-income countries. However, this may also be due to the fact that fewer countries are in the low-income sample, which may reduce the occurrence of statistical significance. Especially in countries with high incomes, a further reduction of the agricultural gap by one unit has a strong impact, with an increase of up to 1.9 per cent in GDP per capita.

The situation is different with the tax variables. These seem to have an increased influence in countries with low or low middle incomes. In low income countries, an increase in tax revenue of 1 per cent, measured as the share of GDP, is associated with an increase in GDP per capita of 4.6 per cent. This effect also applies, to a lesser extent, to lower middle-income countries. However, this can also occur due to a reverse causality effect if the tax base is broadened due to economic expansion. If taxation plays a central role as providing the state with the means to build capacities for economic resilience during the development process and yields from fluctuations (Rothschild, 1973), more analysis of taxes' role in the development process is needed.

The fourth hypothesis *H4* states that equal income distribution has a positive mediating role in the relationship between structural transformation and economic performance. The results of the regression analysis with an interaction term between *agriGAP* and *gini_disp* suggest that this hypothesis can be affirmed provisionally. In an economy with equal net income distribution, agricultural transformation would yield for a much higher increase in GDP per capita. This very naive modelling of complete inequality is unrealistic but still revealing: it shows how important a distribution-focused debate of structural change is within the convergence debate. Inclusion, understood as the participation of as large a population as possible in economic progress, therefore offers a potential lever to accelerate the process of catching up. The development patterns of East Asia and Pacific also show that relatively high-income equality was accompanied by strong and sustainable economic growth. In Sub-Saharan Africa, the patterns in all investigated variables are more scattered than in the other regions.

The results of this thesis concerning the specific answers of the hypotheses put forward are less definite than expected. Nevertheless, it can be clearly stated that the social capability approach is an excellent tool to investigate long-term economic development. Even though the quantification of the conceptual framework cannot be solved econometrically without problems, some statistically and economically relevant trends can be shown with the help of a Fixed Effects model. Especially the division into the four dimensions *transformation*, *inclusion*, *autonomy* and *accountability* helps to break down the complexity of several parallel-running processes. Over the period from 1991 to 2016, it becomes clear that different country and income groups experience different effects of social capability on economic performance.

The consolidation of the rapid economic growth in East Asia and Pacific can be reaffirmed according to the literature discussed, as can the tremendous challenges of Sub-Saharan Africa. However, the path taken by East Asia cannot be transferred hastily to Sub-Saharan Africa. As already recognized by Gerschenkron (1962) and Abramovitz (1995), catching-up processes and technological adaptability have to adjust to the contemporary circumstances continuously. Nevertheless, this thesis, as well as current research, points to a possibly generally valid relationship: Higher equality in the distribution of the benefits of economic development could drive a positive economic performance in itself. The role of inclusiveness in the course of agricultural transformation seems particularly relevant if one considers the still high dependency on agriculture in many developing countries.

Thus, social capability can be understood to a limited extent as the macro-environment within which growth potentials can be realized. In this sense, social capability could not only help to analyse changing levels of income per capita, but also to examine patterns of changing growth rates. If, besides growth, economic shrinking plays a role in long-term economic development, the ability to increase resilience towards shrinking becomes pivotal (Andersson & Palacio, 2017; Broadberry & Wallis, 2017). For Andersson and Palacio (2017), social capability plays a key role for the resilience of developing countries towards economic shrinking and thus for the long-term growth process. However, the thesis cannot contribute more to this debate than to acknowledge that the factors considered are potentially relevant in the catch-up process.

5.3.2   Egalitarianism and agricultural transformation

One result of this thesis is that the extent of the prevailing inequality of the available incomes influences the GDP-increasing association of the agricultural gap's closure. It also shows that Gini values before taxes and transfers do not decrease with increasing income, but Gini values after taxes and transfers do. The finding points to the strong role of redistribution in the course of structural transformation and economic development. Here, it is in line with recent literature, confirming that lower net inequality is robustly correlated with more rapid and sustained growth (Berg et al., 2018). However, this picture becomes unclear with regard to

regional subgroups and therefore requires further context-bound but also generalisable investigation.

Furthermore, the findings suggest more focus on the connection of poverty, inequality and agricultural transformation. Poor regions show different structural patterns in the development of inclusion and autonomy. The interconnectivity of poverty, inequality and economic growth is known both as a challenge and an opportunity for economic development (Bourguignon, 2004). However, various measures need to be combined to investigate this nexus. Bourguignon also considers poverty lines, while this thesis uses the Gini before and after tax as well as the unemployment rate. While the author discusses the interaction between distribution and growth as promising to reduce poverty, this interaction could be analysed within the framework of social capability. By adding the dimensions of agricultural transformation and the state-connected processes of autonomy and accountability, development paths can be analysed in a more realistic environment.

It can be seen as the strength of historical case studies to bridge this gap between the application of theoretical concepts of transformation and contextual policies of inclusion, autonomy and accountability. The role of agricultural transformation is complex and opens up different perspectives at the cross-country and historical levels. Andersson and Andersson (2019) show that, as in the case of Côte d'Ivoire, steady growth of the agricultural sector alone is not enough to ensure sustainable economic development. The authors note the critical role of accompanying structural and social processes. These, in turn, are linked to political autonomy, illustrated by tax revenues. Côte d'Ivoire, for example, has recorded considerably higher real tax revenue per capita since 1961 than Senegal (Andersson & Andersson, 2019). Even though the cross-country panel of this thesis could not prove a general connection between taxes and economic performance, it reaffirms this at least for low-income countries as well as for the Latin America and Caribbean region.

Egalitarianism, not understood as the absolute equal distribution but rather as a pro-poor approach within the debate on catching up, is promising if thought in conjunction with agricultural transformation. The attempt of this work to model inclusion, among other things not as a standard dimension within the social capability approach but rather as a mediator confirms this. The results indicate that high inclusion significantly increases the influence of agricultural transformation on economic performance. It may not only be industrialisation itself that is important, but more the path of increasing productivity and inclusiveness of the agricultural sector to avoid an unsustainable dualism. This shift from overcoming the agricultural economy for the sake of technological industrialisation towards inclusive and sustainable transformation can be seen as the most crucial difference between the *Old Structuralists* and the *New Structuralists*.

6 Conclusion

Studying transformation cannot be a linear process. This is reflected both in the literature on growth and social capability as well as its diverse methodological approaches. If one follows the ideals of Gerschenkron, it is the task of historical research to point out potentially important combinations of possibly relevant factors (Gerschenkron, 1962). The thesis adopts this view and looks at the role of social capability for economic performance. The closing chapter summarises the aims, objectives and results of this paper and offers an outlook on the numerous evolving questions.

6.1 Research aim and objectives

This thesis aimed to provide an empirical perspective on social capability to deepen the understanding of structural patterns behind long-term economic development. Knowing the technical challenges of quantifying conceptual approaches, the focus was to evaluate the dimensions themselves rather than to establish precise causal relationships. The question focused on to what extent the previous conceptual framework of social capability helps to understand long-term growth processes. All efforts were aimed at reducing the existing research gap in regard to social capability and economic performance.

