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<u>The dynamics of migrants' economic development (access to wealth)</u>

<u>in the 'arrival city' area of Accra, Ghana.</u>

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Master Thesis

Globalization, Migration and Development

Human Geography

Radboud University, Nijmegen

June 2019

Student number: s1011623

Number of words: 28000

Summary

Background

This thesis is an attempt to shed some light on the process of migrants' arrival to a city. Coming mostly from rural areas, migrants all over the world settle down in established or emerging cities. However, this is hardly ever a finished process. 'The arrival' is constructed and maintained over years, shaping lives of migrants and the condition of the city as well.

Doug Saunders (2011) described this process, focusing on how migrants' stories are being intertwined with the creation of a so-called 'arrival city'. Author argues that an arrival city, being a destination area within the main city pays a crucial role in modern cities. Migrants, according to Saunders, often show a remarkable degree of agency and self-organisation, actively creating their neighbourhoods, labour structures, systems of self-governance and support. Arrival cities are vivid, densely populated areas which allow information to spread quickly and let opportunities emerge. Because of these features, arrival cities are usually far from what modern economies perceive as urban areas – they seem chaotic, impoverished and unsafe.

Saunders argues that the success or failure of an arrival city depends largely on municipality's assistance and investments. Resilient, self-governing structures are already there, thanks to migrant's agency and efforts. However, that is not enough for creating a prosperous neighbourhood without proper roads, electricity, sewage, education or transport. In other words – without access to means of increasing migrants' capabilities.

The idea of capabilities as possible elements of livelihoods was first formulated by Amartya Sen (1999). In his novel approach to development, Sen proves that development is in fact an ability, not necessarily a measured outcome of developmental works. In other words, development is freedom to decide what, how and when to do with one's lives. In numerous examples Sen shows that especially in the Global South people often lack certain freedoms – he calls these elements instrumental freedoms. By increasing people's capabilities, possible set of life choices, people exercise their freedom to follow values and lifestyle they have reasons to cherish.

This thesis focuses only on one of these instrumental freedoms, namely economic freedom. A possibility of increasing economic capabilities is one of the main drivers leading migrants to cities all over the world. Often deprived of any job opportunities in rural areas, families or individuals try to improve their financial situation and create sustainable livelihoods in the city. However, according to Sen, elements of development are intertwined and improving capabilities in one area (income, for instance) improves other areas as well (education of children, for example).

If to combine this theory with Saunders's understanding of an arrival city it shows that migrants aim at build their resilience and capabilities to a point when they can eventually leave the slum area of the arrival city. But do they? This research focuses on reconstructing migrants' wealth accumulation progress over the years. Often, financial situation betters to a point where after some time arrival city dwellers may leave. The goal, according to Saunders, is always to leave (or change) the arrival city for something better. It may take place in the first or second generation. However, when arrival cities become prosperous, integrated parts of town, sometimes families stay for good, gaining more influential position and thriving.

This thesis focuses on migrants present in the arrival city. Their choices and aspirations stay in the' black box' of individual stories while the research focuses solely on measuring qualitatively whether

people's wealth really accumulates in the arrival city. For that reason, Piketty's concepts (2014) of capital are introduced. The main differentiation takes place between income and wealth. This work aims at measuring both and trying to outline their interdependencies. Nevertheless, following Piketty it is argued that wealth (access to capital) has more profound impact on migrants' lives than only their income. One reason for it is that wealth can be reinvested and then it is subjected to exponential growth - the base of further growth is being constantly inflated by current growth and eventually it leads to very high gains over time. Income does not have this quality; it is always a function of economic conditions on a larger scale and of the growth of economy itself.

Moreover, according to Piketty, return from capital (wealth) is always larger than the growth of the economy in the long run (2014). These concepts are also examined in this thesis – especially the rate of migrants' wealth accumulation. The rate of migrants' wealth accumulation can help to better understand the dynamics of development in the arrival city and is in fact bridging the spatial theory of Saunders with the developmental approach of Sen.

The location chosen for the research is an established and quite developed slum area of Nima in Ghanaian capital city, Accra. There are numerous reasons for that. One of them is that African cities are subject to rapid urbanisation and from the societal relevance point of view it might be useful to deliver more research on the arrival cities in the areas developing the quickest. The reason for choosing Nima itself is its established position in the heart of Accra. Formed over 7 decades ago, Nima experienced crucial investments with sewage system, electricity and paved roads being in place. If to compare with Saunders's theory, it's an example of an area which has all the elements important to thrive as an arrival city. Hence, this is a model environment to measure whether arrival city actually 'works' when it comes to increasing migrants' capabilities in the area of economic freedoms.

Research objective

The goal of this research is to measure whether migrants' wealth levels have increased or decreased over the years lived in Nima; what is the pace and dynamics of this growth within Nima and whether it is significantly faster or slower than the growth of the bigger city (Accra) itself.

Secondly, these measurements would provide insight with which Saunders's concept of an arrival city could be juxtaposed to examine whether the assumptions of the theory are reflected in empirical research.

The aim of this research is:

to qualitatively examine migrants' wealth accumulation processes taking place in the arrival area of Nima; the outcome would provide insight into whether the arrival city's structure provides opportunities for increasing migrant's capabilities in the field of economic freedoms.

Methodology

This thesis uses mixed research methods to reach its goals however, it largely focuses on qualitative methods.

First of all, surveys are being used to obtain information about Nima's first generation inhabitants. There is room for a short comment from the participants and that is the only qualitative part of the research, albeit very insightful.

The rest of data collected varies from personal details to the insight into the length of stay and conditions in Nima. Surveys are also designed to gain data for calculating the International Wealth Index (IWI) score for a sample of 100 migrants. IWI is a novel and universal tool to measure wealth levels in the Global South. It is designed in a flexible way which allows to compare information gathered across different economic contexts and locations.

Moreover, system dynamics tools and terminology are being applied in order to analyse the outcome of the data collection phase. System dynamics was designed to show the behaviour of systems over time and it seemed to provide the most accurate set of tools to measure wealth accumulation in a system such as an arrival city over a certain period of time. What that means in practice is that the conceptual model for this thesis is presented in a form of a causal-loop diagram (Sterman, 2000), a basic qualitative tool of system dynamics. Causal links between chosen variables drive the behaviour of the whole system presenting a certain behaviour which can be juxtaposed with empirical data in order to prove or disprove chosen elements of the theoretical background.

The causal links between variables are assumed in the conceptual model however, the strength of correlations between respective variables is examined using linear regression. Depending on the outcome of this analysis, conceptual model is updated.

Research results

Data was obtained from over a hundred of participants and IWI levels were calculated for each of them for three different moments. The first one was the pre-arrival IWI level (insightful for comparisons but not used in the model), then the 'IWI at arrival' score and the 'current IWI' score.

First of all, research shows a sharp decline in economic well-being levels at arrival. However, this is usually followed by a rather quick increase in well-being, especially compared with the overall Accra's score.

At the same time, IWI levels at arrival and current ones didn't have the same time range since the arrival year of the participants varied. Hence, mean values for each arrival year were taken and juxtaposed with the current IWI levels of people arriving in these years. That resulted in quite strong relation and a salient graphic pattern which became this thesis's 'reference mode' (Sterman, 2000) – a reference behaviour which was ought to be explained by the updated conceptual model.

Further analysis led to creating of an updated conceptual causal-loop diagram. Initial assumption of this thesis was that the conceptual model reflects a behaviour called an 's-shaped growth' (Sterman, 2000) with one loop reinforcing the driving behaviour of the system and the other one balancing it. It results in a slow initial growth, a phase of rapid incline of the slope and stabilization in the end, as reaching the carrying capacity of the environment. However, linear regression analysis of the variables showed that in fact there seems to be a different behaviour at stake, namely a 'goal seeking' behaviour. This pattern does not experience the slow initial growth phase as it grows fast from the beginning and from the start it seeks stabilization.

The reason for that could the relatively high level of Nima's development as an arrival city. With decent municipal infrastructure and jobs available, the area would allow migrants to enjoy quick wealth accumulation growth, stabilizing as it approached the city level (the assumed aspirational level of migrants).

Unfortunately, data on income could not be obtained in a way that would provide robust insight into wealth-income dynamics.

Conclusions

Drop in well-being at the very beginning of the arrival process suggests most of the migrants have relatively good living conditions in their places of origin however, these livelihoods are not sustainable. In other words, conditions in the home villages or towns are quite good, usually in family houses. Still, there are no job opportunities there and many people feel forced to leave hometowns and build their future elsewhere.

From that point, there is a strong pattern of growth of wealth in Nima. The newly built economic well-being is usually as modest as the surrounding conditions but it is quick and robust. Migrants usually reach conditions which allow them to prosper in the arrival city. This initial phase of rapid 'catching-up' dynamics stabilizes after some years and reaches a point of slow, almost stagnant stability. This usually comes at a point when first generation migrants become Nima's elderly. Still, the starting point for their children seems much more favourable than for themselves back at the time. All that suggest the 'goal seeking' behaviour of the arrival city.

Growth in Nima is much quicker than the growth of whole Accra (also measured with IWI score). That would suggest that Saunders's concept of the arrival city as a place of transformation and access is accurate. Arrival city of Nima surely is a gateway to urban life and provides opportunities accessible and inclusive, influencing migrants' economic capabilities and freedoms positively.

With scarce data on income there was no possibility to draw any major conclusions about the income/wealth dynamics.

What seems an interesting and a crucial finding is that Nima seems to have reached a certain level of organisational resilience. Because of that, the constant inflow of migrants can fit into overall growth at the spot of the curve which doesn't require initial slow growth anymore but can serve further growth immediately and seek stabilization at relatively high levels of Accra's well-being.

When speaking of the inflow, something should be said about the outflow. The arrival city concept assumes some sort of outflow of successful migrants. With research of current inhabitants only, such observations cannot be made quantitatively. However, conversations and comments suggest that the outflow covers both patterns outlined by Saunders. On one hand, some people leave for better neighbourhoods or at least their children do, gaining better education and access to the city. On the other hand, many established, quite wealthy migrants were encountered. These respondents didn't intent to leave. That, aligning with the micro-economic overview, would suggest that Nima has become an established neighbourhood, transformed and inhabited by migrants for good. In a long run it will probably 'dry up' as an arrival city and became a regular part of Accra.

Preface

Dear Reader,

Idea for this thesis came to me while I was doing my pre-Master's research in Yogyakarta, Indonesia. At that time, I started reading Doug Saunders's *Arrival City* and the concept overwhelmed me. I saw a very dynamic world of arrivals, departures, of individuality and community combined. Before, I knew that cities could change people. I've experienced it myself whenever I stayed somewhere long enough. However, I never imagined that people could reshape cities in such a systematic but still grass-root, self-governed but not chaotic, manner.

Hence, while researching it in Yogyakarta, I accidentally got to know its name – an arrival city. After thinking about it for a year, I placed it in the centre of my research in Nima, deliberately this time.

I can't say I made friends in Nima. Quantitative nature of my research made my meet a lot of people but it kept them in a distance. A few days after the data gathering was over, I could still recall their faces. When I started putting survey data in a file, I could still match some of the faces with names and details of their lives. Sadly, I knew that soon only numbers, average scores and regression lines would remain.

What I remember now are simple gestures of help offered or gratitude expressed. These small things are a solid reminder that there are life stories behind the 'goal seeking behaviour' of the final conceptual model. These stories are way more anecdotical, nuanced and vivid than any system dynamics model could ever be. They are also less elegant, clean and smooth than the slim curve of the dynamic pattern they form. That is alright. My first quantitative work only proved to me that although I'm attracted to numbers and figures, I am far more compelled by the messy, chaotic, ungraspable charm of an individual story, never fitting any theory after all. It is as if life always rebelled against theories which we try to impose on it. This is the rebellion I'm always glad to come across, even if it sometimes ruins my regression lines.

I wouldn't be able to write this thesis without people who guided me through the process. First of all, I would like to thank my supervisor, Dr Martin van der Velde for all his remarks and sense of humour which always made things seem more feasible. I would also like to thank Dr Lothar Smith and Dr Francis Jarawura for, respectively, inspiring me to go to Ghana and unravelling this fascinating country before me. I would also like to express my great gratitude to Ms Sahadatu Ali Halid, my co-researcher and translator in Nima. Not only Ms Ali Halid's help was invaluable in the context of the survey design and field work but also her engagement in the project gave me a lot of energy to go through complications on site. Last but not least, I would like to thank all the participants who devoted their time and attention to make this project work.

Dominik Formanowicz

Poznań, 16.06.2019

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Introduction

This thesis is an attempt to shed some light on the dynamics of in-migrants' economic development in a chosen urban surrounding of Accra (Awumbila, Owusu & Teye, 2014). 'Dynamics' seems to be the crucial word in this case since the content of this work is designed to show a migratory process of arriving to the city, of establishing new life there, of striving for better conditions and becoming a citizen. This dynamic process does have a starting point (arrival) but there is no explicit ending to it – only a moment in time in which migrant's progress or its lack is being captured by the researcher and his/her questions. Still, an accumulated story of multiple arrivals presented in this thesis is hoped to reveal some pattern of growth.

The main concept used to describe this story of becoming an inhabitant is the idea of an arrival city. First of all, it is a spatial concept. It evolves around an area shaped and reshaped by migrants which over time gains economic and social gravity of its own while shaping the power-relations and dynamics of the whole city (Saunders, 2011). The neighbourhoods where migrants live often get a certain reputation of being unsafe, isolated and unsuccessful. Saunders shows, based on numerous examples from all over the world, that this image is wrong to a large extent and argues that migrants create successful environment themselves however, there has to be a degree of cooperation from the state/municipality.

Arrival city's prosperity as well as its inhabitants' success is all about development. On one hand, it requires systemic investments and the creation of an inclusive environment by the local authorities, on the other hand it needs a freedom of economic and social activity of new-coming inhabitants. It is not only about supply of certain opportunities but about the freedom of migrants to take advantage of these freedoms in the way they consider relevant - in this framework new city dwellers are not 'subject' to growth but they are perceived as active actors exercising their freedoms.

That is the reason why Amartya Sen's theoretical framework is chosen in this thesis to describe development. What differentiates this concept from other approaches (Bakewell, 2008; Sachs, 2005) is the presence of a comprehensive set of 'freedoms' which have to be accessible in order to deliver the environment for growth. Stress is put not only on existence of these freedoms but even more on alleviating 'unfreedoms', always present in societies to some extent. Sen's framework describes political, social and economic factors which are inherently intertwined and influence each other. Lifting 'unfreedoms' in respective fields leads to growing capabilities of an individual or a household – this thesis choses the household perspective on the topic. Capabilities are understood as 'actual and potential' activities possible for a person at a given time (Kuklys & Robeyns, 2005, p. 9) and economically they depend on the level of development and available 'tools'.

This thesis evolves around one kind of capability, namely economic possibilities of the arrival city's dwellers. It aims to show how according to Sen's logic migrants are capable of building resilience to unfavourable life conditions by using their economic capabilities – not only by increasing wages but by accumulating capital (Piketty, 2015) and getting access to wealth (Smits & Steendijk, 2015). Often, development studies focus on income as a source of well-being. Especially more neo-liberal approaches create a certain picture where the threshold of escaping extreme poverty seems to be

appointed as a monetary goal to reach. However, as Banerjee and Duflo (2011) or Byanyima (2019) argue, development is not a one-way street and poverty seems to be a recurrent threat. This threat is persistent for individuals in the Global South despite their income but because of systemic difficulties – or 'unfreedoms'.

What seems crucial to overcoming this constant threat is not simply higher income but access to wealth accumulation. According to Piketty (2014) it is a more robust form of building economic resilience. One of main reasons for that is the fact that return from capital always exceeds economic growth – Piketty calls it the law of divergence. Although Piketty's ground-breaking book *Capital in XXI century* (2014) does not cover development issues per se, it describes in details the laws which rule wealth in capitalist societies, namely the exponential growth of reinvested capital and its role in creating a powerful middle class from historical perspective. At the same time, arrival city's author, Doug Saunders argues (2011) that urban poor always aspire to become the middle class and looks into geographical spaces where this aspiration can be realized. To compliment that, Amartya Sen describes the mechanisms of forming people's capability to achieve that goal.

To conclude, this thesis tries to show that development as defined by Amartya Sen (1999) in his ground-breaking work has its important economic dimension which is subject to laws of wealth accumulation (Piketty, 2014). Spatially, this work focuses on crucial - albeit informal - urban settlements where these laws are claimed to work most profoundly and explicitly (Saunders, 2011).

An arrival city as a system can have many diverse geographic incarnations. Saunders published his book in 2011 and already then, he claimed that traditional arrival areas in traditional migration hubs lose their position, becoming established, often gentrified parts of the city. In other words, they lose their 'surplus of opportunity' – become economically or spatially saturated and do not offer as many chances for better life as they used to. In reply to that, somehow organically, new arrival cities emerge in different parts of the world.

Many 'catching-up' economies are placed on African continent (Buhaug &Urdal, 2013; UN HABITAT, 2009, 2016) and many African states experience the phase of development called 'a demographic window of opportunity' (Lee & Mason, 2006; Van der Ven & Smits, 2011). At the same time, they vary when it comes to political and social stability, necessary to make this growth stable and sustainable. Nevertheless, all of them experience the formation of some kind of arrival cities as a part of the urbanization processes. That is why, from the methodological point of view, it seemed justified to choose one of arrival cities representing this 'new wave', forming currently on African continent.

The choice of a 'right' arrival city, the one which can make 'arrival' successful, is important in order to tell the collective story of migrants' economic development - it allows to focus on the growth and its mechanisms with a cautious assumption that an arrival city itself has 'all it takes' to enhance peoples' capabilities, unless observed otherwise.

Taking into account some established measurements of political, economic and social stability, arrival areas situated in Accra (Ghana), seem the right choice. Ghana shows stable economic growth for over two decades (Molini & Paci, 2015; Baah-Boateng, 2016) and is perceived as a country which reinvested much of it into human development (Molini & Paci, 2015). What is more, Accra covering over 16% of the country's population with most of its inhabitants being migrants (Ghana Statistical Service, 2012) is prone to have salient arrival areas. Stable macroeconomic conditions and rapid urbanisation processes suggest Ghana and Accra as places meeting initial requirements for arrival city's research.

The dynamic process of obtaining and exercising one's capabilities (Sen, 1999) requires dynamic apparatus of measurement and description. That is the reason why the following work uses system

dynamics tools. System dynamics in its premise (Forrester, 1970) was designed to describe processes which take place within a certain system and which direct its behaviour. This thesis tries to perceive an arrival city as this kind of a system within which migrants (and their households) act and exercise their freedoms according to its implicit laws – in that case mainly economic ones. Obtaining and analysing data is supposed to lead to gaining more understanding of these laws by reconstructing the dynamic process driving household's wealth accumulation over time. Hopefully, this research would allow to get quantitative insight into how arrival city's economic system allows people to realise their economic capabilities.

First, literature review is presented in regard to Saunders's concept of an arrival city (2011), Sen's capability approach (1999) and Piketty's laws of wealth accumulation (2014). The goal of that part is to focus on salient similarities of the dynamics of growth suggested by each of these authors. Next, methodology section outlies why and how quantitative methods and system dynamics tools seem to fit best for research based on these particular theories. Further in the thesis, research process is briefly described and its outcomes are being presented, followed by conclusions and recommendations.

Societal relevance

The societal relevance of this work seems two-fold. First of all, migration is largely politicized and securitised, especially in the Global North. Migration from Africa to Europe became a political topic on an unprecedented scale, often lacking substantive discussion about the patterns and consequences of migration. Despite many publications such as "African Roads to Proseperity" (Akinyoade & Gewald, 2015) showing that most inhabitants of Africa are not desperate to leave their homes and travel to Europe, this idea still stands. Thesis which shows the patterns of becoming and belonging within the African cities might help to overcome this harmful and dangerous stereotype and provide a different image of migrants as agents of change, shaping their own environment and economic future.

The other reason is more Global South-oriented. It is true that many cities in West Africa are growing very rapidly (Buhaug &Urdal, 2013; UN HABITAT, 2009, 2016) and that this growth reaches beyond planning and resource capacities of West African nation-states. This process has been a point of owe and concern of international community and development sector for quite some time. With 'resilience' and 'sustainability' being the buzzwords of development in present time, it is doubtful that without a proper knowledge, capacity building and preparation cities would be able to mitigate the shocks and transformations of becoming home to millions of new inhabitants in such a short time. From that perspective, research which is oriented towards describing the dynamic process of striving for economic stability by the city's newcomers might help municipalities design solutions and policies aimed at fostering their prosperity on one and on alleviating the existing hardships on the other hand. For instance, discovering restrictive housing practices might help local municipalities direct policies towards creating regulations which would help prevent economic exploitation in order to accelerate growth.

The truth is that migration is a controversial topic everywhere in present times, not only in the wealthy North. Showing direct, quantitative link between creating inclusive neighbourhoods and economic stability/prosperity might incentivise policy-makers to put more attention into the topic.

From that point of view, the concept of an arrival city (Saunders, 2011) is a remarkable tool of shifting common understanding of mass migration of the poor to the cities from an ongoing and unsolvable 'problem' to a chance, a unique opportunity for the whole city to gain extra economic energy and strength.

Scientific relevance

Out of three comprehensive concepts which this thesis is going to try to synthesize, two are relatively new notions which seem to need more scientific attention to be turned into full-fledged theories.

Backed up with a lot of research and multiple sources, the concept of an arrival city (2011) was delivered by Doug Saunders - a journalist, not a scholar. That obviously does not mean that it can't be scientifically novel, but in order to become established in academic world it needs to be adjusted to its standards of logic, cause and effect relationships and has to become transparent in order to examine its accountability as a possible theory.

Nevertheless, it already gained a lot of attention and became used by some scholars of this decade. Tanya Zack (2014) used it, referring to migrant settlements of Johannesburg but the concept was used more as an intuitive, umbrella term than a operationalised framework. On the other hand, Taubenböck, Kraff and Wurm (2018) conceptualise an arrival city on a global scale in a very comprehensive research however, it is conceptualised spatially but not as a dynamic process. Moore (2015) seems closest to conceptualising an arrival city quantitatively in his research of an area named *Honaria* on a Pacific island of Guadalcanal. Nevertheless, economic aspects, so salient in Saunders's work do not get enough attention there. Moreover, author admits that "the arrival city model does not sit comfortably over Honiara" (p.436) in his concluding remarks. It seems that brilliant but rather loose concepts thrown by Saunders into urbanisation playground still leaves a lot of room for scientific, especially quantitative 'check'.