The first objective of this study was to derive the dimensions of social capability from the considered literature and translate them into an econometric model. Second, data was compiled to enable sufficient quantification to test the hypotheses. Testing the four hypotheses allowed the formulation of an answer to the overall question of how much the social capability approach can help to explain economic performance. The hypotheses were tested using regression analysis and descriptive assessment. The results are less precise than expected, but also reflect the disagreement of the previous literature when it comes to factors behind sustainable growth.

6.2 Results and limitations

The sample of 118 countries over 26 years does not give a clear picture that all dimensions of social capability have a robust positive impact on economic development *(H1)*. Transformation, inclusion, autonomy and accountability, however, have a relevant positive

impact when subsampled based on income group or region. The causal relationships, when they are relevant and when they are not, require an in-depth analysis of regional patterns.

Although agricultural transformation does not play a greater role than the other dimensions, the influence of reducing the agricultural gap is much more robust *(H2)*. A reduction of the agricultural gap is associated with a significant and relevant increase of the GDP per capita. Especially over a longer period of time, these effects can become visible if they persist. Therefore, in the future, the conditions under which successful agricultural transformation has historically taken place should be more strongly integrated.

The effect of social capability on economic performance is not the same for all levels of economic development *(H3)*. Instead of a clear result, the thesis' findings support research efforts to look at the causes of these differences at the regional or national level. Autonomy, measured by tax variables, seems to play a more important role in countries at the beginning of an economic transformation. Moreover, the influence of unemployment on economic performance grows with the level of economic development.

In an economy with equal net income distribution, agricultural transformation yields a much higher increase in GDP per capita *(H4)*. Inclusion, understood as the participation of as large a population as possible in economic progress, therefore offers a potential lever to accelerate the process of catching up. This result requires more careful modelling of inclusion's mediating influence. If this result could withstand falsification attempts, it would support an inclusive or pro-poor approach to economic development strategies.

By addressing the four hypotheses, the research question can be answered: The social capability approach is a useful tool for the analysis of economic performance between 1991 and 2016 and should be developed further. While more sophisticated modelling attempts of the four dimensions are needed in a cross-country context, this thesis supports the focus on agricultural transformation and inclusion. It also encourages the further research for indicators of the dimensions autonomy and accountability, as these seem necessary to create stable yet flexible political and social environments for economic development. Here the view must be broadened beyond taxes and infant mortality.

This thesis and the explanative power of its results are limited in several ways. While limitations concerning the data situation and the use of fixed effects models have already been discussed in section 3.4 and 4.2, here follows a concluding look at the limited informative value. Using a data set of 118 countries over 26 years, the focus was on trends within the significances and coefficient values and not their absolute levels. The informative value of the results is limited to pointing out potentially influential factors in the development process of economic performance. Furthermore, this thesis has only worked on a macro-level and therefore, cannot make any statements on specific development dynamics or propose any clear policy recommendations.

As other growth-related research approaches, this thesis is confronted with the issue of reverse causality. A satisfactory answer requires both comparative cross-country studies and more historical case studies. In the course of the research process, the different methods posed

a particular challenge. In some cases, such as Fagerberg and Shrolec (2017), it was not feasible to access data sets to understand the research methodology fully. Therefore, it was not possible within this work to interlink the results of factor analyses, regression analyses and case studies to make them comparable.

Evidentially, this work is limited, as only selected countries are considered. Many of the countries interesting for development economics are not represented in the sample because of the lack of data. Nevertheless, the newly compiled sample can be regarded as sufficiently representative and, due to its online accessibility, offers the chance to be expanded by anyone interested.

6.3   Practical implications and future research

To this day, the question of what factors drive economic development remains both deeply controversial in academia and highly relevant. Despite or because of almost a century of growth-oriented research, findings and policy recommendations differ widely. Instead of giving further policy advice for one country derived from the experiences of another, this thesis points to processes of structural change. The work of economic historians is increasingly revealing that sustained economic growth is the exception rather than the rule. Empirically, all economically successful countries underwent structural change, each influenced by the changing historical context.

A return to the underlying structural changes, especially agricultural transformation and inclusion in the process, makes sense for several reasons. By quantifying the social capability approach, it could be shown that the subdivision into the four dimensions *transformation*, *inclusion*, *autonomy* and *accountability* with parallel processes is effective. In line with recent literature, this thesis has shown that an increase in agricultural productivity is a robust driver for positive economic performance. Furthermore, inequality is assumed to play a role not only as an isolated factor but more as a mediator for a successful agricultural transformation.

To sum up, the social capability approach offers a useful framework and raises many promising research questions. On the one hand, this thesis highlights the research gap between theoretical concepts of social capability and their practical applicability. On the other hand, it becomes evident that more historical case studies would be useful to understand the interplay between social capability and economic performance. Developing a methodically consistent framework for a variety of context-specific case studies, compatible with cross-country comparisons, could be the most rewarding challenge for future research. This effort requires a high degree of cooperation but opens the door for both generalisable and applicable research on social capability and economic performance.

References

Abramovitz, M. (1986). Catching Up, Forging Ahead, and Falling Behind, *The Journal of Economic History*, vol. 62, no. 2, pp.385–406.

Abramovitz, M. (1995). The Elements of Social Capability, in B. H. Koo & D. H. Perkins (eds), *Social Capability and Long-Term Economic Growth*, [e-book] London: Palgrave Macmillan UK, pp.19–47, Available Online: http://link.springer.com/10.1007/978-1-349-13512-7_3 [Accessed 8 April 2019].

Abramovitz, M. & David, P. (1996). Convergence and Deferred Catch-up: Productivity Leadership and the Waning of American Exceptionalism, in *The Mosaic of Economic Growth*, [e-book], pp.21–62, Available Online: http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.123.2219 [Accessed 12 November 2018].

Acemoglu, D., Johnson, S. & Robinson, J. (2004). Institutions as the Fundamental Cause of Long-Run Growth, Available Online: http://www.nber.org/papers/w10481.pdf [Accessed 14 May 2019].

Acemoglu, D., Johnson, S. & Robinson, J. A. (2002). Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution, *The Quarterly Journal of Economics*, vol. 117, no. 4, pp.1231–1294.

Adelman, I. (1984). A Poverty-Focused Approach to Development Policy.

Adelman, I. & Morris, C. T. (1965). A Factor Analysis of the Interrelationship Between Social and Political Variables and Per Capita Gross National Product, *The Quarterly Journal of Economics*, vol. 79, no. 4, p.555.

Andersson, E. (2018). Econometrics 2 Lecture Module 5: Panel Data and Fixed Effects.

Andersson, J. & Andersson, M. (2019). Beyond Miracle and Malaise: Social Capability in Côte d'Ivoire and Senegal during the Development Era 1930-1980, *Lund papers in Economic History. Development Economics*, no. 2019: 202, p.43.

Andersson, M. & Axelsson, T. (eds). (2016). Diverse Development Paths and Structural Transformation in the Escape from Poverty, [e-book] Oxford University Press, Available Online: http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780198737407.001.0001/acprof-9780198737407 [Accessed 8 April 2019].

Andersson, M. P. & Palacio, A. F. (2016). Structural Change and Income Inequality – Agricultural Development and Inter-Sectoral Dualism in the Developing World, 1960-2010, *OASIS*, no. 23, p.99.

Andersson, M. & Palacio, A. F. (2017). Catch up Growth and Social Capability in Developing Countries: A Conceptual and Measurement Proposal, *OASIS*, no. 26, p.7.