This thesis is too modest of an endeavour to deliver this kind of transformation from a journalistic concept into a scientific theory. Nevertheless, it might be one of the first bricks in creating fundaments for this theory to come, especially by providing empirical, quantitative data confronting this concept with reality – weather to back it up or to prove its main assumptions wrong. There hasn't been too much scientific literature taking up this task so far probably due to a relatively short period of time since Doug Sounders' book came out in 2011. That makes research conducted through the lens of an arrival city concept even more relevant and up-to-date.

The other concept used in this thesis is the explanation of wealth accumulation and its dynamics, provided by Thomas Piketty even more recently than the work of Doug Saunders – in 2014's book *Capital in XXI century*. This publication gained a lot of attention - both praise (Solow, 2014; Ray, 2015) and criticism (Rognlie, 2014; Robertson, 2016), with Piketty's work critically addressed on highest scientific levels (Harvey ,2015). What is certain is that it has a comprehensive scientific underpinning of years of research. However, *Capital* focuses on analysis of wealth accumulation taking place in parts of the world for which such data was available from XVII century – which happen to be the countries of the Global North. Although the works of Simplice A. Asongu (2015, 2016) deserve credit for placing Piketty's concepts in the context of the South, particularly in African environment, overall less attention has been paid to using these concepts in relation to so-called developing countries in order to explain the emergence of inequalities in post-colonial societies.

Inequality will not be a theme of this thesis *per se* but Piketty's understanding of exponential accumulation of wealth is the main rationale behind the chosen methodology. In this case, linking economic notions with human geography, trying to bridge grand theory of macro-scale processes with local dynamics of a chosen arrival city seems to be a scientifically relevant project reflecting the idea of interdisciplinarity.

Another reason which renders this research relevant in a scientific way is the use of system dynamics as a part of its methodology. System dynamics, developed as a business administration tool in 1950'

by Jay W. Forrester (Forrester, 1970; Sterman, 2000) and, among others, used by the Club of Rome to provide first grand-scale climate change simulations ever conducted (Meadows et al., 1972) proved its applicability to different fields many times up to that point. Nonetheless, human geography, aside from some prominent examples, doesn't seem to be a field where system dynamics got too much attention (O'Sullivan, 2004). This thesis tries to build that bridge, too. It might seem art for art's sake but there is a very salient rationale behind it.

System dynamics as a modelling technique focused on analysing and predicting behaviour of a given system over time is a perfect tool when it comes to examining dynamics processes when quantitative data is provided – such as Piketty's theories of capital accumulation, power of societal divergence of accumulation and the dominance of return of capital over economic growth. Both, the tool (system dynamics) and the theory operate on basic notions of exponential growth and of so-called archetypes (Vennix, 1999; Sterman, 2000) of behaviour which dominate systems.

System dynamics has its own specific language and terminology and one if its basic tools are causal loop diagrams (CLDs). Not surprisingly, feedback loops also dominate the narrative of Doug Saunders and his work covering the concept of an arrival city. In fact, arrival city as depicted by Saunders is a perfect example of a system subject to feedback processes, reinforcing loops of connections and balancing behaviours of resources and space depletion.

To conclude, Saunders and Piketty tell a strikingly similar story of accumulation although the former does it spatially while the latter focuses on the economic aspects of that force. Both of them rely on terminology and tools mastered already by system dynamics and this unexpected but logic fusion of two relatively fresh conceptual frameworks might lead to insightful scientific experience aiming at providing relevant new knowledge.

Research objectives and research questions

The objective is to develop a quantitative overlook of migrant's wealth level's growth in order to examine whether the arrival city in fact gives the 'catching up' opportunity described by Saunders (2011) – in respect to a chosen neighbourhood in Accra. By achieving that, this thesis would provide a quantitative understanding of the dynamics of the arrival city's opportunities structure, particularly the speed and range of growth in respect to the carrying capacity of Accra's economic possibilities.

Research of migrants' development would be made through the lens of development as freedom (Sen, 1999), especially in terms of understanding the idea of alleviating economic 'unfreedoms' (*subquestion a*). Wealth, as described by Banerjee & Duflo (2001), can be understood as a way of taking the burden of disadvantage off the poor (releasing capabilities). Capabilities are understood as 'actual and potential' activities possible for a person at a given time (Kuklys & Robeyns, 2005, p. 9) and economically they depend on the level of development and available 'tools' which brings the topics back to Piketty. Although, capabilities are often mentioned in pair with the notion of aspirations (Nathan, 2005; Hart, 2016), the latter will not be included explicitly in the qualitative conceptualisation for reasons detailed in the operationalisation section.

When it comes to economic opportunities, Saunders suggests the 'catching up' potential of the arrival city's environment and his narrative can lead to an assumption of some kind of an s-shaped or goal seeking behaviour of material development growth (*subquestion b*) and researching that growth is one of the main reasons for using qualitative research in this thesis.

Moreover, development approached from an economic perspective reflects the idea of the so-called law of divergence (Piketty, 2014). The closing of an opportunity gap between the city level and the arrival area level, assumed by Saunders's as one of the main drivers of arrival city's success, seems a perfect area for researching this law (*subquestion c*).

When it comes to the idea of wealth itself - the starting point and the umbrella concept for further analysis, it would be measured by International Wealth Index (IWI). IWI was developed by Smits and Steendijk (2015) as a tool of comparing material well-being across different countries. Thanks to Global Data Lab, Greater Accra region's IWI is already available in details for the period of 1995-2017 (Global Data Lab, 2019) which would be this research's point of reference as an assumed carrying capacity of the area. Compared with the overall economic growth of Accra, the speed and amount of wealth accumulation can provide an understanding whether an arrival city does in fact provide more salient opportunities of gaining access to material wealth than other parts of the city overall.

The research questions are:

What are the dynamics of economic development (measured by change in International Wealth Index) of migrants settling and settled in the arrival city of Accra?

   a) How do personal income and wealth accumulation influence migrants' capabilities in alleviating 'unfreedoms' - in respect to Sen's 'development as freedom' (1999) approach?
   b) What is the dynamic of migrants' development level's growth in an 'arrival city' (Saunders, 2011), juxtaposed with Accra's development level's increase over time?
   c) How does migrants' wealth accumulation relate to Piketty's (2014) law of divergence and author's explanation of the exponential nature of capital's growth?

Theoretical Background

Arrival city: an every-man in an every-city

The idea of an arrival city was coined by Doug Saunders (2011) and expressed in his famous book from 2011. The concept focuses not on a city as a whole but on a specific area of it. The prosperity of this area is linked to the presence of migrants – often even its existence is since in some cases a new neighbourhood is being created by migrants from scratch. In other cases, they would revive and existing neighbourhood using it to develop their own belonging and prosperity. Although the agency of migrants is crucial to the concept as well as it is to this thesis, the success of the arrival city as a whole is subject to the interplay of exogenous factors such as legal recognition, municipality cooperation, access to services and the economic activity of newcomers themselves.

Arrival city is supposed to be a reflection of middle-class aspirations of its population. Middle-class access is usually expressed by certain wealth which goes in line with further conceptual aspects of this thesis. "The arrival city, if it is to function at all, must create members of a middle class: Families with enough earnings and savings to start businesses and employ others, to own and improve dwellings, to send children to university, to have a sustainable quality of life capable of moving them, and their neighbours, beyond merely surviving" (p. 143-4) Middle class is also claimed to be socially more stable and institutionally predictable (p.143).

For Saunders, what is crucial for the success of an arrival city is access to land ownership or house ownership. This particular aspect compliments other important conceptual element of this thesis, namely Amartya Sen's approach to development. In fact, as Saunders argues "it was the economist Amartya Sen who first recognized that poverty is, fundamentally, not the dearth of money or a lack of possessions or a shortage of talent or ambition but the absence of capacities—the lack of tools or opportunities needed to function as a full citizen. And in the eyes of arrival-city residents and many observers, another key to realizing these capacities lies in the full ownership of the land beneath your feet" (p. 145).

What can be claimed at that point is that the ownership of land or dwelling is an aspirational factor. It might be a goal but it rarely is the initial situation which migrants encounter when moving in the arrival city (unless they create it from scratch but still, there might be problems with official recognition, p.147-8). Often, to get to that point migrants need two or even three incomes and that makes the arrival city concept go in line with the household approach to development (Rigg, 2007). Saunders argues that it creates a situation of additional child care services necessary which creates even more jobs.

Saunders mentions many structural elements that are characteristic for an arrival city. Among other, he mentions that the arrival city "require a welfare-oriented political will" (Saunders, 2011, p.148), a structural assistance from the municipality. However, the area is often considered a poverty enclave, a no-go zone, destitute and prone to fail. Following that, "rather than getting the tools of ownership, education, security, business creation, and connection to the wider economy, they are too often treated as (…) places that need non-solutions, such as social workers, public-housing blocks, and urban-planned redevelopments" (p.147).

This is triggered by the paradox of an arrival city, one of many, but probably the most important one from the dynamic perspective. The area often looks very poor and because of low prices it attracts

poor people. However, what is not seen in a quick glance is that these poor migrants build a better life for themselves in the arrival city and then leave it, heading for 'better' neighbourhoods, more 'middle-class' and affluent. That leaves space for new-coming poor. Hence, from the outside it always looks destitute and hopeless, immune to improvement. At the same time, there is a constant flow of people striving for relative success and often finding it – and leaving. That perspective resembles the system dynamics understanding of stocks and flows where the information about the stock cannot be fully understood without including the nature of its inflows and outflows. That is the main reason why this thesis evolves around systems thinking. That is why system dynamics is being used to understand the behaviour of the system regarding migrants.

Although the concept is fascinating and insightful itself, this thesis tries to focus on migrants themselves, their process of achieving their goals or failing. That is why, as much as structural characteristics of the arrival city keep coming back further, it always does it in relation to migrants and their individual processes of establishing economic prosperity.

What creates a welcoming neighbourhood might come from the outside (municipal interventions) as well as from migrants themselves. In regard to the former, security, transport infrastructure, healthcare facilities and schools are among the most important ingredients of a successful arrival city.

When it comes to migrants' agency, density and self-organisation plays an important role. What is the worst solution for them are "low-intensity, high-division planning that forbids spontaneity" (p.154) just to recall Bijlmer in Amsterdam in 1970s (Verlaan, 2013).

"(World Bank) concluded that the most effective route to poverty reduction and economic growth is to encourage the highest possible urban population density" (Saunders, 2011, p.34-35) as long as infrastructural and investment arrangements are also provided (p.35).

Density triggers some form of self-governance. It might be legal or illegal, mob-run or community-oriented but there always some form of it emerging. "As villagers building networks of personal and economic support to create pathways into the city's central economy, [they] are not just getting by and searching for work but building full and coherent arrival cities. (p.46) However, without salient family relations on site, less sustainable, criminal activities are more likely to take place (p.52). Again, that leads back to two-income economy and can bring unexpected economic opportunities such as child care services. It seems that arrival city is more likely to bring prosperity when it is not composed of single migrants leaving their families behind but the whole families building up new, coherent future in the city. Drawing on that conclusion, this thesis aims to use household approach instead of measuring the wealth level of individuals or at least it tries to highlight the difference. What seems to add to that matter is the inclusive political framework. Migrants from afar can stay in a liminal state (Turner, 2017) for decades if they are deprived the right to register themselves, send their children to school, "afraid or unable to put their earnings into their communities, trapped in a netherworld of half-arrival, despite being active in the economy" (Saunders, 2011, p.48). Inclusive legal framework, even based on informality (Rigg, 2007), might foster bringing whole families to the arrival city.

The engine of the arrival city's economy is the rural-urban shift. Although, this division does not seem very accurate in the Global South and "rural-urban divide is becoming blurred" (Rigg, 2007, p. 86) it still reflects the direction of mobility. To help to bridge these realities, the population shift might be seen from the translocal point of view (Greiner & Sakdapolrak, 2013).

Translocality approach also might help to explain the quick growth of area's population and the fact that selected areas tend to cluster migrants from very specific origins but not from others. "Much of the suburban settlement has to do with family and village networks, which establish chain-migration

footholds in an affordable suburb, rapidly turning a small group of workers into a large and concentrated influx" (Saunders, 2011, p. 53).

What is important to understand about the arrival city and what also compliments the translocal approach is that its inhabitants are often former villagers. Less in the Global North, but more in the South they might remain both villagers and urbanites throughout their whole lives and that also influences their choices, the notion of success itself and their aspirations (Sen, 1999). For instance, sending remittances (Castles, Miller, de Haas, 2013; Kapur, 2004; de Haas, 2005) might be an important, if not determining factor influencing the levels of wealth accumulated. "The act of sending regular payments back to the rural village is central to the economies of all these neighbourhoods" (Saunders, 2011, p.47).

That triggers more questions. Remittances might diminish one's wealth accumulation levels. At the same time, it might bring prosperity to physically dispersed community one calls 'a family'. If concentrated on wealth too much, research can overlook this process of achieving freedoms by a larger, translocal community. This seems to be the same paradox as the one of simultaneous apparent poverty of the arrival city and prosperity of migrants however, in this case the process takes place on a different scale. Spatial deprivation and household prosperity at the same time, as described by Saunders (2011) in this case is reflected by individual/household wealth constraint and larger family's growing wellbeing.

'Development' meaning what?

The idea of development as freedom, outlined by Amartya Sen in his book from 1999, puts people, their capabilities and aspirations in the centre of the concept, making more room for individual agency and the interaction between an individual and their social, political and economic environment. However, it hasn't always been like that.

Development has been a word of shifting meanings since the end of World War II. Bakewell (2008) argues that in its origins the notion of development was intrinsically connected to colonial reasoning and was in fact based on colonial institutions and organisational structures. The structures which were the tools of colonial states of managing certain population would now switch to the commitment of developing these however, the same rationale of bringing prosperity to keep people in place would prevail. Development seen as a professional practice overtook the legacy of colonial rule, according to Bakewell (2008) and often "early development practitioners had transferred from colonial service" (p. 1344). It does not have to lead to negative consequences *per se* with responsibilities of wealthy nations to help others achieve prosperity. At the same time, it would replicate the division for 'developed' and 'primitive', often leading to one-sided vision of development goals and rather instrumental approach to them. What is more, this mechanism would go in line with dominant economic vision prevailing in the post-war era, namely the modernisation theory (strengthening modern sectors of economy for the traditional ones to follow) and Kuznets's idea of growth as "tide lifting all boats" (Piketty, 2014). Existing structures of development would ensure that "independent states moved firmly into the capitalist global order" (Bakewell, 2008). That phase was called the 'early optimistic one' by de Haas (2010) and lasted between 1950-1970 just as the post-war prosperity era did. It was characterised by the belief in aid, loans and remittances as the tools of development.

That approach started to change with the emergence of some critical theories, underlining the dependency of the developing countries. This dependency was supposed to be the outcome of an over-simplistic and overoptimistic approach of the modernisation theory. Some authors stressed dual (at least) nature of capitalist growth and uneven proportions of actual gains, especially in regard to international migration (Piore, 1979; Wallerstein, 1974). Others focused on inequality, imperialism and

colonialism as well as xenophobia and racism which would uphold the former (Samers & Collyer, 2017). This created a rather pessimistic approach to development which lasted for another twenty years and was characterised by the saliency of so called brain drain, local inequalities, remittances spent on consumption and a vision of permanent dependency on aid.

Over time, the ideas of new economics paradigm (Massey, 1993, 1998; Stark, 1991; Goss & Linquist, 1995) and transnationalism (Portes, 1999; Vertovec, 1999) became more visible and appreciated (Samers & Collyer, 2017; Castles, de Haas, Miller, 2013). Notions of 'development from below' gained more attention and the role of migrants as the actors of change again became more appreciated. Especially remittances, which became a profound tool of transferring wealth from the developed to the developing countries became the 'new mantra of development' (Kapur, 2004) and seemed to 'solve the problem' of development, meant to replace the aid structures. Still, a rather simplistic and instrumental approach to the developing countries and migrants prevailed, this time reflecting the neo-liberal sentiments of the globalized economies – as if levelling the inequalities and solving the problems of underdevelopment was supposed to become the sole responsibility of individuals in these countries and of migrants coming from there, often neglecting the role of nation-states as the organisational structures of these countries. With the growing securitisation of international migration (Samers & Collyer, 2017) it created a dichotomy of development by migrants with simultaneous attempts to keep the developing countries populations put (Nyberg-Sorensen, 2012).

In the light of these approaches, often formed and developed within the discourse of the Global North, Amartya Sen's approach of development as freedom stands out as the one focusing on individual (or collective) freedoms of people (1999). Although these freedoms include freedom of mobility, Sen does not focus on migrants but on inhabitants of the Global South as a whole, weather they wish to migrate or not.

What is 'development' in Amartya Sen's reasoning? It is "a process of expanding human freedoms, and the assessment of development has to be informed by this consideration" (p.36) To clarify that, the notion of freedoms has to be explained as well. Sen defines it as "access the goods and instruments which allow people to expand their 'capabilities' to lead the kind of lives they have a reason to value (p. 18).

What is novel in Sen's approach is that he recognises two kinds of freedoms referring to roles they play in human lives. The first role is a 'constitutive' one and it has to do with the "importance of substantive freedom in enriching human life" (p.36). In other words, it is the value that freedom has *per se* and has little to do with how it complements the process of development. A person has or doesn't have a choice in certain circumstances and the sole fact of having a choice is constitutive to a person's identity as an individual. Kuklys and Robeyns (2005) call it an "intrinsic value of choice" (p.14) in Sen's work.

The other role of freedom is the one called 'instrumental' by the author. It relates to the argument that "freedoms and rights may be *also* effective in contributing to economic progress" (p.37). Enhancing these freedoms increases people's capabilities to live lives they have reasons to value (p.18). That influences their agency – it creates a sense of meaning in striving for a better life. This process inevitably leads to enhancing the level of development – the one chosen by a person/community. Drawing on that, the level of development leads to increasing capabilities. That creates a reinforcing loop of increasing development by capabilities, eventually leading to more capabilities and so on. This very mechanism is the base of this thesis conceptual model and will be illustrated further on.

Sen argues that there is a set of instrumental (p. 38) freedoms which presence sums up to creating an environment for development. The state of poverty and underdevelopment would be characterised

by the lack of some of these freedoms, which the author called 'unfreedoms'. Generally speaking, fields of interest where freedoms are present (or absent) are:

- political freedoms,
- economic facilities,
- social opportunities,
- transparency guarantees,
- protective security.

It goes without saying that these are intrinsically intertwined and often one cannot go without the other. To give an example, Sen mentions that famines in modern history took place only in undemocratic counties (p.160). Although famine itself takes place due to the lack of economic facilities, transparency guarantees have great impact of stopping the famine for instance because of critical journalists being able to cover them. On the other hand, protective security of welfare mechanisms and benefits keep famines of occurring or at least are designed to. Political freedoms of voting against the government are an important tool of changing the current situation and fostering development. Here, Sen mentions the example of the Congress party losing power in India after introducing a very controversial state of emergency in 1970s.

To conclude, all of these instrumental freedoms foster each other and protect each other in developed societies. Thus, all of them need to be present simultaneously to enable development. That is why Sen's approach is different from, for instance, neo-liberal development ideas where individuals are responsible for themselves and where the focus is placed on state's economic growth, often overlooking the institutional structure.

Insightful definitions of Amartya Sen are definitely worth explaining but not all of them contribute explicitly to the content of this work. This thesis focuses on the economic freedoms because they are linked to economic processes described by Piketty (2014) as well to the assumed prosperity (or its lack) of the arrival city (Saunders, 2011).

What has to be clearly defined is the fact that economic freedoms do not mean economic situation as measured by GDP. This is an important distinction. Development as the ability to produce 'whatever', in largest possible quantities and without any reason apart from accountant values (which characterises the GDP logic; Schepelmann et al., 2010, p.51) is the one which Sen seems to reject. In Sen's reasoning, economic freedoms are the opportunities that allow people to "utilize economic resources for the purpose of consumption, or production, or exchange" (Sen, 1999, p.38-39). What is crucial from this point of view is the distributional context which maximizes or minimizes these opportunities. For instance, access to finance (which Sen worked on for a long time due to his contribution to microfinancing tool's development) might foster or stem distributional processes.

"As the process of economic development increases the income and wealth, they are reflected in corresponding enhancement of economic entitlements of the people" (p.39). Another characteristic of Sen's definition of economic freedoms is the distinction between income and wealth.

Often, public opinion gets confused with the development optimism provided by data reporting the growth of salaries, especially beyond the threshold of 1.90$, established by the World Bank as the poverty line. What this overlooks is the fact that poverty often means the lack of access to resources enabling person to accumulate income, to make economic decisions and, more importantly (Banerjee & Duflo, 2011) plan her economic future. Sen (1999) addresses that: "economic entitlements that a person has will depend on the resources owned or available to use as well as on conditions of exchange" (p. 39).

Again, the difference between GDP logic and Sen's logic is that economic growth mantra introduces the understanding by which growth is unlimited and seems to take place in unconstrained reality.

Banerjee and Duflo (2011) link that logic with the 'supply' side of developmental discourse. They claim that there are two rationales in development studies and they shape the whole spectrum of practices from education, economic access to basic needs coverage, housing and gender roles. The 'supply' side argues that developing countries need tools and that the solution is in providing these tools (Sachs, 2005). The 'demand' side argues that there are systemic constrains which render some of the tools useless because there is no demand for them or even if there is, there are other factors at play which make the use of these tools ineffective in the end (Banerjee & Dulfo, 2011; Easterly, 2006). This second approach puts stress on removing these constrains or making the forces influencing them work differently.

Sen's logic seems to reflect this second (demand) approach by introducing the idea of 'unfreedoms'. The lack of any of the instrumental freedoms is not simply its absence but it creates the state of constraint which 'puts constant pressure on poor peoples' shoulders' (Shah et al., 2012) – in a long run it even 'impedes their cognitive functions' (Mani et al., 2013).

For instance, if poor people are exposed to too many (economic, political, environmental) risks to plan and assume their future as secure, it creates an urge to diversify the risks. From this point of view, sending only one child to school seems enough. Livelihoods approach (de Haan, 2012), although refers to migration can just as well refer to *mobility* overall (Urry, 2007), which also means social mobility. One educated child can access different sort of income but if education is all about income and mitigating risks, there is no reason to send other children to school. Unless this reasoning is overcome, more schools' availability (supply side) would not foster development much.