Audretsch, D. B. & Feldman, M. P. (1996). R&D Spillovers and the Geography of Innovation and Production, *The American Economic Review*, vol. 86, no. 3, pp.630–640.

Austin, G. (2008). THE 'REVERSAL OF FORTUNE' THESIS AND THE COMPRESSION OF HISTORY: PERSPECTIVES FROM AFRICAN AND COMPARATIVE ECONOMIC HISTORY, *Journal of International Development*, vol. 20, pp.996–1027.

Average Annual OPEC Crude Oil Prices 1960-2019. (2019). *Statista*, Available Online: https://www.statista.com/statistics/262858/change-in-opec-crude-oil-prices-since-1960/ [Accessed 12 April 2019].

Barro, R. (1991). Economic Growth in a Cross Section of Countries, *The Quarterly Journal of Economics*, vol. 106, no. 2, p.407.

Barro, R. (2012). Convergence and Modernization Revisited, w18295, Cambridge, MA: National Bureau of Economic Research, p.w18295, Available Online: http://www.nber.org/papers/w18295.pdf [Accessed 15 May 2019].

Barro, R. & Sala-i-Martin, X. (1992). Convergence, *Journal of Political Economy*, vol. 100, no. 2, pp.223–251.

Berg, A., Ostry, J. D., Tsangarides, C. G. & Yakhshilikov, Y. (2018). Redistribution, Inequality, and Growth: New Evidence, *Journal of Economic Growth*, vol. 23, no. 3, pp.259–305.

Bernard, A. B. & Jones, C. I. (1996). Technology and Convergence, *The Economic Journal*, vol. 106, no. 437, p.1037.

Besley, T. & Persson, T. (2013). Taxation and Development, in *Handbook of Public Economics*, Vol. 5, [e-book] Elsevier, pp.51–110, Available Online: https://linkinghub.elsevier.com/retrieve/pii/B9780444537591000029 [Accessed 8 April 2019].

Bourguignon, F. (2004). The Poverty-Growth-Inequality Triangle, Working Paper 125, Available Online: https://www.econstor.eu/bitstream/10419/176147/1/icrier-wp-125.pdf [Accessed 21 April 2019].

Broadberry, S. & Wallis, J. J. (2017). Growing, Shrinking, and Long Run Economic Performance: Historical Perspectives on Economic Development, w23343, Cambridge, MA: National Bureau of Economic Research, p.w23343, Available Online: http://www.nber.org/papers/w23343.pdf [Accessed 2 May 2019].

Christiaensen, L., Demery, L. & Kuhl, J. (2011). The (Evolving) Role of Agriculture in Poverty Reduction—An Empirical Perspective, *Journal of Development Economics*, vol. 96, no. 2, pp.239–254.

Cohen, W. M. & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation, *Administrative Science Quarterly*, vol. 35, pp.128–152.

Creswell, J. W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th edn, [e-book] SAGE Publications, Available Online:

https://pdfs.semanticscholar.org/73b7/18e508fa943dfb22a9cb5fb17f888239ad0e.pdf [Accessed 22 January 2019].

DataHub. (2019). Annual Gold Prices since 1952, *DataHub*, Available Online: https://datahub.io/core/gold-prices [Accessed 12 April 2019].

Fagerberg, J. & Srholec, M. (2017). Capabilities, Economic Development, Sustainability, *Cambridge Journal of Economics*, vol. 41, no. 3, pp.905–926.

Fagerberg, J., Srholec, M. & Knell, M. (2007). The Competitiveness of Nations: Why Some Countries Prosper While Others Fall Behind, *World Development*, vol. 35, no. 10, pp.1595–1620.

Fagerberg, J. & Verspagen, B. (2002). Technology-Gaps, Innovation-Diffusion and Transformation: An Evolutionary Interpretation, *Research Policy*, vol. 31, no. 8–9, pp.1291–1304.

Freeman, C. (1995). History, Co-Evolution and Economic Growth, *Economic Growth*, p.98.

Gerschenkron, A. (1962). Economic Backwardness in Historical Perspective: A Book of Essays, [e-book] Cambridge: Havard University Press, Available Online: https://numerov.com/dspace/es/begy_ebook.pdf [Accessed 12 November 2018].

Haraguchi, N. & Rezonja, G. (2009). Structural Change and Sectoral Growth in Selected East Asian Countries.

Hartmann, D., Guevara, M. R., Jara-Figueroa, C., Aristarán, M. & Hidalgo, C. A. (2017). Linking Economic Complexity, Institutions, and Income Inequality, *World Development*, vol. 93, pp.75–93.

Jaffe, A. B., Trajtenberg, M. & Henderson, R. (1993). GEOGRAPHIC LOCALIZATION OF KNOWLEDGE SPILLOVERS AS EVIDENCED BY PATENT CITATIONS, *Quarterly Journal of Economics*, no. 8, pp.577–617.

Katrin, A., Winter, E. & Arentzen, U. (2013). Gabler Wirtschafts Lexikon.

Kennedy, P. (2008). A Guide to Econometrics, 6th ed., Malden, MA: Blackwell Pub.

Kuznets, S. (1973). Modern Economic Growth: Findings and Reflections, *The American Economic Review*, vol. 63, no. 3, pp.247–258.

Lewis, W. A. (1954). Economic Development with Unlimited Supplies of Labour, *The Manchester School*, vol. 22, no. 2, pp.139–191.

Lin, J. L. (2011). From Flying Geese to Leading Dragons: New Opportunities and Strategies for Structural Transformation in Developing Countries, Available Online: https://openknowledge.worldbank.org/bitstream/handle/10986/3466/WPS5702.pdf?sequence=1 [Accessed 7 January 2019].

Lucas, R. E. (1988). ON THE MECHANICS OF ECONOMIC DEVELOPMENT, *Journal of Monetary Economics*, vol. 22, pp.3–42.

McMillan, M. & Harttgen, K. (2014). What Is Driving the 'African Growth Miracle'?, w20077, Cambridge, MA: National Bureau of Economic Research, p.w20077, Available Online: http://www.nber.org/papers/w20077.pdf [Accessed 24 May 2019].

Palacio, A. (2018). The Social Capability Index and Income Convergence, *Lund papers in Economic History. Development Economcis*, no. 2018:184, Available Online: https://lup.lub.lu.se/search/publication/ba2b7772-8583-40f0-9abf-be88fb6b7cbf [Accessed 2 October 2019].

Perkins, D. H., Radelet, S. & Lindauer, D. L. (2008). Economics of Development, New York; London: W.W. Norton & Company.

Quibria, M. (2002). Growth and Poverty: Lessons from the East Asian Miracle Revisited, *Asian Development Bank Institute*, vol. MPRA Paper, no. 2638, p.104.

Rodrik, D. (1994). Getting Interventions Right: How South Korea and Taiwan Grow Rich.

Rodrik, D. (2011). The Future of Economic Convergence, w17400, Cambridge, MA: National Bureau of Economic Research, p.w17400, Available Online: http://www.nber.org/papers/w17400.pdf [Accessed 8 April 2019].

Rodrik, D. (2014). The Past, Present, and Future of Economic Growth, *Challenge*, vol. 57, no. 3, pp.5–39.

Rodrik, D. (2016). Premature Deindustrialization, *Journal of Economic Growth*, vol. 21, no. 1, pp.1–33.

Rodrik, D., Subramanian, A. & Trebbi, F. (2004). Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development, *Journal of Economic Growth*, vol. 9, pp.131–165.

Romer, P. M. (1990). Endogenous Technological Change, *Journal of Political Economy*, vol. 98, no. 5, pp.71–102.

Rothschild, M. (1973). The Changing Tolerance for Income Inequality in the Course of Economic Development, *The Quarterly Journal of Economics*, vol. 87, no. 4, pp.544–566.

Sala-i-Martin, X. (1997). I JUST RAN FOUR MILLION REGRESSIONS, Available Online: https://www.nber.org/papers/w6252.pdf [Accessed 15 March 2019].

Solow, R. M. (1956). A Contribution to the Theory of Economic Growth, *The Quarterly Journal of Economics*, vol. 70, no. 1, p.65.

Solt, F. (2019). Measuring Income Inequality Across Countries and Over Time: The Standardized World Income Inequality Database SWIID Version 8.1, Available Online: https://fsolt.org/swiid/ [Accessed 16 May 2019].

Temple, J. & Johnson, P. A. (1998). Social Capability and Economic Grwoth, *The Quarterly Journal of Economics*, vol. 113, no. 3, pp.965–990.

The World Bank. (2019). GDP per Capita, PPP (Current International $), *The World Bank Data*, Available Online:

https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=Z4-ZG [Accessed 29 April 2019].

Timmer, C. P. (1988). The Agricultural Transformation, in *Handbook of Development Economics*, Vol. 1, pp.275–331.

Timmer, C. P. & Akkus, S. (2008). The Structural Transformation as a Pathway Out of Poverty: Analytics, Empirics and Politics, *SSRN Electronic Journal*, [e-journal], Available Online: http://www.ssrn.com/abstract=1213154 [Accessed 8 April 2019].

Verspagen, B. (1991). A New Empirical Approach to Catching up or Falling Behind, *Structural Change and Economic Dynamics*, vol. 2, no. 2, pp.359–380.

Verspagen, B. (2001). Economic Growth and Technological Change: An Evolutionary Interpretation, OECD Science, Technology and Industry Working Papers, 2001/01, Available Online: https://www.oecd-ilibrary.org/science-and-technology/economic-growth-and-technological-change_703445834058 [Accessed 20 May 2019].

Wang, Z., Wei, S.-J. & Wong, A. (2010). Does a Leapfrogging Growth Strategy Raise Growth Rate? Some International Evidence, w16390, Cambridge, MA: National Bureau of Economic Research, p.w16390, Available Online: http://www.nber.org/papers/w16390.pdf [Accessed 14 May 2019].

Wooldridge, J. M. (2012). Introductory Econometrics: A Modern Approach, p.910.

Appendix

A0: Online Appendix

In order to make the statements of this thesis more replicable and verifiable as well as to simplify further research, all graphs, Stata do-files and the data set are available online: https://drive.google.com/drive/folders/1OZ7K50AXglf6F7tcclnoJaE6Cpc7Szq3?usp=sharing
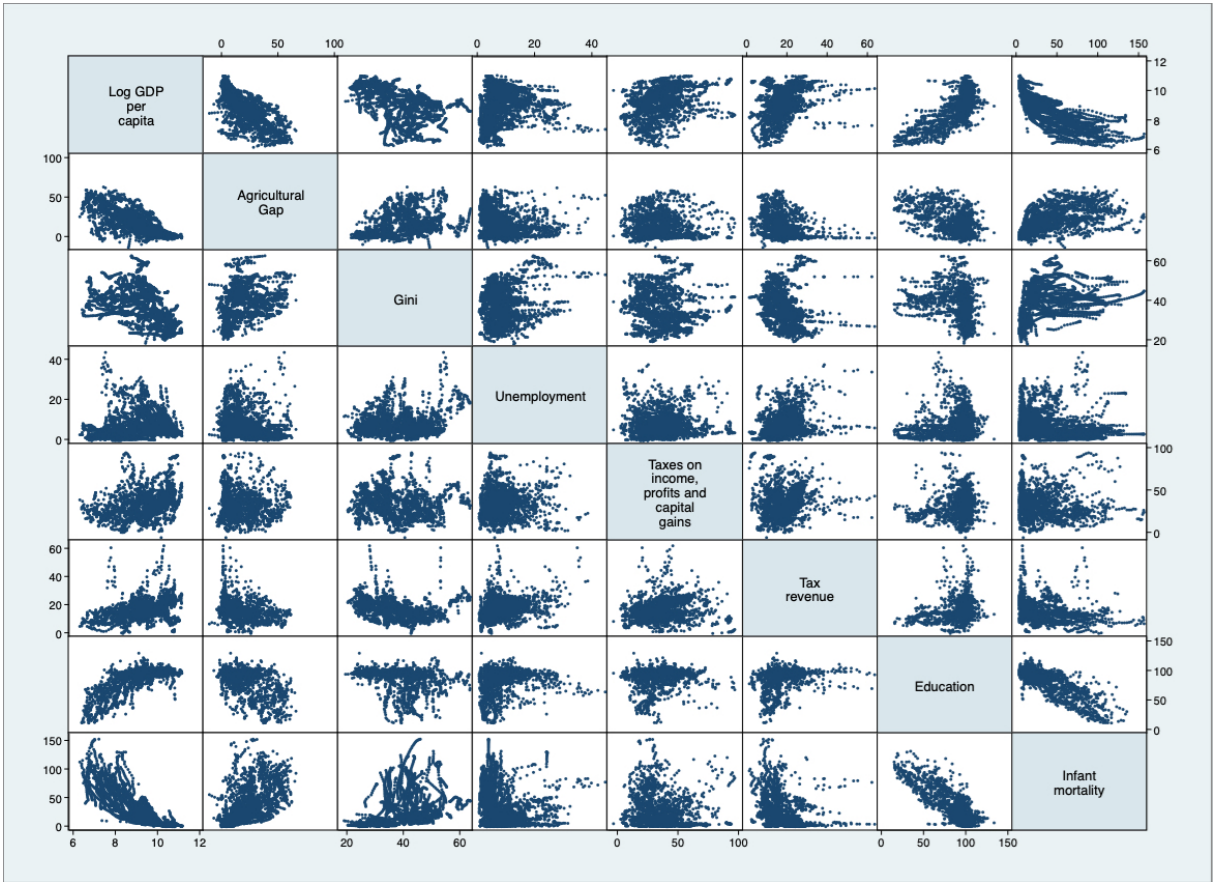
A1: Overview of used data sources