That is why addressing the existing state of unfreedom, instead of simply giving direct 'tools' of development, seems more urgent and realistic in Sen's or Banerjee & Duflo's approach to development. This nuance is important for this upcoming research because it can provide deeper understanding of the processes taking place in the arrival city.

Wealth accumulation as the expansion of economic freedom

Sen does not mention explicitly how 'resources owned and available' (wealth and income) differ when it comes to economic opportunities – which means exercising economic freedoms. In this thesis it is argued that with the state of unfreedom (meaning some kind of 'pressure' stemming opportunities) being the default one, wealth provides more economic means of overcoming this state and income is less inclined to do so.

This claim comes from Piketty's law of divergence (2011) which author claims to be the main force of capitalism, creating opportunities but at the same time leading automatically to deepening inequalities.

This basic law is presented in a simple formula of *r > g* which means:

return on capital > current economic growth

That simple law has profound consequences for inequality forming and differentiates between those who have access to capital and those who do not. For instance, Piketty argues that a regular return on housing property over a long run oscillates around 4-5% per year. At the same time developed economy creates only 1-2% growth. That is why people who have their own houses or can even rent

out one house (or one room at least, etc.) have a way more robust tool of economic access and of exercising their economic freedom than those who have to spend their disposable income on housing – earning in 1-2% economy but contributing to someone else's 4-5% growth.

Piketty's data and conclusions are not so thorough when it comes to the Global South and author admits that himself. However, he also argues that catching up economies tend to have the highest growth. That was the case of post-war Europe catching up with USA and it seems to be the case of many developing countries including Ghana. Its recent growth of around 8% per year (World Bank, 2019) creates more opportunities to yield on income itself and get access to economic opportunities solely on wage. Still, the rule of $r > g$ is an intrinsic characteristic of capitalist system according to Piketty so return on capital still tends to be higher than even the highest economic growth. If the contrary was possible, capital would lose its importance and it would be more attractive for people to spend and consume than to invest. Although, in catching up economies, capital has lower *relative* importance than in developed, established economies, it still is the driving force of stability of economic inclusion – something that according to Byanyima, Banerjee and Duflo and Sen, poor people lack.

Piketty often mentions the role of exponential growth which capital establishes. Capital once invested creates profit which can be reinvested, summing up to the core asset. On the contrary, when it comes to income, it grows in a linear way, without any contribution to the strength of growth itself. In other words, income simply sums up but capital reinvested reinforces the mechanism of accumulation. The nature of exponential growth determines that the beginning of it seems modest but growth gains momentum and the slope of the increase quickly achieves the point where growth 'shoots up', becoming a powerful force, eventually stabilizing at some point when reaching its carrying capacity.

Dynamic behaviour and International Wealth Index

This dynamic pattern links economic growth described by Piketty with Doug Saunders's logic of an arrival city. What is more, it seems to reflect Sen's logic of freedoms and Banerjee & Duflo's approach to alleviating poverty. The reason for that is that freedoms are intertwined – when there is a lack of them, they stay stagnantly low. However, when freedoms grow, they reinforce each other's growth simply because they are interconnected and growth of one contributes to the growth of the other - which again, contributes to the growth of the former.

Following this reasoning, each author seems to tell a similar story of exponential growth ended by reaching some level of carrying capacity provided by the local environment. Saunders (2011) refers to spatial/urban growth. Piketty (2014) refers to wealth. Amartya Sen (1999) and other authors elaborate on the reinforcing, intertwined nature of development growth. Each of these rationales reflects an archetype (Sterman, 2000) called an s-shaped growth or a similar growth limited with environmental restrictions. Even though uniting these concepts in an operationalized model and creating a 'theory of everything' is definitely not the aim of this thesis, the shared behaviour of each 'system' might help the reader to grasp the nature of the processes described.

Below, the typical pattern of s-shaped growth is illustrated in its default form (Figure 1, on the left). On the right, it is supposed to reflect the 'demand' version of Amartya Sen. The difference is the fact that on the right side diagram there is a counter-force which keeps the growth down. One could call it the state of unfreedom.
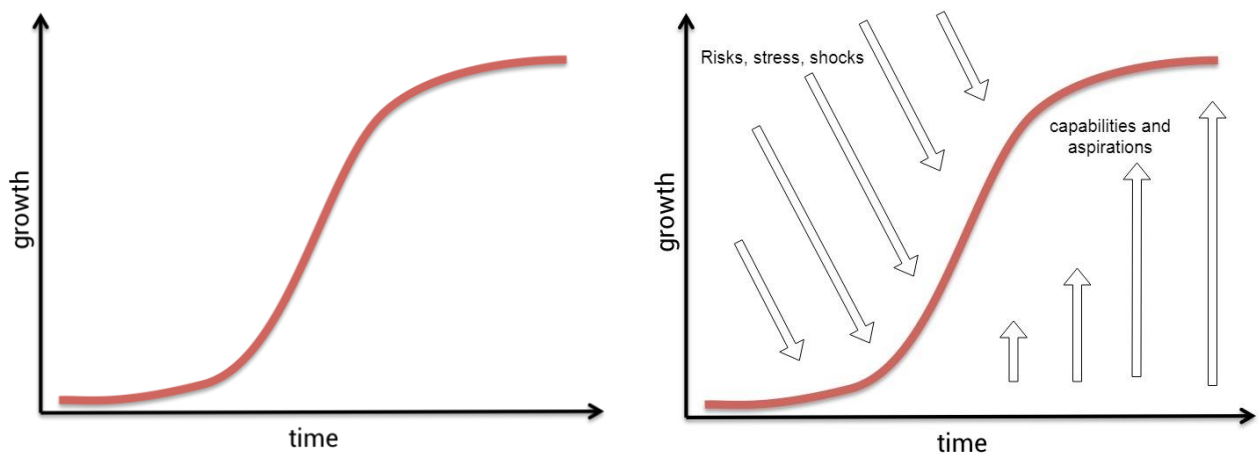
Figure 1 Exponential growth in the context of unfreedoms

This difference is not only an aesthetic one – it determines the conceptualization of the model. The quantitative conceptual model will be measured mainly with IWI – International Wealth Index (Smits & Steendijk, 2015). It consists of various factors which determine person's (households') wealth level. For instance, it mentions the quality of water in the house. This is consistent with the diagram on the right (above) since access to low quality water expressed the lack of sanitation and health protection. This is exactly the kind of constant pressure (stress) which keeps the unfreedom present in person's life. It does not influence economic freedom directly but health condition influences the ability to pursue goal, to predict expenses (medicine) or the everyday state of physical ability to work (Banerjee & Duflo, 2011).

From the point of view of 'resistance' against omnipresent unfreedom using IWI has significant meaning and fits perfectly the narrative of Banerjee and Duflo. Authors claim that changing conditions can release many forms of activity, perhaps more than the tools given. For instance, presence of a fridge can create savings by not wasting food. Possession of a bicycle can enhance work ability or reduce transport costs. To conclude, minor improvements which seem irrelevant from intuitive wealth accumulation perspective, gain much weight when it comes to reducing unfreedoms. What is more, since the instrumental freedoms (Sen, 1999) are interconnected and complement each other, it is subject to exponential growth of freedoms (development) although it is harder to capture by quantitative, monetary measures.

Operationalization. Capabilities and aspirations dilemma.

The goal of the research is to tell a collective story of migrants' economic development. Because of that, operationalization focuses on providing measurements for understanding migrants' perspective on the process.

The boundaries of the operationalisation reflect the situation where migrants' household in a fast-growing city of Accra is subject to the dynamic of an arrival city (Saunders, 2011), experiences economic unfreedoms (Sen, 1999) and builds (or not) resilience (Banerje & Dulfo, 2011) by accumulating wealth (Piketty, 2014).

The spatial 'stage' of creating the model for this thesis is an arrival city in Accra – both spatially and theoretically, seen through the lens of the work of Doug Saunders (2011).

In-migrants from outside of the city are the focal point of the research. Since there is no possibility to conduct a time series research, wealth and disposable income of migrants at different points of migration process would be taken as presenting one shift in migratory experience.

Current economic (wealth) situation is measured quantitatively with stress put on calculating person's IWI (Smits & Steendijk, 2015). Period of 1 to (more less) 25 years also reflects the IWI data already available for Accra between 1995 and 2017 (Global Data Lab, 2019). Available data would confirm or deny the relevance of the conceptual causal loop diagram (Sen, 1999; Sterman, 2000).
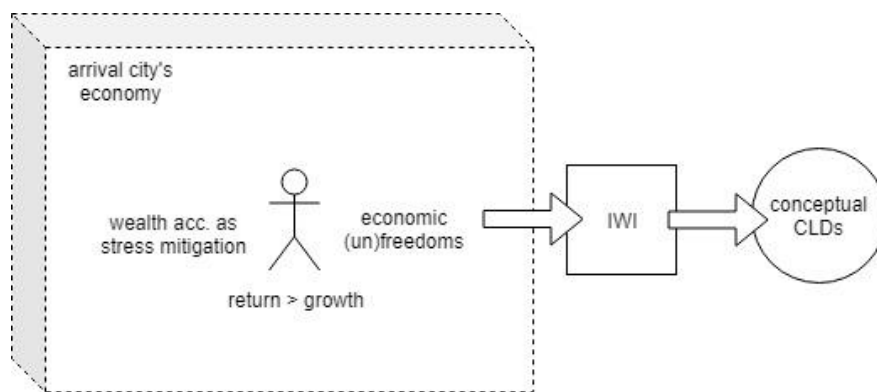

Figure 2 Operationalization scheme

The scheme above (Figure 2) presents the factors taken into account in the research process. Wealth accumulation which drives the return-on-capital dynamics alleviates economic unfreedoms, according to theory. The 'stage' for this process is the arrival city's economy. In this thesis, this process is quantified into IWI score of individual migrants and its change over time is measured. Next, the results of IWI assessment are juxtaposed with the conceptual model presented below. Finally, the model is updated according to research's findings.

The conceptual model is described as a causal loop diagram (CLD), created according to system dynamics terminology (Sterman, 2000). Although system dynamics uses both CLDs and stock and flow diagrams (SFD), creating the latter is not the aim of this thesis.

The conceptual CLD shows two loops, a reinforcing one and a balancing one (limiting the first one with the given environment's carrying capacity) which are intertwined and influence each other's behaviour. This kind of two-loop mechanism often reflects the behaviour of the system called 's-shaped growth' and if this CLD can be quantitatively confirmed, it would probably reflect this very behaviour which goes in line with the theoretical background (Saunders, 2011; Piketty, 2014; Sen, 1999; Banerjee & Duflo, 2011).

To make the conceptual CLD understandable, some theoretical notions need to be conceptualized. Sen builds his notion of development around "*functionings* and *capabilities*, which are defined as an individual's actual and potential activities and states of being respectively" (Kuklys & Robeyns, 2005, p. 9) According to Kuklys and Robeyns (2005, p.16) in capabilities approach "subject to her budget constraint, an individual chooses the basket of goods which maximises her satisfaction or pleasure". This 'budget constraint' seems important from the point of view of shaping economic choices and capabilities. To operationalise this, disposable income (income - costs) would be used and compared to overall household income to provide a ratio of these two. By forming a ratio, absolute differences

in income would be flattened. One argument of critics might be that more absolute disposable income means more capabilities even if the ratio of disposable income is lower. That is true to some extent however at the same time, higher monetary income is usually quickly caught up with higher level of wealth obtained. On this higher level, things tend to cost more (for instance, a car compared to a bike) so a cautious assumption would be formulated that the ratio of disposable income is of more interest from capabilities point view than the absolute monetary income. What is also an advantage of using a ratio is a possibility to simplify the picture by omitting inflation effect, necessary to take into account if sheer monetary value is used.

Aspirations often mentioned along with capabilities relating to 'development as freedom' approach are deliberately omitted in the conceptual model for three reasons.

First of all, aspirations are directly linked with capabilities and to a large extend remain a function of them (Nathan, 2005; Hart, 2016). As Nathan claims, "'the capacity to aspire' (…) is not evenly distributed among groups. (…) The capacity to aspire depends on existing capabilities and practices" (Nathan, 2005, p.36). That statement, backed with the reading of original Sen's works leads to an assumption of a causal relation between capabilities and aspirations. "Thinking about future-oriented goals requires at least a basic level of capability in relation to being able to anticipate and imagine the future and exercise practical reason" (Hart, 2016, p.327). As a function of capabilities, aspiration become less insightful for the model than capabilities.

At the same time, most of the literature relates to aspirations in a rather abstract manner. Hart (2016), drawing on Sen's ideas, outlines different kinds of aspirations: conflicting, guided, shared and individual (p.326), depending on a degree of individual agency and creating a comprehensive but rather unquantifiable image.

The second reason of omitting aspirations is the fact that in an arrival city concept, aspirations are already rather fixed by 'middle class' ambitions of the poor inscribed in it – an assumed desire to become legitimate inhabitants of the city which often is an ambitious task itself (Saunders, 2011). That paves way for an assumption that aspirational levels of rural migrants can be reflected by overall development levels of the greater city – in that case Greater Accra region which consists of the city of Accra in 90.5% according to 2012 census (Ghana Statistic Sercive, 2012).

Hart (2016) seems to provide another argument claiming that some aspirations are less individual than others, "often born out of unequal power relations" leading to attempts to "suit perceived expectations of normalcy and acceptability" (p.327). This desire to 'suit' would suggest a fixed level of aspirations and their exogenous nature. This, consequently, goes in line with the exogenous nature of city's development level in regard to the arrival area's concept. Similarly, this thesis assumes exponential growth of material development which eventually leads to reaching its carrying capacity. Sterman's (2000) prevalent models of this kind of growth include exogenous nature of carrying capacity. In regard to Accra's arrival city, its equivalent would be Accra's level of development (IWI), given over the period of over 20 years by Global Data Lab (2019).

The third reason is the feasibility of the quantified model. In a thriving environment and hopeful times, carrying capacity of aspirations might be overstated. In desperate times or a moment of doubt it can be understated easily.

Hence, taking Accra's IWI level as the aspirational level creates a stable point of reference for the conceptual model. It might be argued that carrying capacity (possible aspiration level) varies for people on different levels of wealth access (economic development). Still, age and accomplishments of

migrants seem to neutralise the growth of aspirations. It takes years to achieve wealth and older age stabilises the perception of what is 'left' to achieved economically.

Below, only the most robust theoretical statements were taken into account to minimize the possibility of creating vague variables, blurring the quantitative aspirations of this thesis. Development and capacities create a reinforcing loop for rural migrants which is then balanced by the carrying capacity of the environment (Accra city). The bigger the opportunity gap, though, the higher the catching up rate (Sterman, 2000; Piketty, 2014). That, again, leads to higher capabilities.

There is an obvious tension between 'collective' development of the arrival city and individual migrants' prosperity. This discrepancy is a limitation of this conceptual model and it cannot be overcome quantitively in such a modest research. At the same time, Saunders's arrival city concept is a physical 'city' only in its name. Author assesses the success (or failure) of chosen 'cities' mainly through the well-being and prosperity reached by their inhabitants. From that perspective, quantified development of individuals can, in a way, be perceived as the development of the arrival city itself.
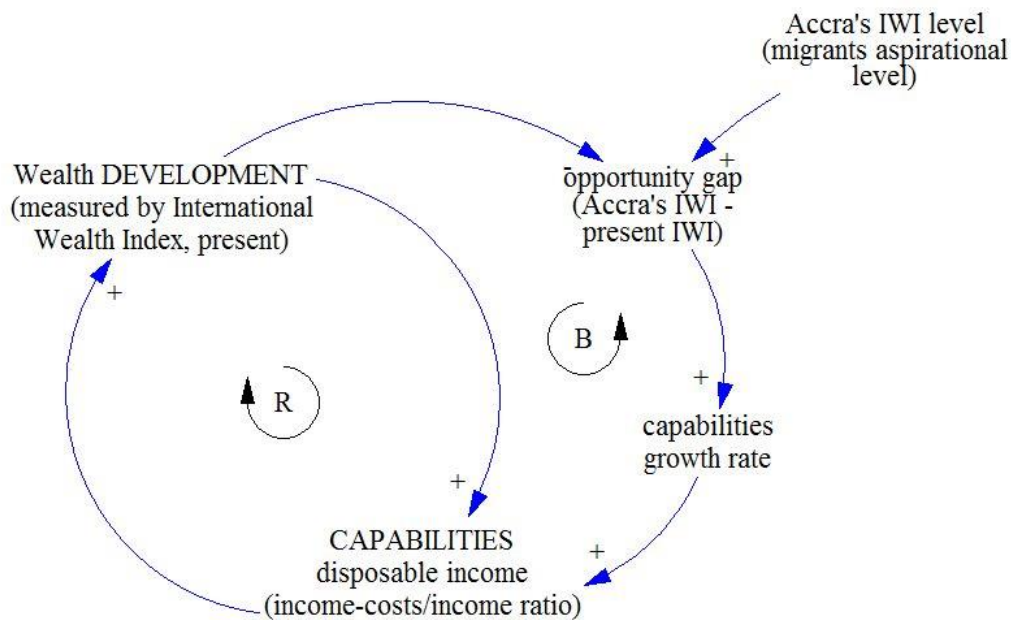

Figure 3 Conceptual model

Methodology

Overview

In this chapter, location choices are presented. Secondly, reasons for conducting surveys would be elaborated and the design of the survey will be shown. That will naturally lead to explaining the construction and functioning of the International Wealth Index. Next, the overview of used quantitative methods will be outlined which can contribute to the analysis of the data gathered. Finally, overview of the system dynamics method would be shown in order to explain the construction of the conceptual causal loop diagram and to shed some light on how this methodology might contribute to understanding the processes of wealth accumulation in Nima.

Why Accra. Why Nima. Methodological aspects.

Accra's arrival area of Nima is set as a stage for this research due to Ghana's stable economic growth (World Bank, 2019) and high level of Accra's inhabitants' migratory origin (Ghana Statistical Service, 2012).

Ghana presents a stable environment in the post-colonial landscape of West Africa (Gocking, 2005; Miller, Awoonor, 2006; Vandome & McBrewster, 2009) almost since gaining its independence from the British in 1957.

It has been a destination for migrants from multiple origins within and from outside of the region (Adepoju, 2010; Castles, Miller, de Haas, 2013). Naturally, most of this movement focuses on the largest urban settings, namely Accra and Kumasi. Ghanaian census data confirms that strongly. Both of these cities are stages of ongoing arrival from rural areas of Ghana itself. Since census data, divided by regions, pointed out at Accra as the place with the highest percentage of inhabitants born outside of the location, Accra was chosen for this research.

Also, Greater Accra Region consists of urban environment of the city of Accra in more than 90% (Ghana Statistical Service, 2012) which gives better access to existing data which is usually constructed on regional level. Since Greater Accra Region consists first and foremost of Accra, regional data regarding G.A.R. can be assumed to represent the city of Accra and this is one of the assumptions of further data analysis. This would be crucial for comparing International Wealth Index (IWI) levels of migrants' places of origin which are available only on the regional scale (GlobalDataLab, 2019).

There are several arrival cities in Accra, some more established and some still emerging spontaneously. Nima is one of the most established arrival areas of Accra. Some sources mention its origins reaching the first half of the XIX century (Naylor, 2000) with regard to the establishment of the first Zongo communities in Accra – predominantly Muslim and originally consisting of Hausa traders. More contemporarily, the structural and infrastructural origins of Nima are associated with an establishment of a US military base during a WWII, which 'opened up job opportunities, attracting more people' (Awumbila, Owusu & Teye, 2014, p.11).

With its population of around 90 thousand people and an area of 1,4km square, Nima is a densely populated area in the heart of the city. That makes it spatially representative for the concept of an arrival city. Furthermore, Nima is a formally recognised settlement, it "benefited from several interventions" and has "improved access to basic, but limited, infrastructure and services" (p.12). That

seems crucial for estimating the dynamics of material well-being for it excludes some of the systemic obstacles to development (Saunders, 2011; Sen, 1999) such as the lack of legal recognition or infrastructure shortages. In other words, if arrival city 'works' in Accra, it works in Nima.
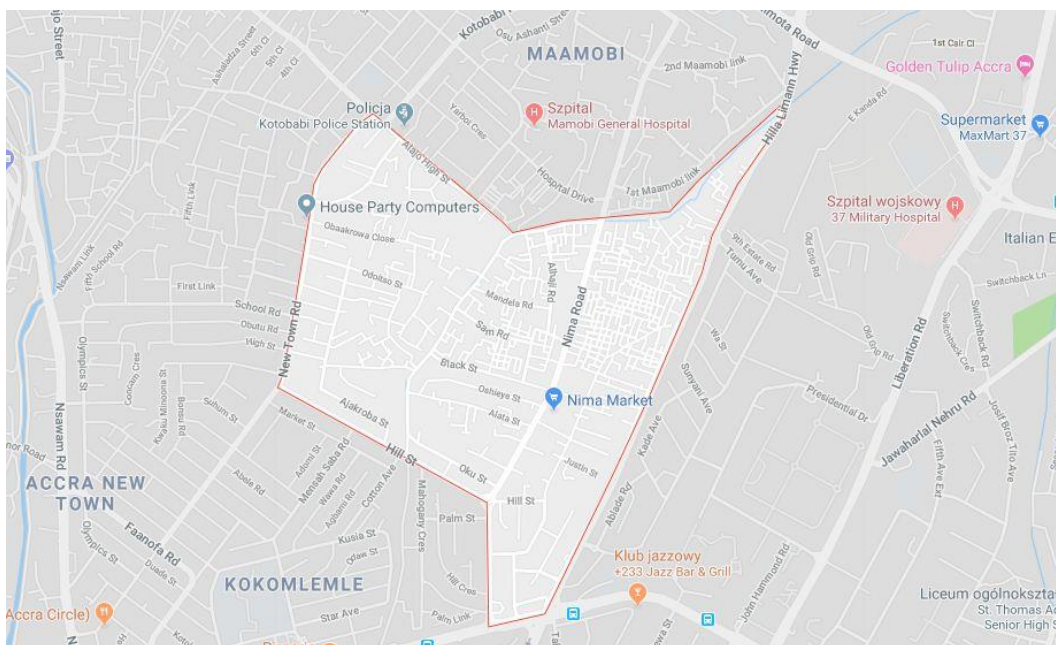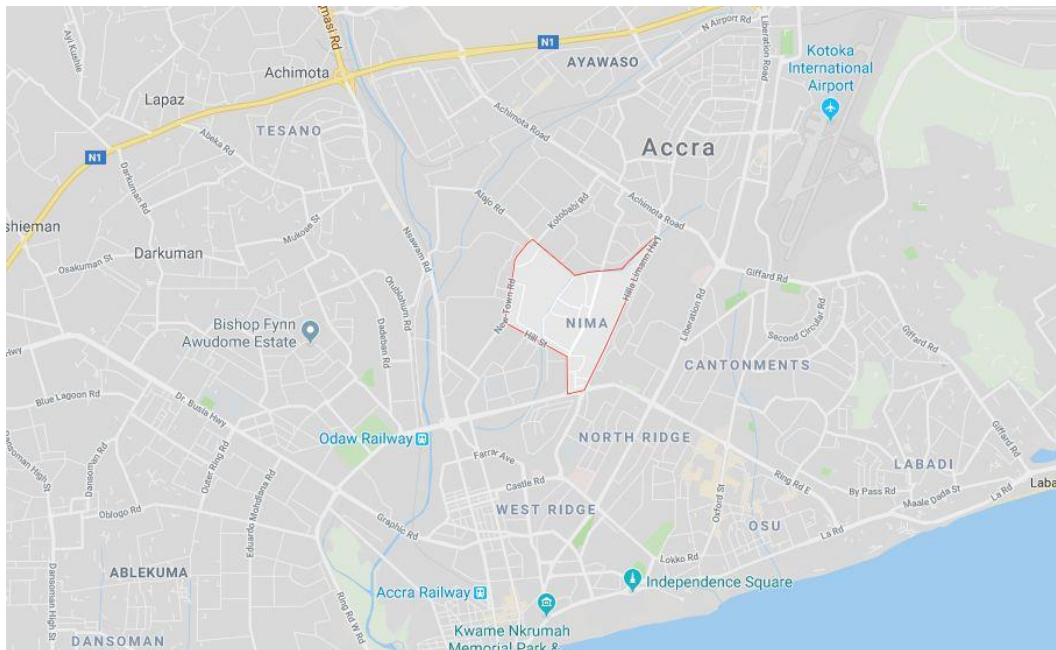

Figure 4 Maps of Nima, Accra (Google Maps)

Gathering data using a survey

Survey for this research is supposed to be conducted by 'asking around' for people who meet the criteria which in practice means snowball sampling (Creswell, 2018). Snowball sampling refers to identifying "cases of interest from people who know people who know what cases are information-

rich" (p. 245) and Creswell argues that it is a technique which can bridge quantitative and qualitative data.

Although snowball sampling seems the most feasible for this kind of research in a dense, heterogenous neighbourhood, it also has its limitations. Definitely, there needs to be some balance between too much and too little heterogeneity of selected participants.

Too much homogeneity in this case could mean following snowball sampling blindly, resulting in respondents suggesting next respondents very similar to themselves, staying in only one particular location during the whole process. Similarities of origin and spatial distribution of migrants might result in too similar results, telling a 'single story' and that is a reason to be cautious about snowball sampling. That is why some sort of randomized sampling has to take place as well. This is reached by starting research in a certain densely populated area where migrants often find employment, around where they usually live (Nima Market). From there research is to be taken to nearby streets – one street per day. That helps avoiding meeting the same people who might spread the information about the survey, about possible answers, etc. Also, in a densely populated area such as the Nima Market migrants from certain locations tend to gather or even live together. That would largely influence data. Mingling into different streets around the market can provide at least some degree of heterogeneity.

For practical reasons, research has to be conducted during the day and that limits the outcome to certain people. For instance, people available for questioning during midday are not the people with stable employment or with office employment. If they work, there is a risk of interrupting them at work and obtaining unprecise data.

On the other hand, it is all about balance. If, as suggested before, 100 migrants are to be taken as 'one migrant over time' and their wealth levels are to be described on the stretch of around 25 years (as planned), there has to be some degree of coherence among the participants. In that perspective, snowball sampling might work in favour not against relevant research. From that standpoint it seems that there are some pros and some cons of this technique but in large – it might be perfectly applicable in the conditions of Nima.

After establishing a sampling technique, a data gathering method has to be chosen and in the case of this research there are many arguments for using surveys.

First of all, this thesis draws a lot from censuses conducted by Ghana Statistical Service. That provides some basic qualitative framework for this research. Stopher argues (2012) that census might be 'as simple as a headcount' but might also provide more complex data on peoples' gender, age, origin, etc. Logically, with census data as a framework, using similar means of data collection seems to be a natural extension of the framework especially that such detailed data as gender, age or origin needs to be gathered for this particular research in order to provide insight into the dynamics of material development.

Stopher mentions many similarities between census and surveys with the latter being similar "to a census, except that it is conducted on a subset of the population, not the entire population. A survey may involve a large percentage of the population or may be restricted to a very small sample of the population" (p. 8). Because of the limitations of this thesis, both time-wise as finance-wise, a survey has to be limited to a very small sample of the population. What is crucial is making this sample representative which was mentioned already before. In addition to that, Stopher argues that this can be measured by three factors:

a) Sample means are no different from population means

b) Sample variances are no different from population variances
c) Sample covariances are no different from population variances.

In other words, "sample is representative if the mean of any characteristic of interest measured in the sample is statistically equal to the mean of that characteristic as it would be measured in the entire population" (p. 68)

That brings the discussion back to censuses and surveys. Data gathered by upcoming survey should be examined according to data provided by an available census. At the same time, with limited possibilities and with natural limitations of a snowball sampling, the results of this comparisons are expected to be somehow skewed anyway. Furthermore, no specific census covering Nima itself is provided and juxtaposing an arrival city with characteristics of the city as a whole would probably miss its purpose. For that reason, reliable testing the representativeness of the survey might not be reached for this research.

Nevertheless, an important argument for using surveys is the fact that they can provide data which can be statistically processed (Stopher, 2012). Apart from strictly informative data (name, age, gender, religion, etc.) the upcoming research is supposed to provide data which can be juxtaposed in forms of regressions, tables and charts. Again, the criteria for these upcoming juxtapositions would be logical, causal link as well as feasibility. Possible regressions would be conducted according to necessary criteria (Foster, Barkus and Yavorsky, 2005).

There are multiple scales possible to use to mention ordinal, nominal interval and ratio (Stopher, 2012). Data can be also metric or non-metric. This research would use mainly nominal and binary scale for quick and efficient collection of data which would further be processed to provide metric scale for the wealth index (IWI).

For practical reasons, surveys have to be conducted on paper with face to face contact with the respondent. That is mainly due to lack of email address access of many respondents (not to mention electricity and internet access in the first place) and due to possible illiteracy levels, especially regarding English. For ethical reasons (Creswell, 2018), each survey copy would include a short note about the purpose of the research and about the storage and further access to data. Nevertheless, due to reasons mentioned before, most of this information needs to be verbally provided to respondents individually and translated properly into respondent's language.

Below, a survey used for this research is presented:

In your household:	NOW (ask first!)	WHEN ARRIVED
TV		
Refrigerator		
phone		
bike		
car		
cheap utensils (home items)		
Do you have a motorbike, AC, computer?	Yes/no What?	
Electricity		
Main source of drinking water		
Toilet facility kind		
What material you have on the floor? Concrete, carpet, ground?		
How many rooms you use to sleep?		
How much rent do you pay?		
How long do you have to pay in advance?		
Can I ask you how much money is earned in your house altogether?		
Are you able to save some money a month? How much?		

Figure 5 Survey used for research

The top part of the survey serves as a reminder for the person conducting research to inform participants about the purpose and usage of data.

Second part is strictly informative. Apart from 'name', 'year of arrival', 'place of origin' and 'age', the rest of data is coded in a nominal manner, mainly with binary system confirming or denying a particular feature or occurrence, for instance 'arriving alone' is coded in 0 or 1 or 'yes/no' but number of children obviously comes at a discrete scale.

The third part of the survey is designed to extract information necessary to calculate IWI of the respondent. This is also coded into 0/1 or YES/NO answers apart from the second part of questions. Drinking water, toilet facility and floor material questions are designed on a scale from 0 to 3 originally (Smits & Steendijk, 2015) and this score needs to be assessed by the person conducting research. This may provide some confusion that is why on the second printed page of each survey there is information provided on the criteria of choices - it is hard to memorise them and to remember them instantaneously in the field. Assessing water, toilet and floor elements of the IWI required some practice and recognition of the field since most of the households have very similar amenities. That makes the assessment much easier in the long run.

What came up spontaneously in the conversations with experts in Accra is the possibility of assessing pre-arrival IWI as well. That criteria got included in the research and written down on the right side of the 'when arrived' category but was not included in the original survey design. However, it is clearly visible in the source materials for this research.

What is worth noticing, the respondents are given 5GHS each (0,86EURO) for their time and information shared. The reason for that is that many of them live on daily wage in precarious conditions without stable work. The time when they don't look for work or they are not available for some ad hoc work might be a lost income. Furthermore, in economy based on information there seems no reasonable argument not to repay financially for the information respondents provide.

Further complexities and nuances of the survey, as well as of the IWI assessment would be outlined in further sections.

International Wealth Index (IWI).

IWI is a tool of assessing wealth levels of individuals of households across multiple locations and in diverse economic realities. Index was designed at the Institute for Management Research at Radboud University and is available to explore via Global Data Lab website.

Its authors, Jeroen Smits and Roel Steendijk, introduce it as "the first comparable asset-based index of household's material well-being, or economic status, that can be used for all low- and middle-income countries" (Smits & Steendijk, 2015).

In fact, index seems to be a useful tool for wealth assessment with some salient advantages. First of all, it seems very simple and is easily understandable. It consists of few variables and can be graspable by both students and policy makers. However, mathematical calculations behind it are robust and thoroughly tested.

The general assumption behind it is that people in low- and middle-income countries have access to limited assets which construct their wealth levels but in fact this set of assets is quite similar across economic and social contexts. Hence, it can be generalized to a set of amenities which can be further compared among countries to assess personal or household levels of economic development. It gives insight not available before – "wealth indices suffer from one great disadvantage" (p.66). They used to make 'cross-national and cross-temporal' (p.66) comparisons impossible. IWI largely bridges that gap. With a simple set of universal amenities (both personal and infrastructural) it brings valuable insight into world regions which have never been qualitatively compared on such a scale before.

"IWI is based on data derived from 165 household surveys, held between 1996 and 2011 in 97 low- and middle-income countries. Together these surveys included information on 2.1 million households, covering all regions of the developing world." (p.66). That remarkable amount of data renders the index very robust.

The index runs on a scale from 0 to 100. "This dimension runs from a situation in which a household has no possessions at all that may help satisfy their material needs, to a situation in which the household possesses all assets that are broadly considered necessary for living a comfortable life." (p.67).

The value of 0 means basically no wealth but also no access to infrastructure and no personal belongings. "Households with an IWI value of 0, on the other hand, own none of the included items—not even a cheap utensil like a chair or radio—have a floor of earth or dung, have none or bad quality

toilet, no electricity, only one room, and water from an unprotected source." (p.69). The value of 100 means all the needs covered and all the practicalities assured. Changes beyond 100 do not seem to matter anymore from the perspective of material access and material freedoms and unfreedoms (Sen, 1999). Index is additive so gaining a certain possession increases the value of the index (p.68). That makes it an interesting tool for cross-temporal assessments and that is why IWI is a tool tailored for the purposes of this thesis.

IWI, as mentioned before, is constructed on a set of indicators for which certain mathematical weights are being appointed. The weights are computed using primary component analysis (PCA), attributed to authors such as Filmer and Pritchet (1999, 2001). "PCA is a multivariate statistical technique that can be used to reduce the number of variables in a dataset by converting them into a smaller number of components; each component being a linear weighted combination of the initial variables" (p.73).

Weights are computed in a way which reflects the possibility of a household equipped with certain amenities to have others particular belongings. More expensive assets do not necessarily have higher weights. That is because its weight reflects the contribution of the certain good on top of another factors' contribution and this is flexible and contextualized (Smits & Steendijk, 2015, p. 73).

To compute IWI score, first a so-called raw score is computed (p.74) but its scale doesn't reflect the 0 and 100 range yet. Some more computations lead to a final formula of:

$$IWI = constant + \Sigma(W_n \cdot X_n)$$

where *Wn* are the variables themselves and *Xn* are their weights (GlobalDataLab, 2019).

To conclude, "a household's position on IWI indicates to what extent the household or its members own a basic set of assets that is valued highly by people across the globe" (Smits & Steendijk, 2015, p.82).

That sort of tool seems to fit both Amartya Sen's framework of access to freedoms (1999) and Piketty's relevance of capital in development. Its quantifiable nature allows to process data in a way which allows to further asses the dynamics of IWI of migrants in the arrival city according to Saunders' theory

Linear regression and curve estimation

To assess the existence and the strength of links between variables presented in the conceptual model linear regression would be used. That comes from a simple argument that linear regression is used to "determine whether the independent variable(s) affect or relate to the dependent variable(s)" (Foster, Barkus & Yavorsky, 2006, p.11). Of course, this relation is assumed to be a correlation. Variables correlate with each other with not necessarily a causal relation between one another.

However, there might be some underlying assumption of causality which is an intrinsic characteristic of the causal loop diagram which serves as the conceptual model of this thesis. In the same vein, there might be a situation with only one possible causal direction – for instance 'development level' may only influence the opportunity gap which is its function. Opportunity gap cannot influence the development level directly. In this example, even with only a correlation measured, some causal link can be easily drawn.

At the same time, "dependent variable Y is related to the independent variable X" (p.11) so there is some assumed direction of the relation. The equation of linear regression,

$y = c + bX$

shows this dependency.

This thesis will try to link the causality assumptions behind the CLD with the statistical accuracy of measurement of linear regression.

However, general linear model's assumption is that the relationship is linear in nature (p.11). That might be a limitation of this tool in regard to the conceptual model which seeks or at least stays open to non-linear solutions.

There are different curves that can be drawn between variables and many times non-linear variants fit data better than their linear counterpart. It seems that assessing the amount of data explained by the model, represented by r square value might be also a relevant tool of deciding which behaviour (represented by the curve) represents data best.

In order to asses that, some basic assumptions of data must be met. First of all, ANOVA test has to be conducted which "examines differences between three or more groups of participants" (p.12). In other words, it shows whether "the effect of the independent variable is greater than the effect of individual differences" (p.12).

Secondly, there are multiple assumptions that have to be tested regarding linear regression. Among others:

1) Linear relationships between continuous data (this can be tested by looking at a scatterplot)
2) Normal distribution of the residuals (also provided by histograms or Kolmogorov-Smirnov test)
3) Multicollinearity may not occur – which would mean independent variable too strongly correlated internally
4) homoscedasticity – no clear pattern with the distribution of the residuals.

In this thesis, if there is no specific problem with any of these assumptions mentioned regarding the regressions run for the sake of this research, it means that they have been checked and met the criteria.

Regarding the conceptual model of this thesis, linearity of the relationship is not a value to it *per se* - actually all the theoretical framework suggests non-linear behaviour. That is why it should be clear that linear regression is only a tool for estimating the accuracy of the consecutive elements of the model. In case of other estimated lines of best fit being available for the regressions, mathematically explaining more of the variance than the linear option, these would be also taken into account as explaining the relation between variables best.

Other possible techniques of analysing data

Since the goal is to test the conceptual model, data would be tested in all possible ways. It may occur that simple comparing means might give some insight to the model. That is why multiple tables and charts are predicted to provide insight into data analysis. All the estimations and regressions would be computed using Excel and SPSS software.

System dynamics tools for understanding the arrival city

First of all, it is worth explaining why it is system dynamics that was chosen as a methodological framework for this particular research.

To answer that briefly, a table from another master's thesis is quoted – Gunda Zuelich's system dynamics research on migration and development in Senegal (2011). Because of the proximity of fields of research as well as methodology, author's arguments of comparing different modelling techniques seem to fit this thesis's argumentation.

		Verbal models	Mathematical model		
			Empirical/statistical model	Analytical solution	Computational solution (simulation model)
1	Feedback relations	√	X	X	√
2	Endogenous representation of a broader socio-economic-environmental context	√	√	X	√
3	Non-linear relations and behaviour	√	X	X	√
4	Dynamic behaviour	√	?	?	√
5	Accumulation	X	?	?	√
6	Net effect	X	?	?	√
7	Aggregated country level	√	√	√	√
8	Description	√	√	√	√

Table 1 Usefulness of different kinds of data processing strategies according to Zuellich (2011)

As can be clearly seen, Zuellich's work is aimed as a full simulation model (which practically means a fully operational SFD). That is understandable since author's thesis is a diploma in system dynamics. This thesis will not aim at creating a fully operational SFD, limiting the scope of research to a CLD. Nevertheless, some useful remarks can be made.

System dynamics has certain advantages over statistical solutions which pay an ancillary role for this thesis. First of all, SD observes non-linearities crucial for the arrival city concept. These are linked to feedback relations which govern dynamic behaviours observed only over time. Statistical solutions might provide that insight to some extent (for instance, time series analysis) and some fair share of forecasting as well. However, even time series analysis has to rely on period-to-period data gathered,

whereas a systems model (both CLD and an SFD) might predict behaviour only with data taken from a certain short time interval (as in this research's case) as long as the feedback mechanisms which run it are understood correctly. That leads to another element which is a clear description of laws governing accumulation and flows. That is not only a feature but a *raison d'etre* of the whole system dynamics methodology.

That is why, although statistical evidence and techniques would be used complementarily in the following work (for checking the relations between variables and testing data's robustness), the causal links and conclusions regarding possible accumulation would be drawn based on system dynamics logic and tools.

System dynamics is a relatively new methodology, established almost singlehandedly by J.W. Forrester at MIT in 1950s. It was originated from the need of tools of understanding the behaviour of complex systems (Zuellich, 2011). At the beginning it was meant for addressing business issues but soon it found a very wide range of applications. One of them, the works of so-called Club of Rome was particularly influential as a first attempt to model human impact on natural environment (Meadows et al., 1972).

The central notion of system dynamics is unsurprisingly – a system. Zuellich (2011), quoting Sterman (2000) defines a complex system as "characterised by many interconnected variables, feedback relations, high dynamic (change over time), delays and non-linearity (effect is not proportional to cause) producing counterintuitive behaviour as cause and effect are often distant in time and space" (p.10). These cause and effect relations are the most crucial aspects of system dynamics because all the elements of the system are somehow directly or indirectly interconnected creating loops which drive their behaviour over time.

A famous scholar and author Donella Meadows defines system as "an interconnected set of elements that is coherently organized in a way that achieves something" (2008, p.11). This 'something' is a goal of a system. A complex system often has multiple goals which operate in the loops mentioned before. There might exist contrary goals within one system and their impact on a whole depends on their strength in relation to other goals.

Another important aspect of system dynamics as a methodology is the fact that it observes systems over time so the relative strength of goals, manifested in the loops, might vary over time and switch in being dominant, creating non-linear behaviours (2008).

Generally speaking, there are only two kind of loops, one being reinforcing and another balancing. Reinforcing loops strengthen the original behaviour over time and the latter balances it. These two forces are in constant dialogue within a system, reshaping its behaviour (Sterman, 2000; Zuellich, 2011).

The other aspect of system dynamics methodology is the stocks and flows approach. If two kinds of loops describe the way a system behaves over time in a relatively 'qualitative' manner, stocks and flows are the 'quantitative' equivalent of the same picture. Stocks are the quantity of the content of the system, be it water in a lake, products available in a magazine or population of a city. They are quantifiable and what is crucial they are subject to accumulation and depletion. Again, this brings them back to the basic element of system dynamics which is observation over time. Nevertheless, a stock is nothing more than quantity in a certain moment in time – a snapshot of the system (Meadows, 2008). To tell how the system behaves, information about inflows and outflows is necessary. That is why every stock is always the outcome of an impact of two forces – one increasing the stock and one depleting it. These forces are governed by the goals of the system, manifested by previously described loops.

The notation of the systemic language reflects this division. One way of describing a behaviour of a system is a CLD – a causal loop diagram. The conceptual model of the following thesis is described using this notation. The causal relation between variables is described with arrows which not only point out the direction of causality inscribed but also carry a mark of the behaviour. Arrows carrying a 'plus' sign mean a positive direction of causality and 'minus' signed-ones indicate a negative relation. In other words, the former mean 'the more x, the more y' and the latter indicate that 'the more x, the less y'.