Variable	Description	Source
GDP per capita	Measured in 2011 international Dollar, Purchasing Power Parity	The World Bank Indicators, Website Version 2019
employ_agr	Employment in Agriculture as a share of total employment.	The World Bank Indicators, Website Version 2019
employ_ind	Employment in Industry as a share of total employment.	The World Bank Indicators, Website Version 2019
employ_ser	Employment in Services as a share of total employment.	The World Bank Indicators, Website Version 2019
VA_agr	Agriculture, value added as per cent of GDP	The World Bank Indicators, Website Version 2019
VA_ind	Industry including construction, value added as per cent of GDP	The World Bank Indicators, Website Version 2019
VA_ser	Services, value added as per cent of GDP	The World Bank Indicators, Website Version 2019
gini_WBI	Gini index estimate	The World Bank Indicators, Website Version 2019
gini_disp	Estimate of Gini index of inequality in equivalized household disposable (post-tax, post-transfer) income	Standardized World Income Inequality Database (SWIID), by Solt (2016)
gini_mkt	Estimate of Gini index of inequality in equivalized (square root scale) household market (pre-tax, pre-transfer) income	Standardized World Income Inequality Database (SWIID), by Solt (2016)
unemploy_total	Unemployment, total as per cent of total labour force; modelled ILO estimate	International Labour Organization, ILOSTAT database. Data retrieved in September 2018.
tax_IncProf	Taxes on income, profits and capital gains %as per cent of total taxes	International Monetary Fund, The World Bank Indicators
tax_revenue	Tax revenue (% of GDP)	International Monetary Fund, The World Bank Indicators
education	primary completion rate as per cent of relevant age group	UNESCO Institute for Statistics
mortality	Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year.	The World Bank Indicators, Website Version 2019
inflation	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services.	International Monetary Fund, The World Bank Indicators
trade	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	The World Bank Indicators, Website Version 2019
OIL	Average annual OPEC crude oil price in standardised US Dollars per barrel	https://www.statista.com/statistics/262858/change-in-opec-crude-oil-prices-since-1960/

GOLD	Yearly gold price in standardised US Dollar	https://datahub.io/core/gold-prices
region	Regional classification of countries following the UN rules	United Nations Geoscheme
subregion	Regional classification of countries in Sub-Saharan Africa following the UN rules	United Nations Geoscheme

A2: List of countries in the sample

Europe & Central Asia (41)	East Asia & Pacific (14)	Sub-Saharan Africa (27)
Albania	Australia	Angola
Austria	Cambodia	Benin
Azerbaijan	China	Botswana
Belarus	Fiji	Burkina Faso
Belgium	Indonesia	Burundi
Bosnia and Herzegovina	Japan	Cameroon
Bulgaria	Korea, Rep.	Central African Republic
Croatia	Malaysia	Chad
Cyprus	Mongolia	Cote d'Ivoire
Czech Republic	Myanmar	Ethiopia
Denmark	New Zealand	Ghana
Estonia	Philippines	Kenya
Finland	Thailand	Lesotho
France	Vietnam	Madagascar
Georgia		Malawi
Germany	**South Asia (7)**	Mali
Greece	Bangladesh	Mauritius
Hungary	Bhutan	Namibia
Iceland	India	Niger
Ireland	Laos	Nigeria
Italy	Nepal	Senegal
Kazakhstan	Pakistan	Sierra Leone
Latvia	Sri Lanka	South Africa
Lithuania		Tanzania
Moldova	**Latin America & Caribbean (21)**	Togo
Netherlands	Bahamas, The	Uganda
Norway	Barbados	Zambia
Poland	Belize	
Portugal	Bolivia	**Middle East & North Africa (8)**
Romania	Brazil	Algeria
Russian Federation	Chile	Egypt, Arab Rep.
Serbia	Colombia	Iran, Islamic Rep.
Slovak Republic	Costa Rica	Israel
Slovenia	Dominican Republic	Lebanon
Spain	Ecuador	Malta
Sweden	El Salvador	Morocco
Switzerland	Guatemala	Tunisia
Turkey	Honduras	
Ukraine	Jamaica	
United Kingdom	Mexico	**Total: 118**
USA	Nicaragua	
	Panama	
	Paraguay	
	Peru	
	Uruguay	
	Venezuela, RB	

A3: Matrix of correlation plots

A4: Summary of missing values

| Variable	Missing	Total	Percent Missing
GDPpc	41	3068	1.34
logGDPpc	41	3068	1.34
agriGAP	122	3068	3.98
gini_WBI	2013	3068	65.61
gini_disp	367	3068	11.96
unemploy_total	0	3068	0
tax_IncProf	854	3068	27.84
tax_revenue	839	3068	27.35
education	1111	3068	36.21
mortality	1	3068	0.03
inflation	162	3068	5.28
trade	97	3068	3.16
OIL	0	3068	0
GOLD	0	3068	0
employ_agr	0	3068	0
employ_ind	0	3068	0
employ_ser	0	3068	0
VA_agr	122	3068	3.98
VA_ser	167	3068	5.44

A5: Histograms of variables with more than one per cent missing values
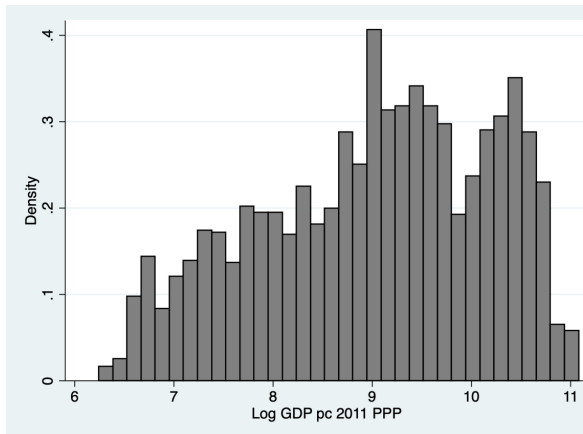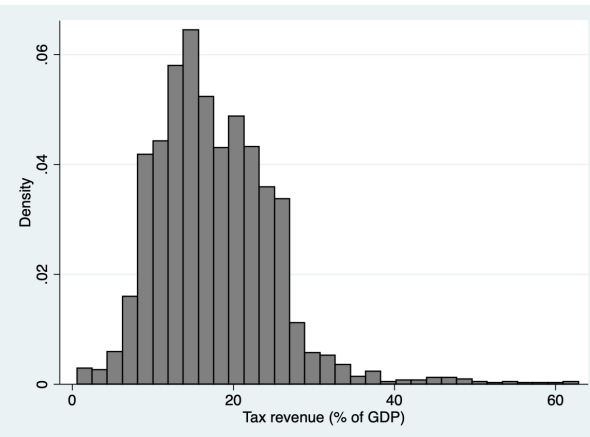
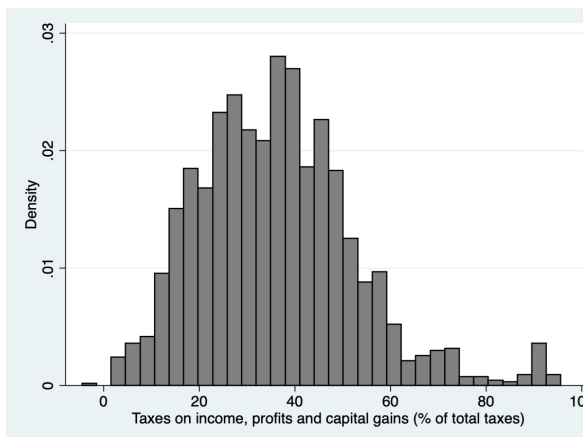

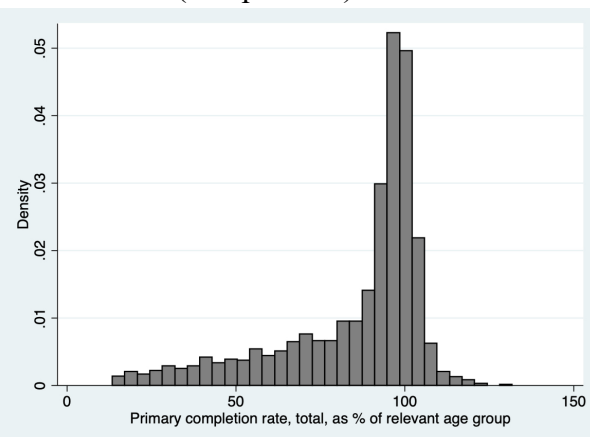1) GDP per capita (dependent)
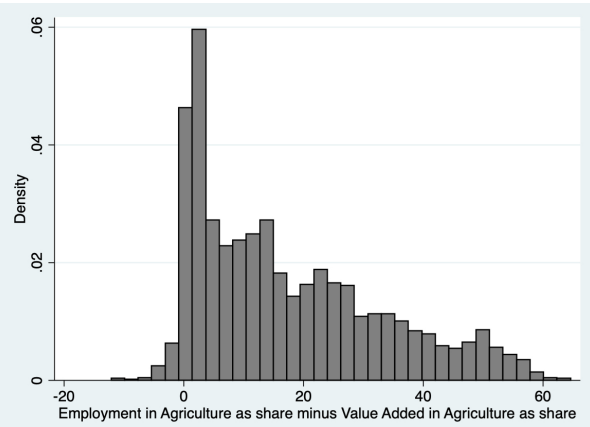
2) Agricultural Gap (independent)
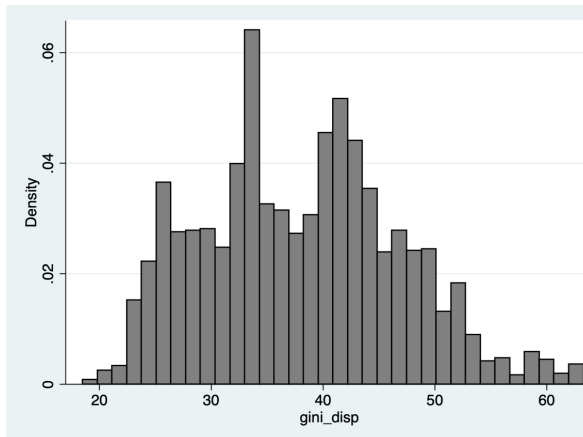
3) Gini disposable (independent)

4) Taxes on Income, Profits and Capital Gains (independent)

5) Education (independent)

6) Education (independent)

A6: Between and Within Variation for Fixed Effects model

Variable	Variation	Mean	Std. Dev.	Min	Max	Observations
logGDP pc	overall	9.04	1.16	6.24	11.12	N = 3195
	between		1.13	6.63	10.97	n = 120
	within		0.25	7.47	10.08	T-bar = 26.62
Agricultural Gap	overall	16.99	15.51	-12.10	64.62	N = 3102
	between		14.62	-1.69	53.55	n = 120
	within		5.10	-23.22	51.56	T-bar = 25.85
Gini	overall	38.11	8.80	18.50	63.30	N = 2706
	between		8.62	23.41	61.82	n = 118
	within		1.43	30.94	42.31	T = 22.93
Unemployment	overall	8.15	6.02	0.16	44.16	N = 3240
	between		5.46	0.77	32.34	n = 120
	within		2.58	-2.30	22.33	T = 27
Tax Income Profit	overall	36.17	16.60	-4.47	95.67	N = 2285
	between		15.73	6.04	91.00	n = 111
	within		6.40	-13.44	69.85	T-bar = 20.58
Tax Revenue	overall	17.46	7.46	0.58	62.86	N = 2301
	between		6.95	1.89	43.16	n = 113
	within		2.79	1.42	38.61	T-bar = 20.36
Education	overall	85.78	21.25	13.46	131.80	N = 2040
	between		18.92	26.06	109.12	n = 114
	within		9.41	27.12	130.55	T-bar = 17.89
Mortality	overall	31.76	31.60	1.60	154.90	N = 3239
	between		29.63	2.86	125.89	n = 120
	within		11.28	-15.01	84.09	T-bar = 26.99

A7: Fixed Effects model

Following Andersson (2018) and Wooldridge (2012) a basic linear model for data structured in a panel can be written as

$$Y_{it} = \alpha + \beta X_{it} + u_{it}$$

With X_{it} as a vector of exogenous regressor.

Introducing the Fixed Effects structure, one looks at the variation within the investigated units (here: countries) over time. This is done by splitting the combined error term u_{it}:

$$Y_{it} = \alpha + \beta X_{it} + \eta_i + \varepsilon_{it}$$

η_i denotes the time-invariant unit-specific error term and ε_{it} the idiosyncratic error varying over time.

In FE models the exogeneity condition is assumed to hold. The idiosyncratic error term ε_{it} is not allowed to correlate with the regressors:

$$E[\varepsilon_{it}|x_{i1}, \dots, x_{it}, \eta_i] = 0$$

Assumptions in detail

Fixed Effect models are a special case of classical linear models or multiple linear regression models (MLR) (Andersson, 2018; Kennedy, 2008). MLRs need the five Gauss-Markov

assumptions and the assumption of a normally distributed error term to hold (Wooldridge, 2012, p.119). First, the model needs to be linear in its parameters with the coefficients as "[…] unknown parameters (constants) of interest and u [as an] unobserved random error or disturbance term" (Wooldridge, 2012, p.83). Second, the sample has to be random and representative for the used model. Third, no perfect collinearity, defined as an exact linear relationship, should exist among the independent variables (Andersson, 2018). Fourth, the zero conditional mean assumption is softened in FE models. This allows for correlation between the time-invariant factors:

$$E[\eta_i|x_{i1}, \ldots, x_{it}] \neq 0$$

Fifth, the error term should have the same variance for different values of the independent variables (Andersson, 2018). If this assumption dies not hold, the model shows heteroskedastic error terms. The sixth assumption is not part of Gauss-Markov and assumes normality. This means that the "[…] population error u is independent of the explanatory variables […] and is normally distributed with zero mean and variance" (Wooldridge, 2012, p.118)

Due to the nature of economic development, where people change their patterns of consumption, investment and others with rising income, heteroskedasticity might pose a challenge to this study. Heteroskedasticity would bias the estimators leading to biased F statistics and could make OLS estimators less efficient, while they stay consistent. Several tests investigate the relationship between the error term and the independent variables.

To correct for possible heteroskedasticity, all FE models use heteroskedasticity-robust standard errors. Therefore, clustered standard errors were used and cross-checked with the methods of *bootstrap* and *jackknife*. All methods of clustered standard errors lead to similar results. Furthermore, the plots of residuals are screened for triangular shapes: this would indicate heteroskedasticity.