The most famous example of how system dynamics notation works is the bathtub example. Below, a CLD of this simple system is presented.
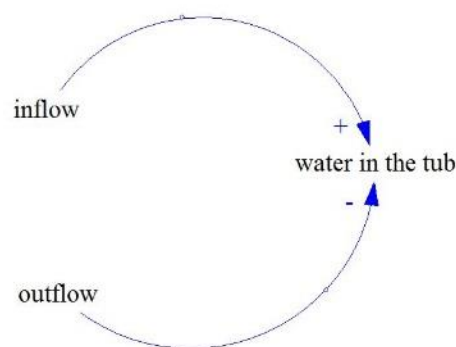

Figure 6 Example of SD notation

The other notation used in system dynamics is the one used for describing stocks and flows – quite literally called a stock and flow diagram (SFD) (Sterman, 2000). It includes stocks depicted usually with boxes and with arrows pointing at flows direction. What is worth mentioning, arrows used in SFDs do not carry any causal meaning anymore.
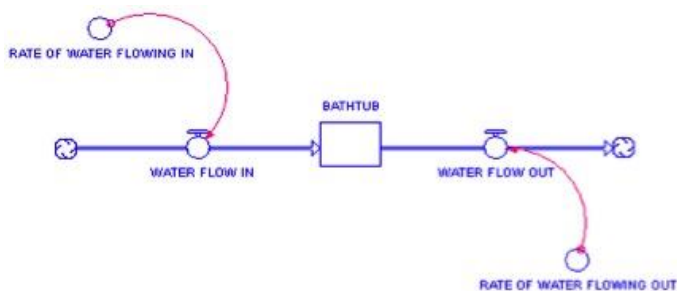
Figure 7 Example of SFD (stock and flow diagram)

The conceptual model for this thesis is presented as a two-loops model in which one is a reinforcing one and the other one is balancing it. In system dynamics loops operate causing exponential behaviour which is a mathematic equivalent of any accumulation where the stock is constantly 'reinvested' through repetitive loop-like behaviour (Sterman, 2000; Meadows, 2008). The two-loop system presented in this thesis forms a behaviour knows as an s-shaped growth. It is characterised by exponential gain of the stock, eventually limited by the carrying capacity of the environment. A good example of it might be a population of a certain area, growing at first but eventually being limited by density and food supplies. This thesis aims at showing that wealth accumulation of migrants in the arrival city is subject to a similar behaviour (with limited carrying capacity) according to the original concept of the arrival city (Saunders, 2011).
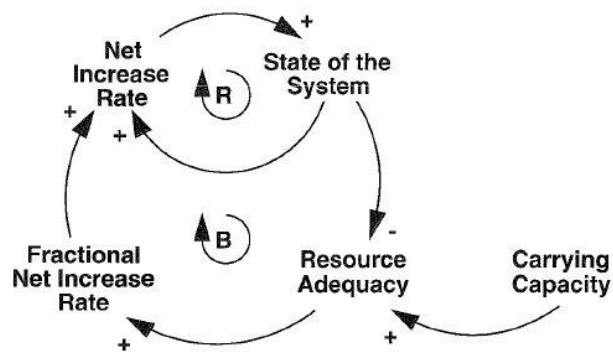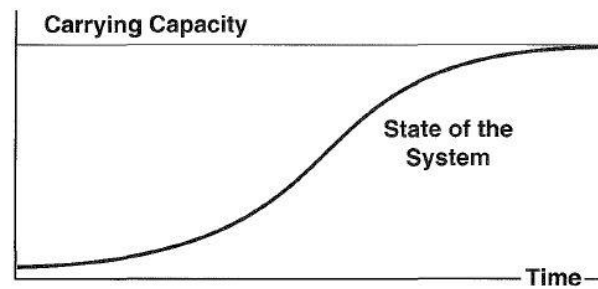
Figure 8 A model of an s-shaped growth (Sterman, 2000)

There are other types of behaviours which systems are subject to, so-called 'archetypes' (Sterman, 2000).
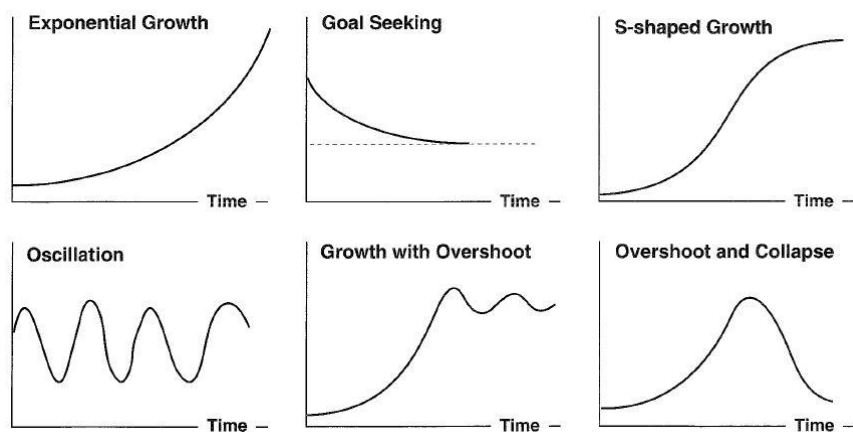
Figure 9 Different 'archetypes' of dynamic behaviour (Sterman, 2000)

The arrival city concept (Saunders, 2011) is originally presented more as an s-shaped growth and that is what the thesis' conceptual model evolves around. However, a very similar behaviour is manifested by a goal seeking behaviour presented below and at that stage it is too early to predict which behaviour would be the result of the field research.
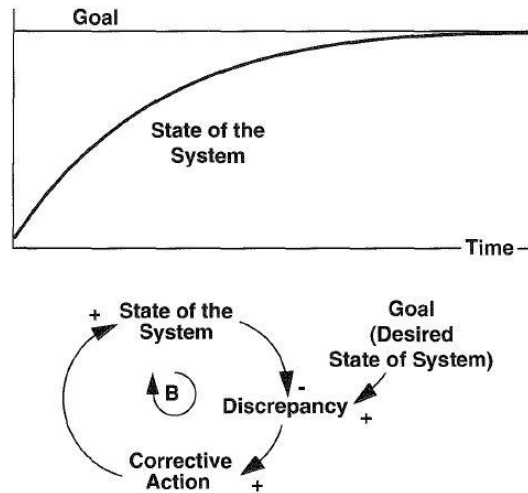
Figure 10 A model of a goal seeking behaviour (Sterman, 2000)

Although the conceptual CLD is formed as a s-shaped model, it seems that only quantifiable data over time might tell which behaviour governs the wealth accumulation of migrants in Nima.

What is worth highlighting is the fact that SD methodology outlined above suggests that the 'system' this thesis evolves around is the whole arrival city. That is not entirely the case since modelling a whole arrival city model would largely exceed the scope of a master's thesis. However, the rationale behind an emergence of an arrival city seems to be wealth accumulation or any wider idea of access and prosperity. Having the same 'goal', the spatial container such as an arrival city might be at least partially subject to similar dynamic laws as migrant's arrivals. In a way, 'growth' of migrants is the growth of the arrival city itself and although this thesis is not going to generalise about the whole arrival city's dynamics, its aim is to describe the dynamics of migrants' possible future within an arrival city.

Research process and data collection

Developmental environment of Ghana

Ghana was chosen as a stage for this research for multiple reasons. To test arrival city's economic possibilities, it takes a rather stable environment in which there are no major political or social disruptions to blur the economic dynamics of the neighbourhood (Saunders, 2011).

At the same time, the presence of fast-growing cities with salient urbanisation processes seems to make a clear stage for that. West African cities seem a good choice for that since the growth of the cities is rapid and their new inhabitants come from rural areas around the whole country and beyond it (Pieterse & Simone, 2013). When it comes to growth, a salient example of Nigeria comes to mind. Some figures regarding that country are worth quoting in order to show the scale of economic advancements in the region. That can allow to understand the macroeconomic situation of Ghana better.

Nigeria has an exceptionally large population (World Bank, 2019) with the city of Lagos being one of the biggest economies on the continent itself with 136 billion USD of GDP in 2017 (National Bureau of Statistics, 2017). This outcome makes Lagos the 5th economy on the continent itself according to International Monetary Fund (World Economic Outlook Database, 2018). However, smaller countries in the region keep gaining their economic strength and first of all - stability which is necessary for an emergence of successful arrival cities. Examples of these might be Ghana or Cote d'Ivoire with much more modest outcome exceeding 40 billion USD (2018) which might be only a fraction of Lagos' output but with much smaller area and populations create a stable environment for growth.

However, when it comes to researching arrival city's macro-scale surrounding, it is not only the economy which has to be taken into account but also other factors such as political stability and the rule of law – according to the author of the concept (Saunders, 2011). Also, Sen's comprehensive approach to development seems to go in line with that statement.

Here, comparing Ghana to other states in the region gives it even more advantage. Country is praised for long-lasting and stable economic growth by World Bank experts (Molini & Paci, 2015) as well as domestic scholars (Baah-Boateng, 2016). In the mid-80s, it reached economic growth of around 5% per year and kept it until 2006 when growth started to oscillate however – only in the upward direction (2016). It went down slightly around 2012 to stabilize on the level of 5-7% in 2017 and 2018 (World Bank, 2019) and current forecast suggests ongoing growth of 6%.

What is important to acknowledge from the arrival city perspective is that Ghana, despite rapid long-lasting growth, had the GDP per capita locked at the level of less than 500 USD for most of this time and it boosted only in the last decade.

Chart 1; Ghana's GDP growth and per capita GDP
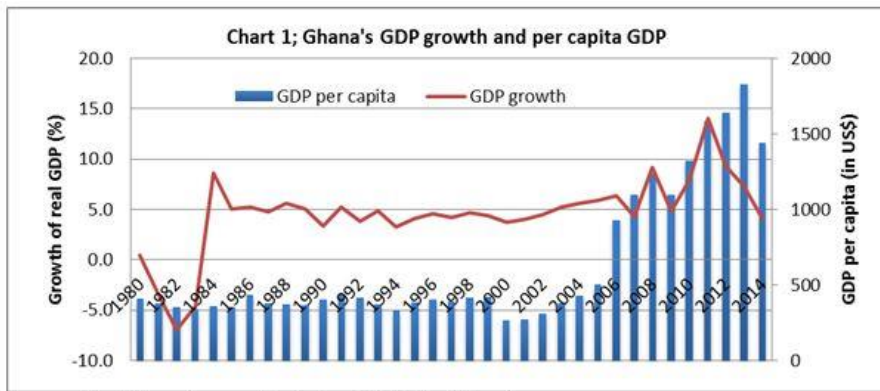
Source: World Development Indicators 2015, World Bank

Figure 11 Ghana's GDP (World Bank, 2015)

Despite the economic factors, this rapid growth in GDP per capita surely has to do with the population growth stabilizing and actually declining slightly (World Bank, 2019). Since gaining independence in 1957 Ghana observed a population growth of 2.5-3% per year (wave2analitycs.com, 2016; World Bank, 2019) however recently it fell down to 2.2% with an observable trend of further decrease.

3% annual growth over half of a century becomes a great force of population increase. Since gaining independence, Ghana increased its population from merely 5-6 million to over 27 million in 2016. "This represents over 320% population growth over the past 59 years" (wave2analytics.com, 2016).

According to World Bank analysts (Molini & Paci, 2015), one of the sources of the relative prosperity of Ghana is the fact that it has reinvested the growth into alleviating poverty and human development. School enrolment ratio went from 60% in 1970s to almost 100% currently. In the respective period, life expectancy went up from around 45 to 62 years (World Bank, 2019). This data has to be taken with some caution – Ghanaian census from 2010 describes only 74% of the population as literate and as many as around 800 pregnancy related deaths for 100 000 births in some regions (Ghana Statistical Service, 2012).

Nonetheless, the factors mentioned above place Ghana at an advantageous spot in the so called 'demographic window of opportunity' (Lee & Mason, 2006; Van der Ven & Smits, 2011). The meaning of this 'window' is that with smaller older cohort due to high mortality in the past, with large working and able to work in a foreseeable future cohort (due to mortality decreasing with development) and smaller youngest cohort (lower fertility) it gives a country manpower working in favour of economic prosperity (Smits, 2018) – if proper political and social arrangement are in place. This situation is called the Demographic Dividend and Ghana seems to yield on that (Lee & Mason, 2006). First, the labour population is large, way larger than the dependent population. With less children, women enter the workforce easier. There is more incentive to save more due to higher life expectancy so savings increase which has an important impact on wealth accumulation and investment in human capital. With less children it might be easier for households – although this assumption is often questioned (Banerjee & Duflo, 2011). For sure, there is more pressure on the government (Smits, 2018).
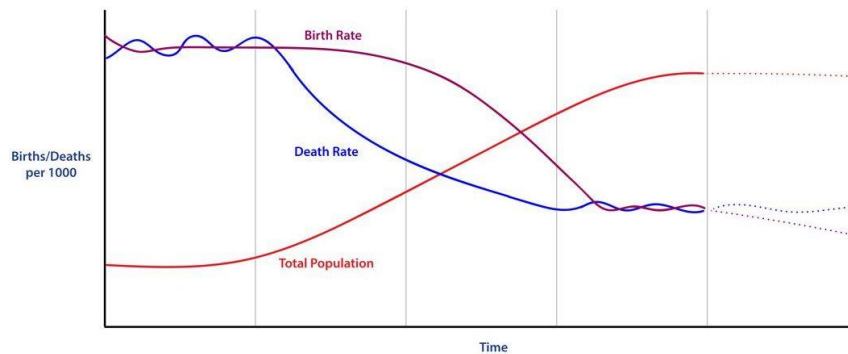
Figure 12 A scheme o Demographic Window of Opportunity (Smits, 2019 [lecture slides])

What seems important for Ghana as a whole and indirectly for the opportunity structure of arrival areas in the centre of the cities are other systemic factors such as legal framework, transparency, civil rights and political stability.

It that regard, Ghana holds a very strong position in the region. World Peace Index, taking into account various elements contributing to development and registering all possible disturbance factors places Ghana on a 41st position in the world, 5th in Africa (with Mauritius and Madagascar not being too representative in that case) and second in the region (Sierra Leone being the first). It shows relatively low levels of societal and security threats (2/5) and even lower levels of international and internal conflicts (1.5/5). The factor worsening its score is access to weapons and perceptions of criminality with scores fluctuating around 3/5 (World Peace Report, 2018).

Also, according to Rule of Law Report (2018), Ghana occupies 43rd place and the first rank in the region with deficiencies in many elements but scoring rather high in fundamental rights and open government factors.

Figure 13 Ghana's state of rule of law (Rule of Law Report, 2018)

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Amnesty International highlights some improvements regarding worker's rights but mainly in respect to tackling illegal gold mines which does not influence arrival city environment directly (Amnesty International Report, 2018). Also, "access to justice remained limited, especially for people from low income or marginalized backgrounds" (p.176).

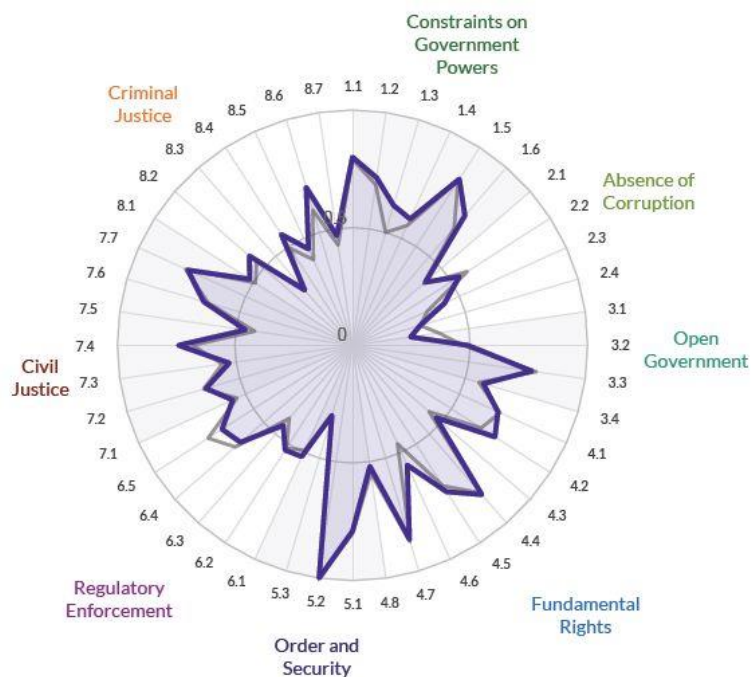These developments seem modest but if, for example, compared to Nigeria (13th regional and 97th overall) the difference is rather big. Even more salient it seems comparing the World Peace Index where Nigeria is placed on very far, 148th position in the world.

Economic challenges

Baan-Boateng (2015) draws some criticism on Ghanaian growth and it goes in line with Molini & Paci (2015). "The development challenge faced by Ghana is to consolidate its poverty reduction successes in the context of difficult internal and external economic conditions and a rapidly changing economic and social environment" (p.xiii) Baan-Boateng (2015) argues that there has not been enough high-quality job creation within this long period of growth and that jobs are mainly low-quality jobs in services, especially at the expense of agriculture. "There has been a shift in employment away from agriculture to low productivity service activities. The labor market is also dominated by low-earning self-employment in the informal sector. Indeed, employment growth in the country has largely occurred in the informal sector, reflecting an increased share of employment in the sector from 84% in 1984 to 88% in 2013" (2015). What the author defines, most probably accurately, as a macroeconomic problem, seems to be a typical structure of an arrival city, often build on small, self-run enterprises located in dense neighbourhoods.

The other issue seems to be growing inequalities with Gini coefficient going up (Molini & Paci, 2015) Other, decomposable inequality measurements show very large interquartile consumption differences as well as rather obvious, geographic disparities which also strengthen the role of the arrival cities. "Spatial inequalities in the incidence of poverty are striking and patterns of poverty are closely linked to a divergence in employment opportunities. It is therefore not surprising that moving to the faster growing areas of the South and Ashanti has been seen by many as an effective way of escaping poverty. In absolute numbers, since 1991, Accra and Ashanti gained over 2.4 million inhabitants each, around half of them in the last decade" (2015, p.xii).

Accra as a site of an arrival city research

The 2010 census mentions that over 16% percent of the population of Ghana lived in Greater Accra Region (Ghana Statistical Service, 2012). This might not seem striking but for instance, the population of Lagos is only slightly more than 10% of Nigerian population (World Bank Database, 2019).

Also, Kumasi gains economic importance as well as secondary cities such as Tamale or Wa. That is good for the economy because it shows some dispersion and interregional development. Nevertheless, Ghana is still largely an agricultural country (composing up to 25% of the GDP compared to 40% in 2000 – Baan-Boateng, 2015) and it also relies on extraction industry, also spatially dispersed (mainly in the South). Ashanti Region (with Kumasi as its capital) has nearly 20% of the population but is much larger, centrally located and Greater Accra Region covers a highly urbanised, small strip of land (urban locality covers 90.5% of the region).

Because of that, although Accra and Ashanti experienced highest population growth rates in Ghana in the last two decades, population density, so important for arrival city's infrastructure (Saunders, 2010)

is very different." At the regional level, Greater Accra is the most densely populated region with a density of approximately 1,236 persons per square kilometre compared to 895.5 persons per square kilometre in 2000. It is followed by the Central region with a population density of 224 persons per square kilometre" (Ghana Statistical Service, 2012, p.2).

What seems important for the choice of the research site is the number of in-migrants. Again, Accra Region slightly outnumbers Ashanti – "Greater Accra (46.4%) and Ashanti (58.0%) regions recorded the lowest proportions of persons born in the locality of enumeration" (p.5). That doesn't mean that these numbers are true for densely populated city centres of Kumasi and Accra as arrival city areas - nevertheless, assuming that Greater Accra Region is largely composed of the city of Accra itself, the factor of more than half of the people being born elsewhere can be used for the city centre (where in fact it is most likely to be even higher) which does not automatically hold true for Ashanti and Kumasi regions respectively. Speaking in economic terms of International Wealth Index, IWI has been constantly growing over the last two decades (GlobalDataLab, 2019). With its values oscillating around 45 in the second half of 1990s, it reached the value of 67,5 in 2017 (Figure 14). Data for following years is not available although a strong trend line is visible. Greater Accra's IWI level (taken in this thesis as the Accra city leve too) could reach the score of 70 around the year of 2020.
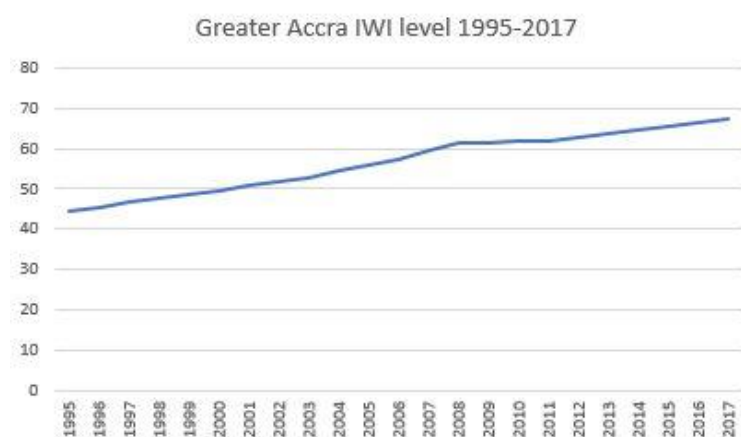
Figure 14 Accra's IWI level growth

At the same time, Accra's position is more complex than its statistical evidence. As Awumbila (2014) argues, although the capital has "has attained the status as the least poor area in the country" (p.6) it doubled the occurrence of poverty incidence and tripled extreme poverty incidence (p.6). That would suggest that with the development comes growing inequalities. That makes a concept of arrival city even more intriguing, but not as an oasis of development but a place of rather harsh competition for survival. Still, "despite living in a harsh environment with little social protection, an overwhelming majority of the migrants believes that their overall well-being has been enhanced by migrating to Accra" (p.2).

Nima as an established arrival city

As mentioned before, Naylor (2000) mentions Nima's origins reaching the beginning of the XIX century and links it with the forming of so called Zongo neighbourhoods. Conversations with scholars from University of Ghana and multiple informal interviews with locals show that this terminology still holds in Accra, referring to certain populations, particularly with predominantly Muslim and Hausa speaking traders and street vendors. There is even an area in the north of the city which is named a 'Zongo Junction' and is a vivid area of retail shops.

In its most recent study, Nima is described as "poor neighbourhood" (for what it's worth, the word 'slum' is rarely used in Nima's context), a melting pot of ethnicities and nationalities, with population of migrants originating mostly from Northern Ghana and countries like Mali, Niger and Burkina (Awumbila, 2014, p.10-11). This thesis research would ask a growing Togolese population to that melting pot.

Nima is one of the largest low-income informal settlements not only in Accra but the whole of Ghana (p.11). However, its informal status is to be doubted since in practical terms it is recognised by the municipality. The best proof for that is the sewage and electricity infrastructure along with good condition of mostly concrete roads. Nima's contemporary origin is associated with US military base placed there during WWII. In its aftermath, returning Gold Coast troops stationed there (p.11). This strong military presence created demand for multiple services and attracted many migrants resulting in the growth of the area and its relative prosperity. Now, Nima covers 351,6 acres of land (around 1,4 km square).

There is basic sewage and electric infrastructure almost everywhere but there was not much spatial planning involved, housing are planned often ad hoc, without permission, with high density of people in one room (Songsore, 2003). The spatial structure is usually compound based with up to 80 people leaving in a compound (Songsore, 2003; Awumbila, 2014, p.11). There is a wide range of income but most of the people leaving in Nima are low-income earners (Awumbila, 2014).

Nima is located in the very center of Accra. It is also very well communicated with the rest of the city with three main roads going through or around it. New Town Road encircles it from the West, marking a better-off, a more suburban part of Nima – considered a separate part of town by its inhabitants (New Town). From the East it is closed with Hilla Limman Highway, one of the fast arteries of Accra, parallel to the main road of Accra, the Liberation Road. Nima Road goes through the heart of the neighbourhood, leading to the dense and vivid market area (Nima Market) where the research was mainly held.

Preceding this research, the survey conducted by Awumbila (2014) for the sake of the article shows a certain social structure with 31% of migrants arriving from the Northern Region, 19% from Eastern and 17% from neighbouring Volta. Around 8% would come from outside of Ghana. However, this data is provided by a survey – considerably bigger in scale than the one conducted for this thesis but still involving only 239 people.

Unfortunately, there is no census data for Nima itself or it was not available for the author of this research. Data presented in the following work would be juxtaposed with data from Awumbila's work however it will not suffice as a census-survey test of sample's representativeness, as suggested by Stopher (2012). Not all detailed demographics outlined in Awumbila's work (Awumbila, 2014) are crucial for the following work albeit, the following one provides insight into the length of stay of migrants (121 of them in the 239-people sample).

Lenght of stay	Frequency and percentage of respondents
1 year or less	5 (4.1%)
2-6	35 (28.9%)
7-11	31 (25.6%)
12-16	17 (14.0%)
17+	32 (26.4%)
Missing	1 (0.8%)

Table 2 Lenght of migrants' stay in Awumbila (2014)

Unfortunately, survey was conducted among respondents above 15 years of age. In this group only slightly above 7% would be people above 55 years old and over 40% of the sample had 0 or 1 child. That could suggest fulfilling the 'demographic window of opportunity' criteria (Lee & Mason, 2006; Van der Ven & Smits, 2011) which means a small proportion of elderly and infants compared to a numerous and young work force. Nevertheless, there is no data about the percentage of children below 15 years of age in the sample. The following sample doesn't provide this kind of data either.

Conducting the survey

The research process was begun with literature review of various statistical and descriptive data as outlined above. With insight into numerical data about Accra and Nima, author of this research held some informal meetings with Ghanaian scholars from the University for Development Studies (multiple online sessions) from the Centre for Migration Studies at the University of Accra. After confirming data and the direction of the following research, MA Sahadatu Ali Halid was contacted – a recent graduate from the Centre for Migration Studies.

Ms Ali Halid's suggestions was to measure not only the IWI of migrants at the time being as well as at the time of arrival but also to ask about the material well-being prior the arrival. The surprising outcome of this part of the research gave new perspective on migrants' choices and priorities.

Survey was conducted between March 25th and April 1st, preceded with multiple preparations, mainly three long visits in Nima in order to get to know its topography and possible challenges. Other activities included discussing research questions, reaching the same understanding on the purpose of the data to be obtained, printing the survey sheets, obtaining one hundred 5 GHS notes (easier said than done), etc.

Although the period of data gathering might seem very brief, a working week was spent from morning until afternoon in Nima and multiple people were asked for help and engaged in organising the research. Nima's inhabitants proved to be extraordinarily hospitable and welcoming. Some of the shop keepers or bus owners let the research team (Ms Ali Halid and the author) stay in their venues - strategic spots at the crossroads or near the main road. That made it significantly easier and quicker to work since the research team was clearly visible attracting inhabitant's attention.

On the first day, research was held in the proximity of the Nima Market, around Nima Post Office. Each day, team moved to a slightly different location of the nearby streets in order to gain access to a more varied sample of inhabitants, still staying around the market area where many migrants could be asked. Moving a few blocks away always resulted in the number of migrants decreasing and more settled non-migrant inhabitants being encountered. Also, the market area was a predominantly Muslim area which is reflected in the results. The further from the market area, the more Christian inhabitants were met. That would align with the image of the Zongo community being Muslim traders and even if this image doesn't reflect the exact data about Nima it confirms the image among Accra's citizens who identify Nima with its market area.

As stated before, a remuneration of 5 GHS was provided for each of the survey's participants. First of all, this idea resulted from the ethical considerations outlined in the methodological section. However, the expected result was also increased participants interest in being a part of the project which significantly shortened the time of research and made it more efficient. The only challenge was to keep possible 'imposters' pretending to be migrants away from research. Eventually, it was not the case at all. In a densely populated area around the market everyone seemed to know each other and an organic system of 'checks and balances' seemed to operate.

The organic order of the selection was amplified by some interesting characteristics of the social organisation in Nima:

- by-standers would exchange information among each other and look for more participants out of their own interest

- almost each day some person who could speak English better than others would become a self-appointed translator and agitator, correcting information, translating questions (especially the ones asked by the author of this thesis, unable to speak any of Nima's multiple languages). That sort of a leader would emerge very naturally and without any struggle, making the whole process easier

- participants would invite their migrant friends which seemed to be alarming but at the same time the research team was often informed that "there were no other migrants here now" which was confirmed by team's efforts to find more migrants despite these opinions. Also, detailed nature of the survey questions and logical order of them would largely exclude any fraud itself.

- on day 3 and 5 researchers' presence was recognised by tro-tro or shop owners which would give them additional credibility and recognition

- often, a self-appointed translator would question a participant himself after easily knowing the meaning of the questions which were painfully repetitive. On some occasions, one person would respond on behalf of the respondent without even asking him or her. That seemed alarming but after some clarification it always turned out that a person knows exactly the conditions of others. The shared knowledge of other's stories and conditions was astounding and is a very interesting aspect of a communal life of Nima's dwellers itself.

To conclude, data gathering process could be as brief and efficient as it eventually was mainly because of the self-organising abilities of the Nima community. In relation to the arrival city concept, the research process itself seems to qualitatively confirm high levels of information flow and self-organisation of the community, exactly as observed by Saunders (2011).

Some limitations were present as well. The hours of researcher's presence (around 10am to 4pm) would skew the outcome by excluding people having regular, office jobs. Also, time availability of new-comers would skew the year-of-arrival statistics to the direction of recently arrived, unemployed-yet migrants. Finally, high representation of young males without stable occupation on the streets of Nima surely must have influenced the gender share in the results.

Data ordering and storage

Despite the data gathering process lasting a week, it took about two weeks of ordering data and creating an Excel file with the input. Also, this part was done by the author only, so it took more time. The reason for that was a very repetitive nature of questions, prone to making mistakes.

For each of the participants, three separate Excel files were created. Global Data Lab (2019) provides a ready-made spreadsheet for calculating one's IWI and these were used by the author to create a file for migrant's current, arrival and pre-arrival IWI score. Eventually, the content of these files would be put into an aggregated Excel file along with personal information and often a short comment about the livelihood in Nima.

Figure 15 IWI calculator (Global Data Lab, 2019)

Eventually, one single, ordered file was created in such a way that it could be imported and used by SPSS software. Wherever possible, yes/no answered were translated into 0/1 order, as well as questions about gender, religion or language were also changed into numbers.

Challenges with measuring IWI

The challenges were present in the most sensitive to mistakes part of the IWI measurement, namely estimating water, floor and toilet facilities. These areas of the index are more descriptive than other parts which are simple statements about belongings. That is why relying on migrant's statements had to be juxtaposed with the knowledge of the infrastructure.

For instance, migrants often stated that they had a toilet inside so for a researching Westerner that could mean 'high' value. However, consulting with Ms Ali Halid showed that a 'flush' toilet was not the case in Nima, at least in the vast majority of cases. Unfortunately, these conversations took place after the survey since these discrepancies couldn't be predicted. Hence, in some cases, toiled facilities were marked as 'unknown' whereas in others, when the stated toiled 'level' was 3, it was post-factum lowered into 2 due to more knowledge of the Nima's infrastructural limitations.

Another example was the quality of water access factor. IWI guidelines (GlobalDataLab, 2019) mention 'private piper water' as 'high quality' level. Nevertheless, as stated before (Songsore, 2003), many of Nima's inhabitants live in compounds. As well as there was agreement regarding the idea of 'piped', there was an obvious discrepancy of the term 'private' since many of the respondents would consider an inside the compound source of water as private. From the Westerners perspective (and the IWI design perspective in the first place), an amenity shared by up to 80 people (Songsore, 2003) is nothing

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but private even if it reflects the compound-street division. In these cases, the level was stated as middle, not high.

These choices are not reality-based choices dependent on the state of factual knowledge but are strictly dependent on the point of view. Should a North-based researcher apply his/her standards of the term 'private' or comply to migrants understanding? The latter seems reasonable however, with most of the previous data calculated by Western scholars, an assumption can be made that more North-oriented choices were made on that matter so far. In that case, a community-oriented choice would artificially inflate the results. This topic is covered in the recommendations section with more depth.

Research findings

Data was collected among 108 participants covering:

a) General information
b) IWI for the year 2019
c) IWI at the moment of arrival (chronogically varied, dependent on the time of arrival)
d) IWI for the pre-arrival period
e) Income and rent data
f) Short comment

Overview of the general data

Age groups were divided into 6 age groups groups. The results show a very high representation of young workers with a small representation of non-working age persons. It is also very similar to the survey obtained in 2014 (Awumbila, 2014). That would confirm the window of opportunity structure of the area, at least regarding the working part of the sample. The data regarding participants children is as following.

Age group	Head count	Children							
		0	*1*	*2*	*3*	*4*	*5*	*6*	*7*
15-24	32	22	8	2	0	0	0	0	0
25-34	42	20	10	8	3	1	0	0	0
35-44	18	2	3	2	3	3	4	1	0
45-54	7	0	2	2	1	1	1	0	0
55-64	5	0	1	1	1	1	0	0	1
65*	1	0	0	0	0	1	0	0	0

Table 3 Age group / number of children

Without children's age, it is not possible to draw any more conclusions. What blurs the results even more is the fact that many migrants don't live with their families in Nima but remit money to distant rural areas. This would be elaborated on further.

Among the participants there were 70 man and 35 women. This disproportion was commented already as a limitation of the research.

Sample was predominantly Muslim (90 respondents) with 14 Christians.

Level of education	Head count
No education	26
Primary	48
Secondary	27
Tertiary	2

Table 4 Education level of respondents

Interesting results came up in the section of migrants' origin.

place of origin	Percentage of respondents
Ashanti	6,4
Central	2,8
Eastern	1,8
Kumasi (city)	4,6
North East	3,7
Northern	17,4
Upper East	15,6
Upper West	1,8
Volta	14,7
Western	0,9
Benin	0,9
Burkina	0,9
Gambia	0,9
Niger	3,7
Nigeria	0,9
Togo	20,2

Figure 16 Origin of respondents

This provides a slightly different viewpoint from the one presented by Awumbila (2014). Northern Region was represented by only 17,4%, compared to 31% in the previous survey. Volta Region is very similar (14% compared with 17%) but Eastern Region is represented by one respondent compared to previous 19%. This survey represents much more diverse image of migrants from different parts of Ghana. It also collides with the popular viewpoint that predominantly people from the Northern Region settle there. However, geography of Ghana allows to say that people from the North settle in Nima since there are two administrative regions 'above' the Northern Region and they are largely represented (Upper East and Upper West).

The results only show that depending on the exact location, different outcomes can be reached and a need of a census covering Nima separately comes to mind. In the previous survey foreigners represented only 8% of the sample. In this research, a big community of Togolese emerge (20,18%), with 6,42% of Nigeriens and one participant per Benin, Nigeria, Burkina and the Gambia.

When it comes to language, the result is more consistent.
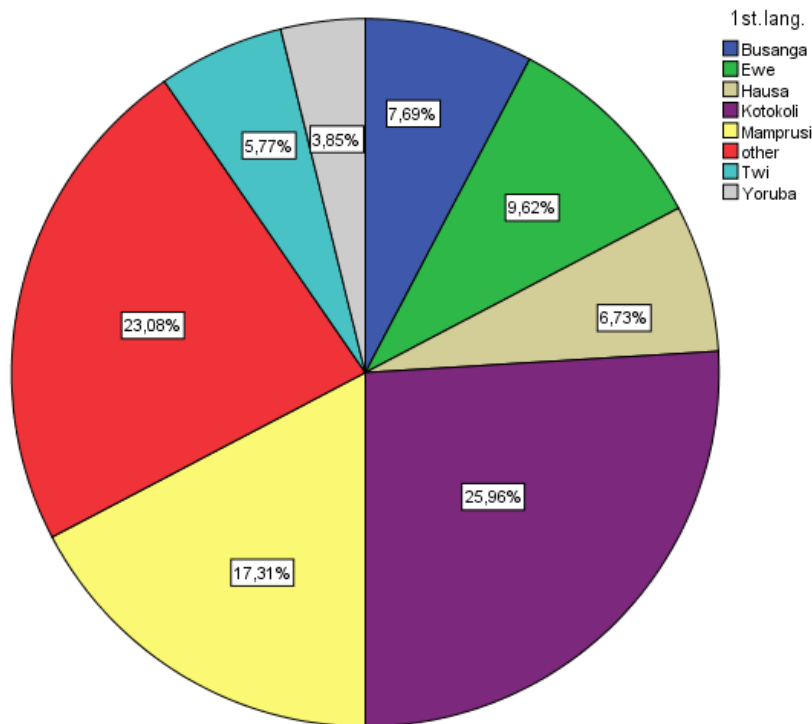
Figure 17 Languages of respondents

High presence of Kotokoli is mainly due to Togolese migrants. However, low presence of Ga, Tchi and Ewe users is surprising. Also Hausa, the language associated with Zongo communities is almost absent. That can be attributed to the fact that now Zongo communities are more established in Nima and in the survey only newcomers were interviewed.

IWI outcomes

The mean current IWI for the sample is 46,11 however it is surely lowered by the large group of freshly arrived (a couple of years), sometimes homeless migrants. On the other hand, surveys seem to depict the situation of freshly arrived migrants quite well since the mean year of arrival to Nima in this sample is 2011 which is quite recent. At the same time, it matches data obtained by Awumbila (2014) – the number of inhabitants with 2-11 years or residence was above 50% there. At the same time, mean IWI at arrival is 29,98 in the sample.

What is worth noticing, mean pre-arrival IWI is 42,90 and it is confirmed by stories shared by migrants. Thus, the main pattern is that the standard of living in the family village or town was better but there was no work at all or no work outside agriculture – hence, livelihoods were not sustainable there. Migrants often face a sharp decline of well-being after leaving their hometown. At the same time, better living conditions of the family house are prevalent for young people in every culture and macroeconomic situation. This 'rite of passage' situation must be taken into account. Nevertheless, surely it is steep and harsh and leads into precariousness in Ghana way more than in the Global North. In some cases, the decline was stretched between over 60 IWI points at family village to homelessness (usually scored 4 due to some public amenities) in Nima.

Pre-arrival IWI score is an interesting insight however it doesn't play any role in the conceptual model or in the arrival city 'story'. Nevertheless, it is included in this descriptive part of research findings to shed more light on migrants' situation.

Income measurement complications

Unfortunately, income data appears to be somehow disappointing. With many missing numbers and high degree of vagueness it jeopardises the idea of measuring capabilities by disposable income. First of all, some problems with translation occurred. Some migrants used values from before the currency transition which cut the values on notes by 4 digits. Secondly, many referred to daily income however they could not specify how many days per month they worked and often this additional question was overlooked by the research team. Thirdly, respondents gave even rough estimations of income with some hesitation. In some cases, mostly in cases of recent migrants, no answer was obtained at all since their income was really scarce or they mostly relied on help of friends. That reflected the answers regarding savings too, obviously.

Nevertheless, from the data obtained it seems that monthly income in Nima ranges from 50 to 1500 GHS (from 8.20 to 250 Euro) with some outliers reaching 5000, mostly by owning a shop or other form of wealth previously accumulated. Figures as high as that don't come from labour in Nima. The mean income of the sample is 615,89 GHS.

This head count sums up to 90 with as many as 18 cases missing.

Income (GHS/month)	Frequency	Cummulative Percent
100 or less	9	10,0
200	16	27,8
300	13	42,2
400	17	61,1
500	5	66,7
600	11	78,9
700	1	80,0
800	5	85,6
1000	5	91,1
> 1000	8	100

Table 5 Income of participants

Things seem much clearer with rent. Renting a room in Nima fluctuates around 60 GHS per month (mean value) although rent needs to be paid upfront and that time period varies from monthly rent to 3 years upfront with the most repeating time period being one year. That may influence housing choices and in worst cases prologues the initial period of homelessness.

Percentile of respondents	Rent paid (GHS)
20	,000
40	50,000
60	70,000
80	100,000

Table 6 Rent paid by respondents (table and histogram)

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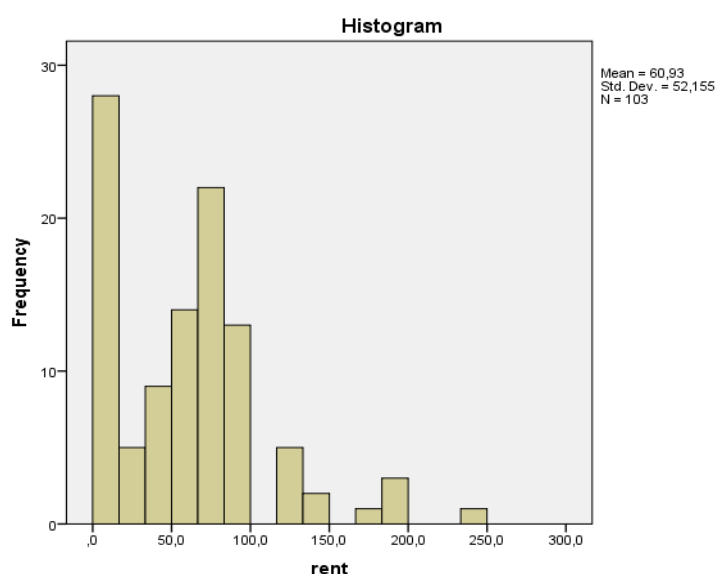
Advance of payment		Head count
Valid responses	1 month	35
	3 months	1
	6 months	2
	1 year	20
	2 years	34
	3 years	7
Missing		10

Table 7 Advance of rental payment

Interesting outcome can be found in dependencies between housing and IWI score. The following table shows 12 reported cases of living on the street juxtaposed with having any regular housing.

		yrs in Nima	IWI PRE-ARR.	IWI ARR.	IWI 2019	Family in Nima (freq.)		inc.	savings
						Yes	No		
Housing Access	No	2	45,74	7,27	11,50	12	2	354	138
	Yes	10	42,38	33,77	51,88	39	44	660	189

Table 8 Having a home as a factor influencing IWI score (mean values except of when noted)

The following shows that there is an obvious discrepancy of IWI since housing, electricity or quality of amenities are the factors influencing the score. However, even if summed up, these factors don't create as big discrepancies as in the figures observed. That means factors surely influence each other.

What is interesting is that migrants without homes are often the ones who left their families behind. There is a recurring pattern of young men and women leaving their families behind and starting literally from scratch in Nima. Some of them choose to stay living without a proper shelter in order to send more money home, saving around 1/3 of their income. That seems to be confirmed in a small absolute difference in savings between groups, disproportionate to income levels. Another surprise is the pre-arrival IWI showing very similar levels of well-being. There is no clear explanation to that, based on the data gathered. More qualitative research could provide more insight.

When it comes to gender, female migrants (1) seem to have significantly higher income and savings than men (0). That might be explained by less women arriving by themselves and perhaps more ease in finding work in 'gender related' jobs.

	Income (mean)	Savings (mean)
Men	587	157
Women	666	220

Table 9 Income in relation to gender

There is a large difference in education with female migrants being significantly less educated however the very small sample of women has to be taken into account in generalizing the results.

	No education	Primary	Secondary	Tertiary
Men	7	40	20	2
Women	19	8	7	0

Table 10 Education level in relation to gender

As many female as male migrants arrive alone to Nima.

	Accompanied arrival	Solitary arrival
Men	32	36
Women	17	18

Table 11 Arriving alone in relation to gender

Eventually, IWI statistics between genders are quite similar (comparing means).

	IWI 2019	IWI arrival	IWI pre-arrival
Men	46,55	27,41	44,26
Women	45,24	35,12	40,60

Table 12 IWI in relation to gender

The last chosen general information is the history of IWI score change between ethnic groups. It seems that Ghanaian migrants are generally better-off than foreign nationals, especially the Togolese who are the only foreign group well represented in the data.

	IWI 2019	IWI ARR.	IWI PRE-ARR.
Ashanti	60,95	39,26	48,56
Central	54,42	38,31	22,79
Eastern	58,24	24,01	29,61
Kumasi (city)	60,95	53,33	64,41
North East	43,58	18,41	53,98
Northern	36,13	21,11	37,29
Upper East	54,44	38,51	37,88
Upp. West	49,40	41,63	60,93
Volta	62,07	37,61	53,86
Western	62,32	44,81	29,85
Benin	4,00	4,00	48,90
Burkina	46,97	19,14	9,52
Gambia	66,87	66,87	91,53
Niger	51,78	32,10	30,85
Nigeria	38,44	38,44	48,22
Togo	29,20	17,08	43,28

Table 13 Place of origin in relation to IWI with a map of Ghana (retrieved from www.ghanaconsulatedubai.com)

Research findings juxtaposed with the model

The short way - the reference mode

Research provided diverse insight regarding the conceptual model. First of all, data exhibits some dynamic behaviour which can be partially confirmed by the model but it also provides insight for calibrating it more. Secondly, the behaviour pattern found in data analysis seems to be a very strong dynamics reference mode (Vennix, 1999; Sterman, 2000) which only confirms the relevance of the system dynamics methods used in the conceptualisation.

Reference mode is a "problematic and/or desired behaviour [which] can be sketched over time in one or more graphs" (Vennix, 1999, p.50).

In the system dynamics methodology called 'group model building' a reference mode is a core notion.

"Note that the reference mode of behaviour can be derived from the perceived system's behaviour and represents its problematic behaviour. In turn, the model builder will attempt to construct a simulation model which is capable of replicating this reference mode of behaviour in order to increase confidence in the model." (p.50)

In other words, reference mode is a behaviour over time which needs to be explained by the causal relations, equations and other system dynamic tools. Reference mode is a manifestation of forces which influence the system. The model created by the modeler is inclined to replicate the reference mode.

Ideally, the reference mode is provided by the system first and then replicated by a model. In this case, there was a theoretical model provided by both Saunders and by Piketty's laws of exponential growth of the accumulated capital. This created a base for the conceptualisation. Data gathered empirically was supposed to tell something about the truthfulness of these claims. However, at that stage, data becomes a point of reference (a reference mode) again - for adjusting the model to reality.

This new, data-based reference mode was created by plotting years spent in Nima by migrants against the average current IWI of migrants who arrived in a specific year. In other words, the aim was to show what happens to migrants' IWI over time, as if to finish the sentence: "The more years in Nima…" the more or less material well-being.

It is argued that juxtaposing years spent in the arrival city with the current levels of IWI score is a relevant tool to reflect the arrival city dynamics because it graphically reconstructs a certain pattern or exhibits a lack of it, also giving an insight into the relevance of the conceptual model.