A8: Regression results for income groups

	Dependent variable is log GDP per capita			
	Low income	Lower middle income	Upper middle income	High income
agriGAP	-0.00115	-0.00159	-0.00471**	-0.0199***
	(0.000967)	(0.00373)	(0.00224)	(0.00495)
gini_disp	-0.0171	0.0277	0.0272***	0.00247
	(0.0123)	(0.0163)	(0.00878)	(0.00673)
unemploy_total	-0.0161	-0.0164	-0.0178**	-0.0150***
	(0.0148)	(0.0100)	(0.00668)	(0.00154)
tax_IncProf	0.00221	0.00235	1.00e-04	0.00187*
	(0.00299)	(0.00234)	(0.00143)	(0.000970)
tax_revenue	0.0467***	0.0117*	-0.00638	-0.000539
	(0.0105)	(0.00630)	(0.00384)	(0.00125)
mortality	0.00167	-0.00662*	-0.0166***	-0.0717***
	(0.00277)	(0.00337)	(0.00264)	(0.00581)
Constant	7.283***	7.365***	8.796***	10.57***
	(0.482)	(0.833)	(0.350)	(0.214)
Controls included	yes	yes	yes	yes
Country FE	yes	yes	yes	yes
Observations	111	416	514	837
R-squared	0.626	0.756	0.750	0.899
F-Statistic	384.46	27.56	17.99	56.31
Number of countryID	12	27	30	37

Note: Robust standard errors in parentheses. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

A9: Regression results for regional groups

	Dependent variable is log GDP per capita			
	Europe & Central Asia	Sub-Saharan Africa	Latin America & Caribbean	East Asia & Pacific
agriGAP	-0.00521	-0.00494**	-0.00234	-0.00649
	(0.00489)	(0.00187)	(0.00139)	(0.00796)
gini_disp	0.0159**	0.0279	0.00239	0.0263
	(0.00692)	(0.0165)	(0.00937)	(0.0246)
unemploy_total	-0.0200***	-0.0148*	-0.00540	-0.0126
	(0.00267)	(0.00711)	(0.00850)	(0.0118)
tax_IncProf	0.00166	-0.000720	0.0112***	0.00459
	(0.00194)	(0.00387)	(0.00154)	(0.00289)
tax_revenue	-0.00137	0.0103**	0.00928	7.06e-05
	(0.00281)	(0.00468)	(0.00617)	(0.00868)
mortality	-0.0285***	0.000532	-0.00570**	-0.0146***
	(0.00578)	(0.00312)	(0.00238)	(0.00232)
Constant	9.661***	6.846***	8.792***	8.428***
	(0.284)	(0.709)	(0.447)	(1.115)
Controls included	yes	yes	yes	yes
Coutnry FE	yes	yes	yes	yes
Observations	867	223	304	254
R-squared	0.826	0.573	0.763	0.804
F-Statistic	60.21	56.71	159.84	2780.09
Number of countryID	41	21	16	14

Note: Robust standard errors in parentheses. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

**A10: Regression results for the full and mediated models**

	Dependent variable is log GDP per capita		
	Pooled OLS (5)	FE (4)	FE mediated (6)
agriGAP	-0.0228***	-0.00645**	-0.0378***
	(0.00131)	(0.00254)	(0.0143)
gini_disp	-0.0160***	0.0158**	0.00463
	(0.00126)	(0.00711)	(0.00769)
c.agriGAP#c.gini_disp			0.000734**
			(0.000303)
unemploy_total	0.00290	-0.0197***	-0.0186***
	(0.00198)	(0.00294)	(0.00292)
tax_IncProf	0.0157***	0.00148	0.00174
	(0.000621)	(0.00125)	(0.00119)
tax_revenue	0.00870***	0.00247	0.00307
	(0.00156)	(0.00271)	(0.00265)
mortality	-0.0205***	-0.00771***	-0.00776***
	(0.000682)	(0.00217)	(0.00211)
Constant	10.15***	8.911***	9.309***
	(0.0626)	(0.285)	(0.316)
Controls included	yes	yes	yes
Country FE	no	yes	yes
Observations	1,878	1,878	1,878
R-squared	0.835	0.668	0.680
F-Statistic	764.52	37.62	37.95
Number of countryID		106	106

Note: Robust standard errors in parentheses. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

A11: Agricultural transformation and industry employment
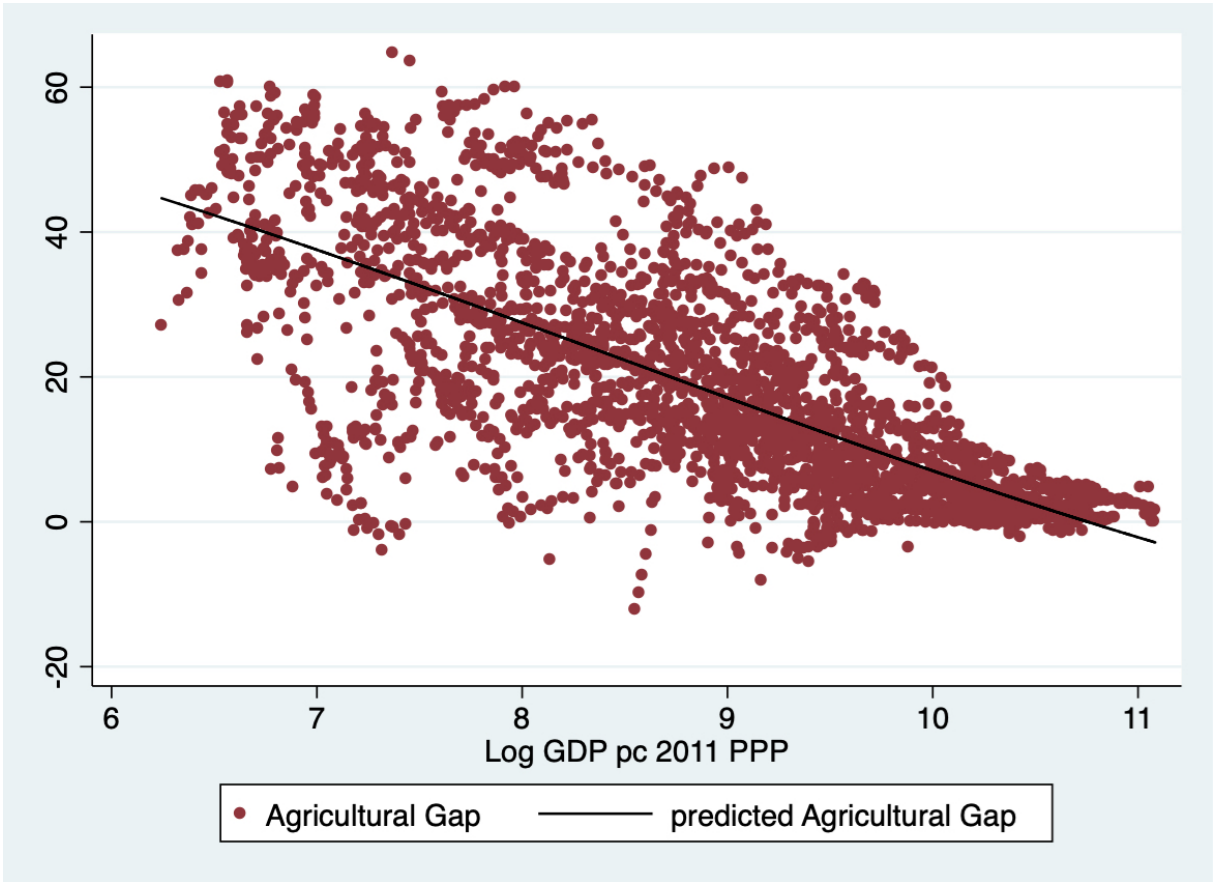
A12: Taxes development for regional groups and full sample