There seems to be a graphical pattern. Trendline tool has been used to compute a possible trendline.
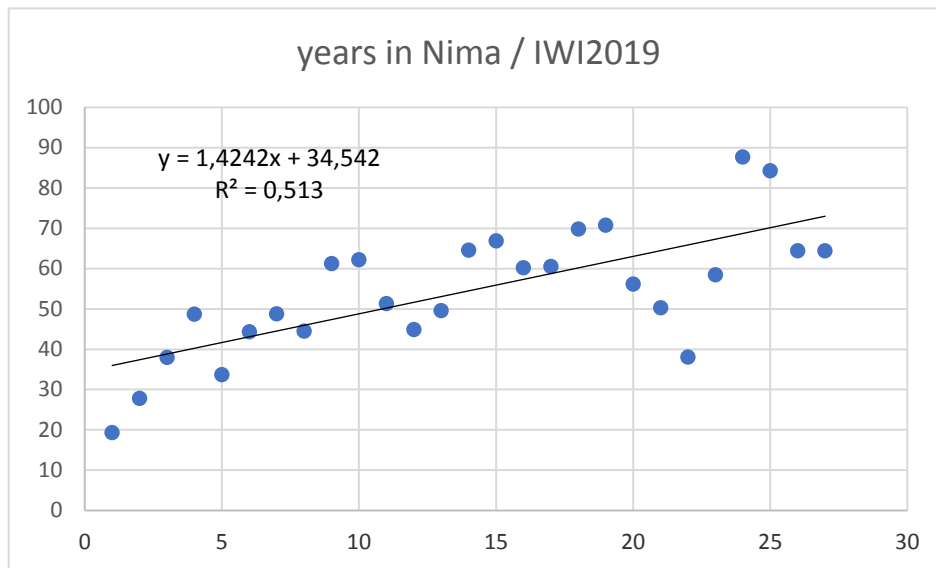

Figure 18 Linear regression of length of stay (indep.) and given year's IWI score (dependent)

The graph shows a regression line suggesting the equation of the trendline and the value of data explained by the equation which is exceeding half of it (R square = 0,513).

The model fits the data quite well (Appendix 2). With very high significance (0,000) and stable values of f-test (26,337) and t-test (5,13) it can be perceived as robust enough. Beta coefficient shows a clear slope of correlation between the time spent in Nima and the IWI score. What matters most for conceptual reasons of this thesis is the shape of the data distribution which is crucial from the system dynamics perspective, non the slope itself. What is more, both serve well as a reference mode. Hence, the one showing higher value of R square is chosen for further analysis.

As a matter of fact, linear regression outcome is not a value *per se* in exposing a reference mode of the data gathered. The quantity of data explained by the trend line seems to be the leading purpose of the regression chosen. By testing different possibilities for R square maximization, it was discovered that in fact a logarithmic line along with the power equation fit data even much better.
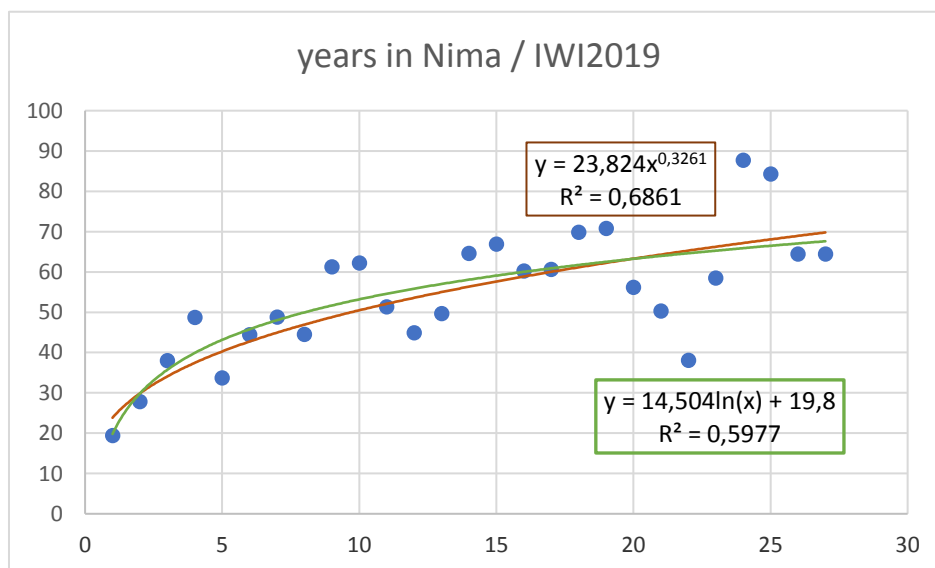

Figure 19 Best fitting curves presenting the pattern of IWI score growth over time. Reference mode of behaviour.

Again, the aim of this analysis is not to calculate the exact value of the migrants' wealth growth simple because the sample is too small. A quantitative generalisation could be made only with a broad census data analysis. For that reasons, the fit of the trend line is more relevant than the value of slope, for instance. Taking all that into account it clearly shows that the two best fitting curves (0,68 and 0,59) are the ones which show a clearly exponential behaviour.

In other words, the curves presented present a systemic behaviour which confirms qualitative claims of Saunders (2011) and exponential nature of wealth accumulation described by Piketty (2014).

The long way - Correlations between the CLD variables

Another way of testing the theory is processing data by checking the dependencies described by the conceptual model. In order to do that linear regressions would be held to look for correlations between variables. The causalities are already assumed in the model by its nature ('causal-loop diagram').

To start, it is useful to remind the model itself.
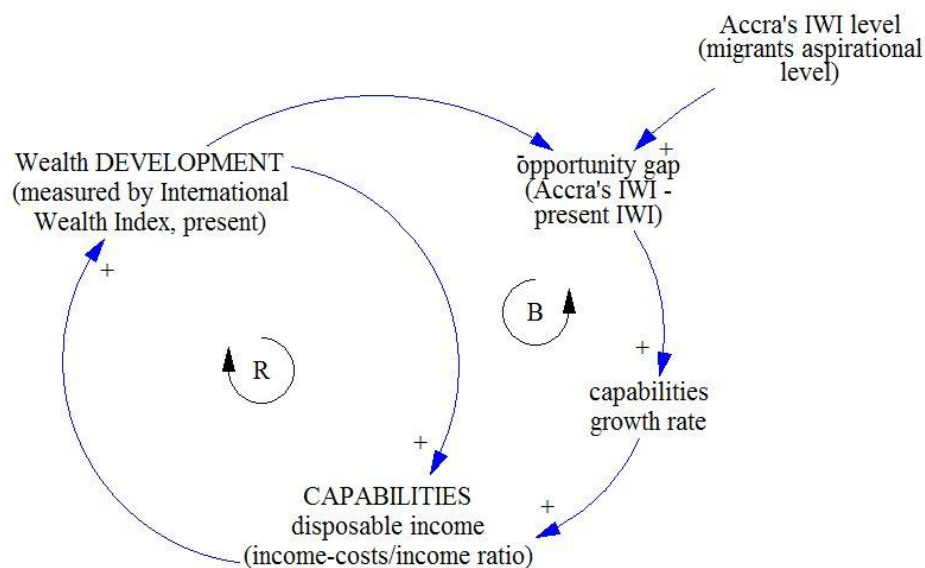
Figure 20 Initial conceptual model

As mentioned before, capabilities estimation seems to be a drawback of the empirical research. First of all, income data was questionable for the reasons mentioned before. Secondly, the disposable income was to be assessed by the (income-costs)/income equation. Results to that were slightly disappointing. With a lot of participators stating 0 income a trivial problem of dividing by 0 occurred. This data was to be left out or, for instance, could be replaced by median value of the whole set. That would provide numbers but these numbers would skew the outcome. Or, in the cases where income was truly 0, it would mean showing a false image of the sample. On the other hand, in the case of migrants whose rent cost was 0 but had some income (homeless workers) ratio would show a 100% of disposable income which would be obviously not true.

To conclude, survey questions were not constructed with the necessary depth to tell too much about capabilities as defined in the conceptual model. Secondly, the actual survey was not conducted with the questions asked deep enough to obtain this data.

Thirdly, disposable income is a category more complex than only income minus rent and no exact definition of the costs was set before the research.

Still, what is definitely worth looking into is a possible correlation between income and IWI 2019 which could reflect some of Piketty's relations between income and wealth. For that, taking into account the reservations mentioned before, linear regression was conducted with income as the independent and IWI 2019 as the dependent variable.

Unfortunately, R square is low (0,139) so the model does not explain too much of the data (Appendix 7). Also, the beta coefficient is small with the value of 0,373 only. The distribution of the residuals can be treated as acceptable. Nevertheless, the homoscedasticity pattern is visible (Foster, Barkus & Yavorsky, 2006).

That follows Piketty's line of argumentation (2014) that income itself is not a sufficient tool of creating wealth, especially compared to capital. Nevertheless, with a model that weak it can be taken more as an anecdote than as a relevant research finding.

Also, linear regression was run to check if there is correlation between IWI score at the arrival (independent) with current income (dependent). The model was statistically sufficient but with even worse normality and homoscedasticity measurements. Also, it explained only 0,1% of data and the coefficient of correlation was lower than 0,308.

The income data collected in Nima seems useful for further research and insightful already when it comes to simple tables and juxtapositions as shown at the beginning of this section. However, it is not statistically robust for making generalizations regarding the conceptual model. Any computations involving it, such as the initially planned disposable income category would blur the actual image even more.

Conceptual model adjustment

Having that in mind, it was decided to focus on the robust data, meaning data directly referring to wealth and material well-being of migrants.

Since capabilities taken as the derivative of income were not measurable with the present set of empirical data and there was no physical ability to conduct the survey again, capability measurements had to be set aside and focus was brought back to the main values obtained, namely IWI variations over time.

What was observed was that in fact some additional variables emerged:

   a) individual's IWI growth rate (IWI growth/years in Nima)
   b) individuals' net growth of IWI over time (IWI 2019 – IWI arrival)

An interesting observation is that if 'capabilities growth rate' and 'capabilities' growth rate were to be replaced with a) and b) respectively, they make a sound dynamic logic. In fact, they create a coherent system with robust data containing only one set of data, the 'IWI over time' data.

Hence, the adjustments are made as follows:

a) adjusting the conceptual model to analyse only the IWI dynamics over time (unifying the variables)
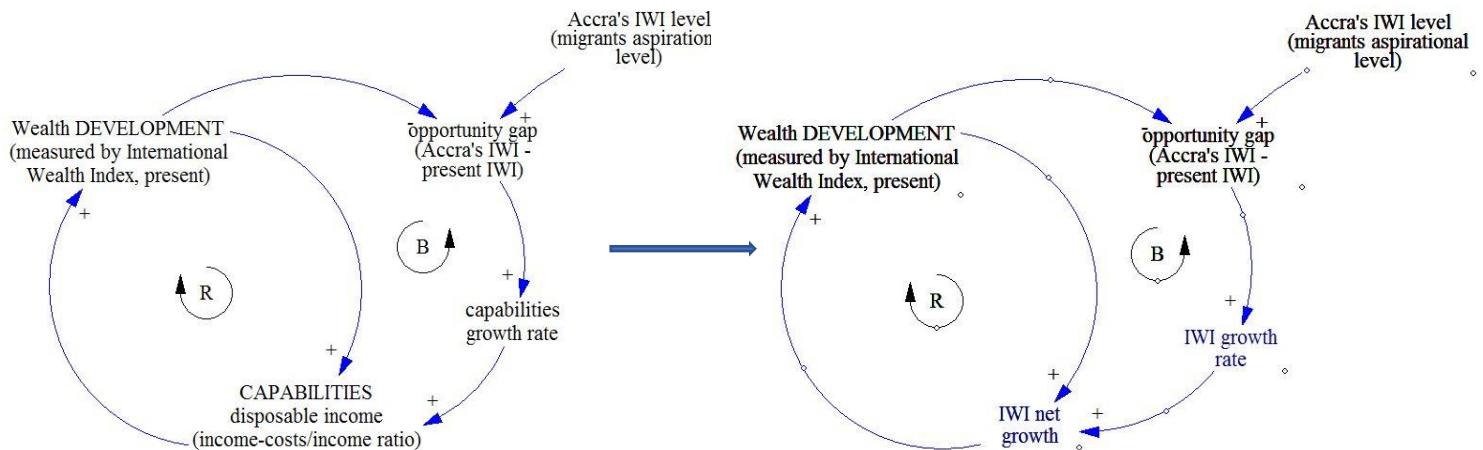

Figure 21 Conceptual model adjustment (step 1)

With that change, the loop makes new sense however the 'opportunity gap' variable becomes problematic. As shown in the graph depicting the Greater Accra IWI level, it has been changing over time as well. What also has to be taken into account is that migrants had a different date of arriving to Nima so their growth rate dynamics have varied. That is reflected by the computation of the 'IWI growth rate' (dividing individual absolute IWI growth by the length of individual stay). From that point of view opportunity gap stays stringent and becomes more exogenous than it seemed before. That conclusion leads to another adjustment.

b) Setting the opportunity gap as an exogenous variable
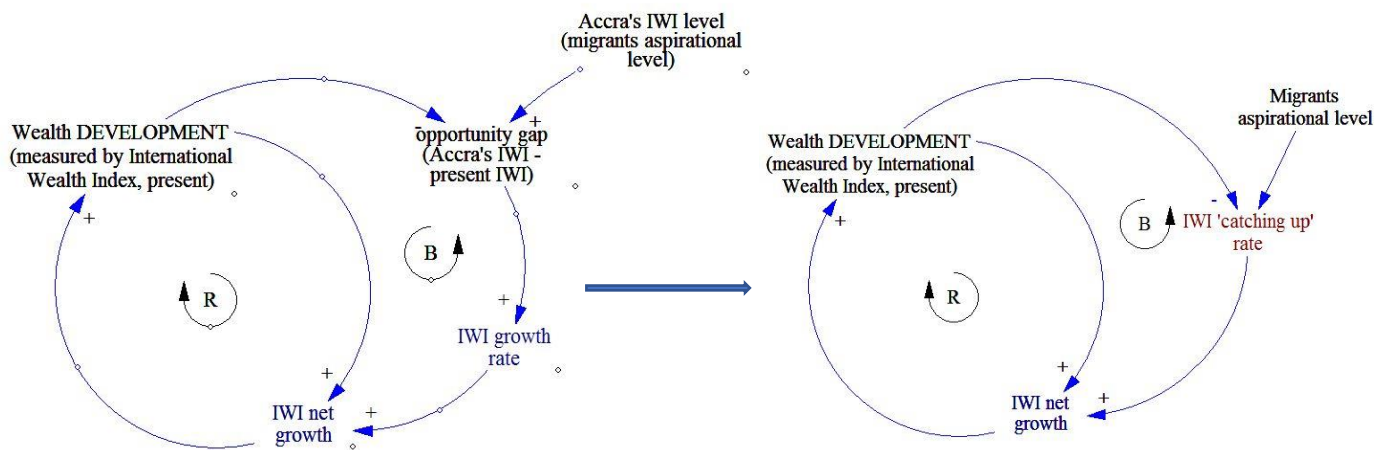
Figure 22 Conceptual model adjustment (step 2)

As it can be seen, migrants' aspirational level was set as an exogenous variable. It can be asked why the variable was called 'aspirational levels' in a rather abstract manner instead of defining it simply as an 'opportunity gap'. This came from a practical assumption that migrants know themselves best what is feasible in their situation and what their goal is. At the same time, it puts migrants' aspirations and actual opportunity gap in the 'black box', outside of the model, but the reason for that is to create a model quantitatively robust even when that means minimalizing it. A broader explanation for that is that the actual opportunity gap is changing respectively to Accra's growth. Since migrants arrive in

different moments in time, we don't know their actual, quantitative 'opportunity gap' in the time of arrival. It seems more practical and also more convenient to put it outside of the model as an exogenous variable with a reasonable assumption that migrants knew their aspiration levels at a given time themselves.

There is also a strictly computable reason for that. The opportunity gap might be taken as a difference between actual state of the system and the aspirational level. Hence, Accra's IWI score (mean for the assessed years) minus migrants' IWI 2019.

The linear regression for this computation has perfect significance, beta coefficient of 1 and R square of 1 as well. It would seem brilliant if not the fact that it is just self-explanatory. In other words, if (a) minus (b) equals (c) then (a) minus (b) is obviously correlated with (c). Thus, this part of the loop, although statistically valid, doesn't bring any insight into data.

What is the crucial difference in the new diagram is that the task of balancing the loop (bearing a negative correlation) switched to the correlation between 'Wealth Development' and the 'IWI catching up rate'. In practice it means that the higher score of IWI at the arrival the lower the speed of IWI growth. That falls in line with Piketty who argued that the catch-up rate slows down with higher developmental levels (2014).

c) Differentiating between the arrival IWI level and the current IWI level (2019)

Linear regression is not designed to explain dynamic behaviours. In order to show the causal influences over time, variable 'Wealth DEVELOPMENT' can be split into two. It is argued that in order to examine the correlations, the loop needs to start with 'IWI arrival' data and end with 'IWI 2019'. This is a solely technical solution introduced for testing reasons.

A single variable named 'IWI over time' can be used as well but the division shows the practical solution which needs to be implemented – using two different inputs as the first and as the last variable.

It could be argued that in that case the behaviour between both 'IWI levels' is not a loop anymore. That couldn't be further from the truth. In fact, splitting the initial and the ending value is only a matter of notation in the graph. The behaviour still 'runs' in a loop since it is the same IWI level measured in both cases and it is measured over time. The rationale for splitting it on the diagram is to keep consistent with the outcome of the underpinning research, to show the direct link between the research results and the adjusted conceptual model.
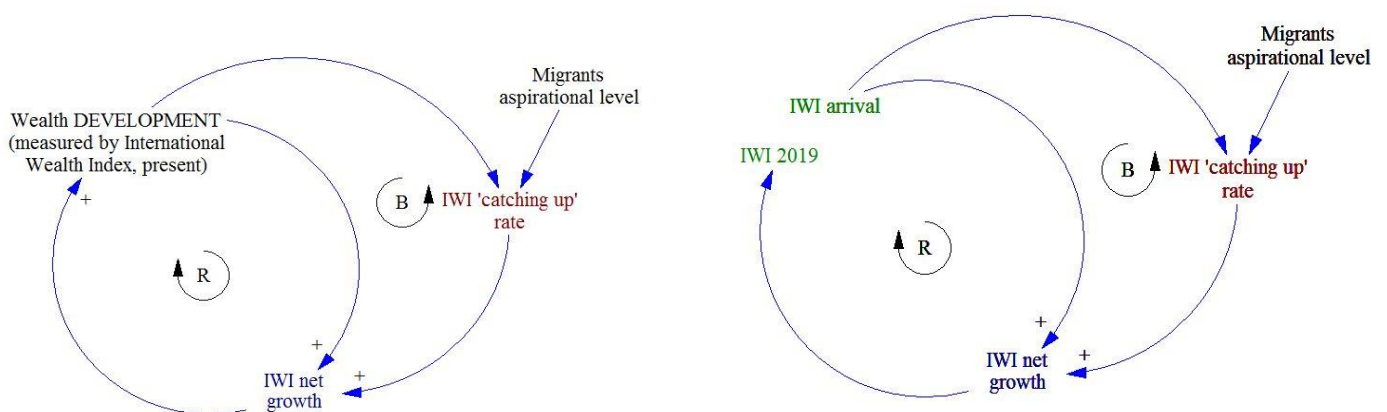
Figure 23 Conceptual model adjustment (step 3)

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d) Computing regressions for each of the alleged relationships (Table 14 and Appendix 5)
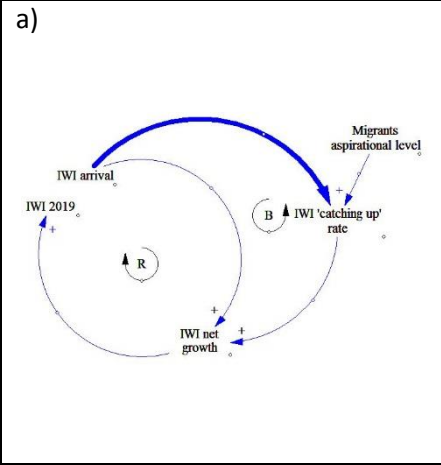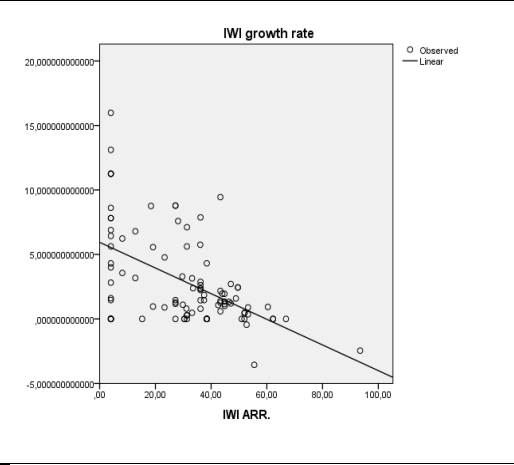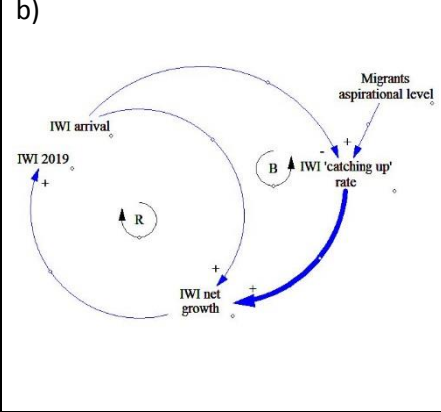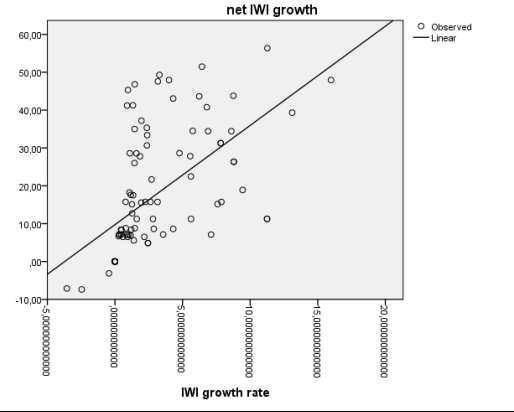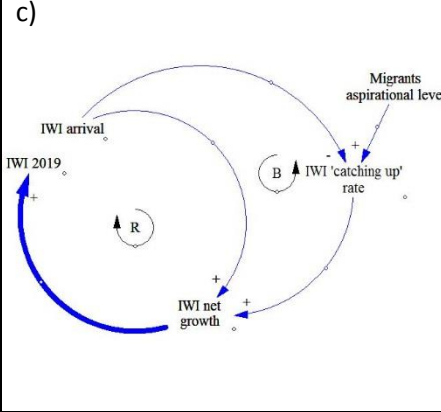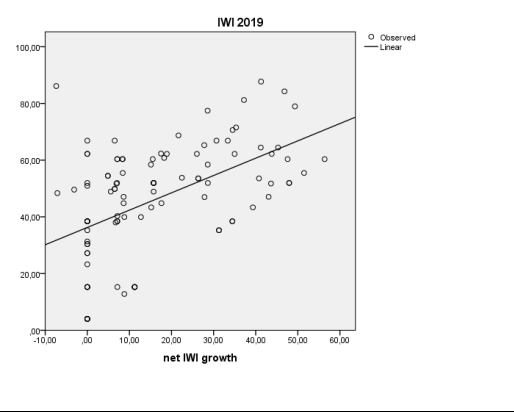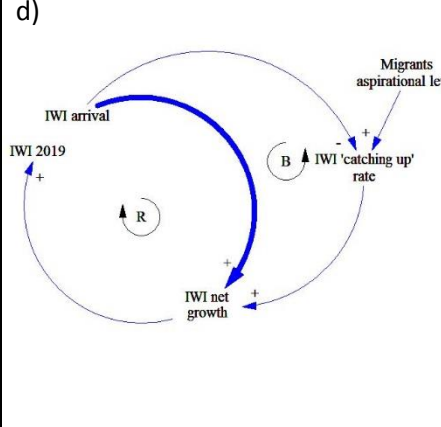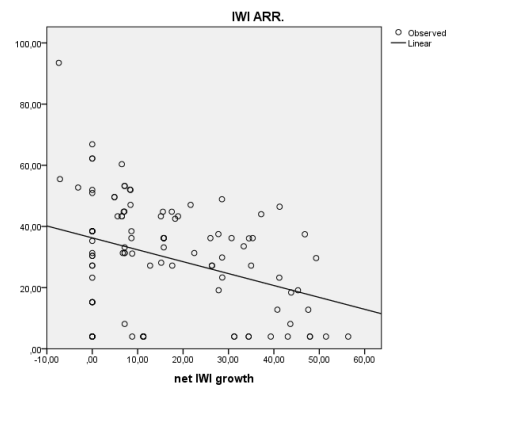
a)		IWI arrival (independent) IWI 'catching up rate (dependent) R: 0,521 R square: 0,272 Durbin Watson: 1,915 F: 35,796 Sig.: 0,000 Beta: -0, 099 Stand. Beta: -0,521 Normality: ok Multicollinearity: ok Homoscedasticity: problematic
b)		IWI catching up rate (indep.) IWI net growth (dependent) R: 0,570 R square: 0,325 Durbin Watson: 2,134 F: 46,197 Sig.: 0,000 Beta: 2,621 Stand. Beta: 0,57 Normality: acceptable Multicollinearity: ok Homoscedasticity: ok
c)		IWI net growth (independent) IWI 2019 (dependent) R: 0,502 R square: 0,252 Durbin Watson: 1,306 F: 34,651 Sig.: 0,000 Beta: 0,611 Stand. Beta: 0,503 Normality: good Multicollinearity: good Homoscedasticity: good
d)		IWI arrival (independent) IWI net growth (dependent) R: 0,347 R square: 0,120 Durbin Watson: 1,788 F: 14,072 Sig.: 0,000 Beta: -0, 309 Stand. Beta: -0,347 Normality: ok Multicollinearity: good Homoscedasticity: ok