x
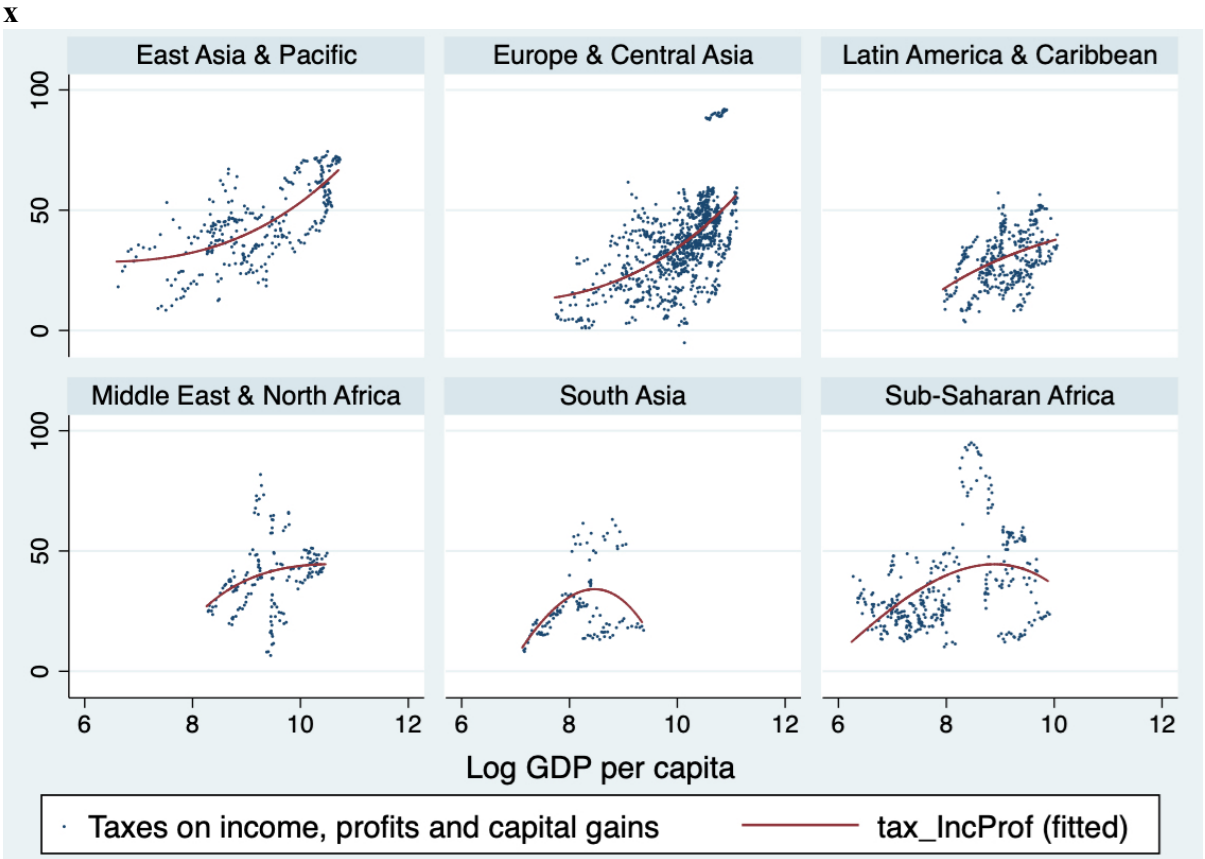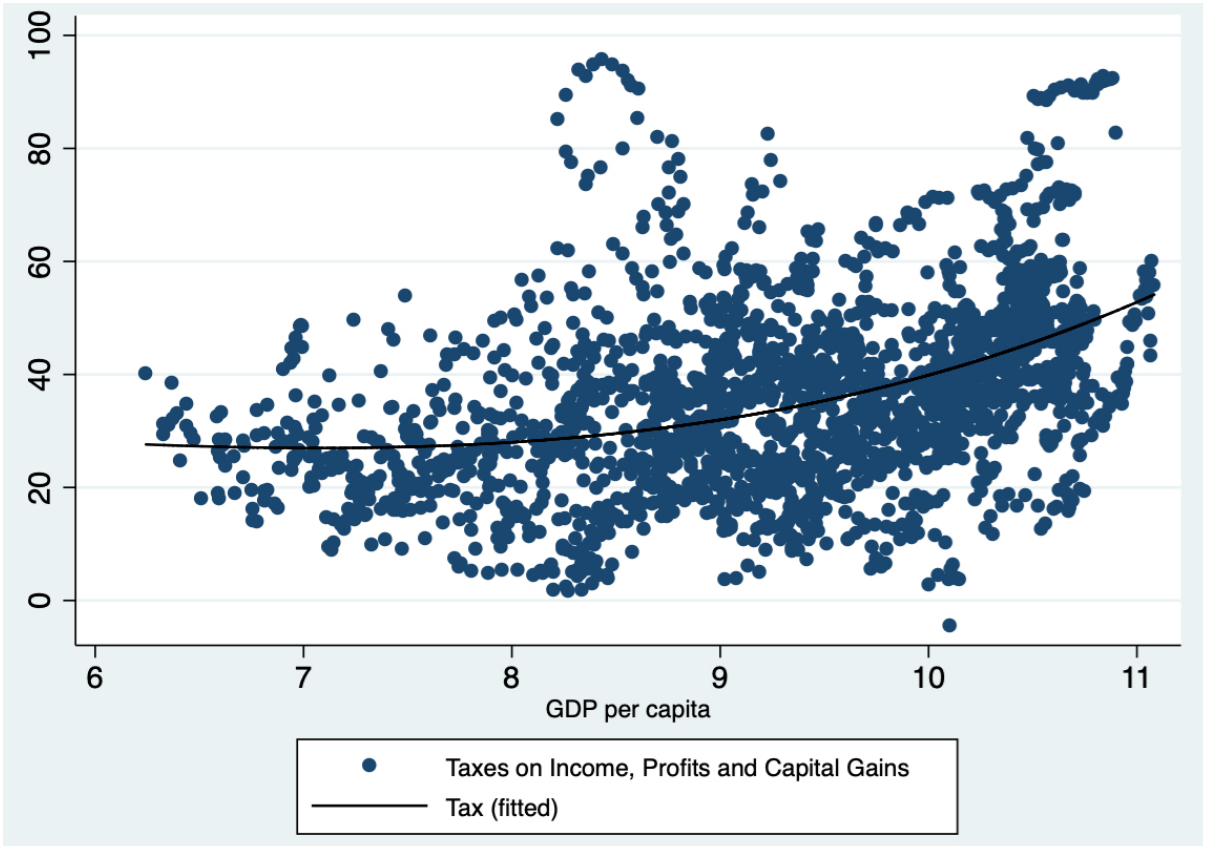
i The classification into *Old Structuralists*, *Development Economists*, *Innovations Economists* and *New Structuralists* is itself a strong and in many respects misleading simplification and is based solely on the author's perception. On the one hand, many economists were active both in the fields of development and innovation. On the other hand, the terms "old" and "new" suggest a temporal component that is not necessarily assumed. The theoretical inspiration for the classification is the consideration of the techniques of economic analysis (Schumpeter, page 12-25).