Table 14 Linear regression results for consecutive relationships of the conceptual model adjustments

It seems that the correlations (a), (b) and (c) exhibit the behaviour which was predicted by the CLD. With (a) being balancing and (b) and (c) being reinforcing there is a clear balancing loop.

Correlations (a), (b) and (c) explain at least 25% of the data each. The exception is loop (b) with even stronger explanation of the data obtained (0,32). It also has the steepest slope (0,57).

Although 25% of data explained doesn't seem much, if taken into account a relatively small sample which constitutes a modest representation of migrants' situation in Nima, it becomes obvious that there are many more factors at play than only the impact of time. Without knowing and taking these factors into account the model can't show the full situation in Nima. However, it never aspired to do that.

Amartya Sen (1999) writes about multiple instrumental freedoms being intertwined. Material freedom transforming into material well-being is just one of them but other instrumental freedoms influence the material outcome as well. From that point of view, 25% of the data explained seems reasonable. What is more, IWI is the outcome, not the constitutive variable - the entire spectrum of factors cannot be explained by an outcome variable. In fact, with capabilities left out in the model, the constitutive factors stay in the 'black box' (Vennix, 1999) of the system even more than before.

What is an interesting finding is the correlation (d). It seems an outlier both in terms of the R square value which is much lower and in terms of steepness of the slope. Comparing it to the other variables' relationships it is the weakest one and also the one with the most vagueness of the slope.

First and foremost though, it balances the loop which was supposed to be reinforcing. That new discrepancy seems to result from the new logic of the model. With the variables being 'capacities' and 'development' so far, a reinforcing logic would hold. Currently, with only the developmental increase and with the argument of Piketty (2014) who points out at the gradually slowing down 'catch up' rate of development, the relationship presented by regression (d) seems uncertain.

However, there is one more possible explanation of why this loop became a balancing one. Perhaps regression (d) is currently nothing more than an indirect copy of the part of the loop presented by regressions (a) and (b). After all, it goes directly from the variables which have a clear negative correlation through regressions (a) and (b).

To check that, path analysis tools can be used. With multiple regression run for various variables, path analysis estimates the effects variables have on one another. Eventually, the direct effects are summed up and the indirect ones are multiplied (Foster, Barkus, Yavorsky, 2006, p.95).

The effects of 'IWI arrival' variable and 'IWI catching up rate' can be multiplied to check whether regressions (a) and (b) combined show an effect similar to regression (d) on its own.

Hence:

-0,521 x 0,570 = -0,296

Compared to the direct effect of -0,347 it can be argued that this is a 'close enough' fit. That is not a direct proof but it seems a reasonable premise to perceive regression (d) as unnecessary and assume that it is only a blurred version of a longer path explaining the behaviour.

To conclude: with three correlations confirming the assumed dependencies and one correlation rendered uncertain and its effect unnecessary for the model, a final version of the conceptual CLD gets its final shape.
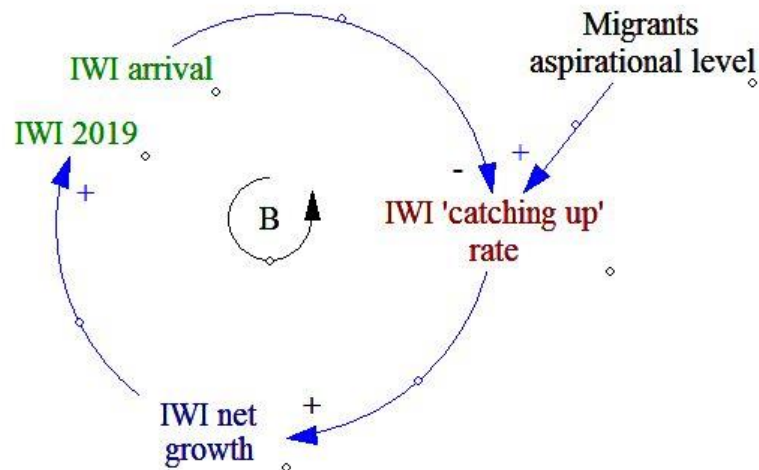
Figure 24 Updated conceptual model (CLD)

Regarding the 'catch up rate' there is one more robust argument proving that Piketty's remarks on the slowing down catch up rate are right, at least in Nima's context.

Running linear regression between the two main, 'input' variables, namely IWI arrival and IWI 2019 shows an interesting result. With R square reaching around 0,40 in both cases and distinctive beta coefficients, linear regression line and the logarithmic line show a strong correlation between the two IWI scores.
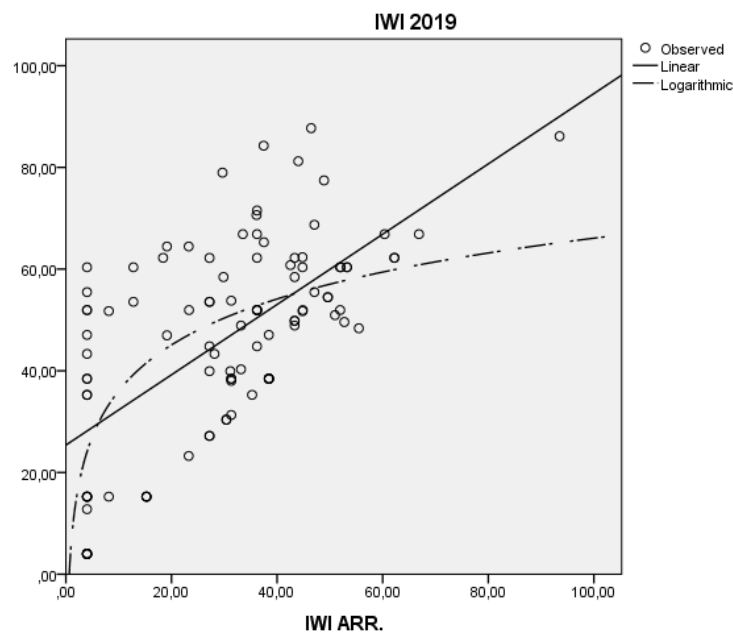
Figure 25 IWI at arrival / IWI 2019 regression curve

Although both of the lines are statistically valid, the logarithmic one seems to say more in terms of the dynamics of IWI growth. It shows that for lower arrival levels of IWI, the current ones are much higher. For the higher values of initial IWI score, current values don't change so much. Although this graph represents only 40% of data, still it seems a valid argument in confirming the 'catching up' dynamics of the arrival city – the bigger the gap, the faster the 'catching up' rate.

At the same time, this graph doesn't show the change over time. It only represents correlation between two variables. Although the exponential shape of the curve reminds the shape presented in the 'short way', it tells more about the catching up dynamics than about the absolute values of wealth accumulation. In other words, it seems to confirm the updated conceptual model.

Dynamic behaviour analysis

With the updated conceptual model representing only one (balancing loop), the s-shaped growth assumption accompanying the initial model falls.

At the same time, the updated model perfectly matches another archetype of dynamic behaviour, namely the goal seeking behaviour (Sterman, 2000). That is a major surprise of this research for as much as the updated conceptual model would exhibit some kind of a dynamic behaviour it was not aimed at fitting into another 'archetype'.
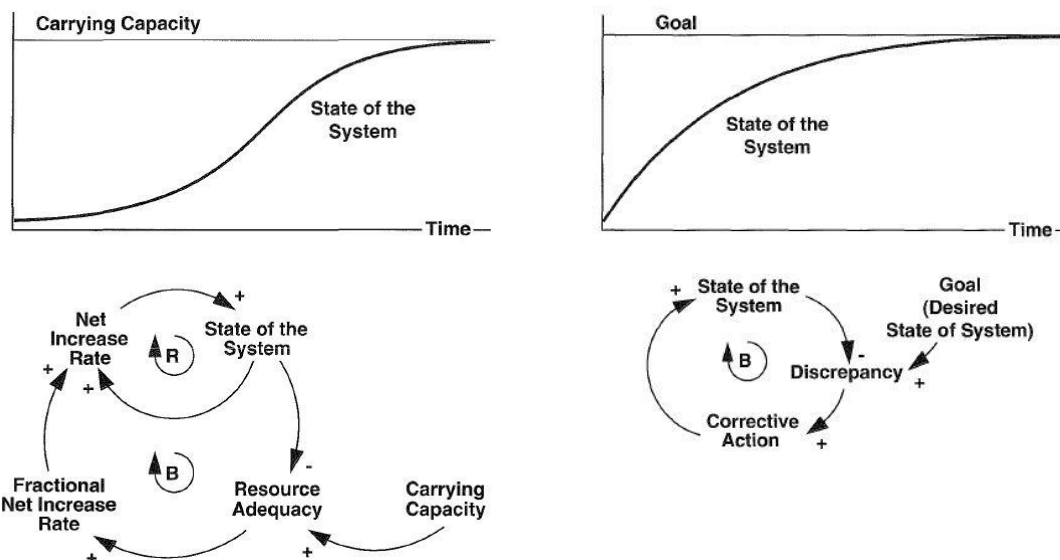
Figure 26 Comparison of archetypes of dynamic behaviour (Sterman, 2000)

The graph on the left shows the initial projected CLD structure. The one on the right shows the CLD of the updated conceptual model, based on the obtained data.

The graph on the right seems to be more modest but at the same time it is statistically robust. It explains around 25% of the data but in a complex system of the arrival city. With a relatively small sample it seems to be a relevant discovery.

At the same time, the graph on the right confirms the reference mode of the behaviour which was obtained from data in the previous part of this section.

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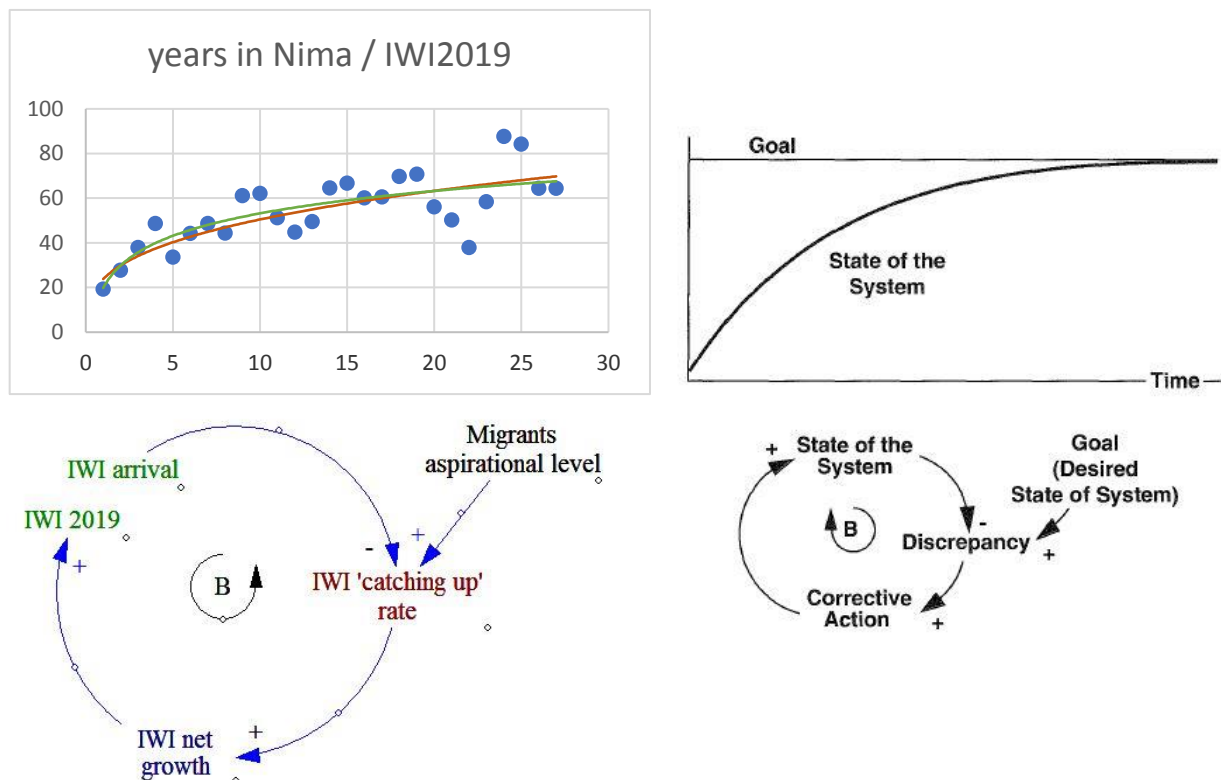
Figure 27 Comparison of the reference mode with the archetype (Sterman, 2000)

One could argue that 'discrepancy' variable is not the same as 'catching up rate'. This is true only at the surface. The catching up rate is in fact 'a rate of catching up according to observed discrepancy and existing opportunities'. In that sense, the discrepancy placed in the centre of attention by Sterman (2000) is a conscious motivation for certain actions which have their speed and rhythm manifested by the catch-up rate. The observable corrective action parallels the net IWI growth. Sterman's choice of variables' names seems to focus on the motivation of the system since it needs to be as general as possible. This thesis's focus is on migrants' collective efforts and this difference, epistemological if not semantical, can be easily bridged by shared understanding.

The behaviours of both archetypes (s-shaped growth and goal seeking) are not as different from each other as it would seem. Without the reinforcing loop fuelled by growing capabilities (deliberately left out), the growing system is anyway exposed to a juxtaposition with the discrepancy between its current state and the desired state of the system (or a carrying capacity) and thus it behaves accordingly. It still tries to make 'the best out of it' until it reaches the desired level or the level of the upper limit of the given environment. Both seem exogenous – they still are interesting from the arrival city point of view but this clearance exceeds the scope of assessing migrants' wealth accumulation dynamics which is solely an outcome of processes intrinsic to the environment.

Both of the models seem to fit the concept of an arrival city which was qualitative enough in its origin (Saunders, 2014) to give certain 'slack' for telling its dynamic story.

Nevertheless, with the reference mode showing a goal seeking behaviour and the conceptual CLD reproducing it, the dynamics of migrants' material development in Nima seems to have been revealed to a satisfactory extent.

Goal seeking behaviour as a part of an *s-shaped growth*. Conceptual analysis.

Research in Nima confirms that the dynamic of respondents' economic development reflects the dynamic of a goal seeking behaviour, as described by Sterman (2000).

Nevertheless, the nature of the curve presented on the diagram (Figure 27) does not tell if the behaviour shown reflects the whole behaviour of the system or rather if it expresses a part of a larger historical structure. The nature of systems, gaining complexity with more variables would suggest the second possibility – especially taken into account a rather modest number of variables included in the CLD. In other words, a shape of a goal seeking curve might be only a part of a larger s-shaped growth curve. The nature of an arrival city would suggest that and the following arguments explain that.

First of all, the scope of this research is rather modest, creating a 'snapshot' of Nima's reality and its inhabitants' development. As mentioned earlier, Nima has been an established arrival city for a few decades already, before the participants of this research arrived there.

Created around a military base during World War II and later equipped with decent infrastructure, present Nima is far past the first stages of an arrival city's creation. Saunders (2011) describes these initial stages as building almost from scratch, without access to the main city and relying on modest infrastructure, prone to possible failure. As a consequence, these initial stages are also characterised by a slow growth of important factors such as economic possibilities and well-being.

History of Nima clearly shows that this initial phase has been reached decades ago. Hence, all the amenities, networks and possibilities on site seem to have already accumulated, creating a path for faster growth and faster development of newcomers. That phase of an arrival city's story in which Nima appears to be in now is characterised by faster growth, already reaching stabilizing effects.

Taken all this into account, it seems that the goal seeking behaviour of Nima's newcomers' economic development captures a mature stage of an arrival city's development. This argument is developed further in Appendix 6.

The diagram below (Figure 28) illustrates this concept, juxtaposing larger s-shaped growth pattern presented in the theoretical section with the reference mode of data gathered in Nima.
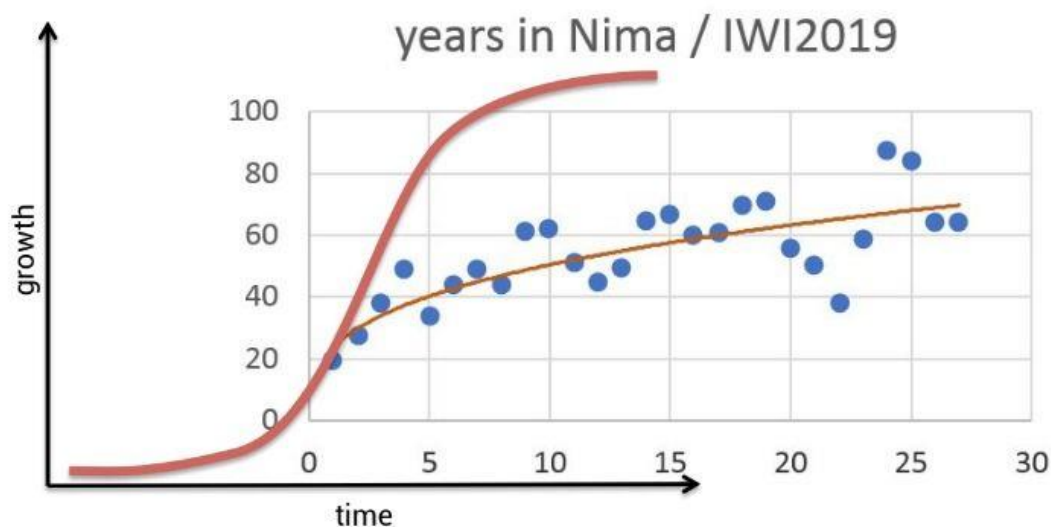

Figure 28 Juxtaposition of theoretical exponential growth and reference mode for Nima

Conclusions and recommendations

Research subquestions would be answered first, in order to generalize the conclusions towards the end of this chapter.

Subquestion 1

How do personal income and wealth influence migrants' capabilities in alleviating 'unfreedoms' - in respect to Sen's 'development as freedom' (1999) approach?

There is strong evidence that migrants' wealth level increases over time, although the pace of this growth differentiates largely across the population. The average pace of growth of wealth, measured by the International Wealth Index is 2,3 IWI points per annum and it exceed largely the pace of Accra's development growth.

Also, there is some correlation between time spent in Nima and the level of development. With around 25% of data explained by linear regression and a distinctive slope of around 0,5 (Appendix 4) it can be argued that the level of development in Nima increases over time.

This regression was run on the whole sample – not to be confused with the regression which was run on mean IWI/year of arrival versus current IWI levels which constituted the reference mode for the conceptual model. Nevertheless, both of these regressions confirm increase of wealth levels of migrants.

However, as found in Nima, development as defined by migrants is not only about *wealth* but predominantly about *work*. That fits Amartya Sen's theory strongly in a way explained below.

Sen (1999) finds economic freedoms twofold – as a value *per se* and as a factor instrumental in alleviating the default state of 'unfreedoms' in the Global South. Apart from being peoples' basic right, freedom itself is defined as "access [to] the goods and instruments which allow people to expand their 'capabilities' to lead the kind of lives they have a reason to value" (p.18).

This state of instrumental freedom seems crucial in interpreting the outcomes of this research. With researching not only the arrival city IWI levels but also pre-arrival conditions, a sharp decline was discovered between the well-being level of the place of origin and the place of arrival. Thus, it can be argued that development levels at hometowns and villages were frequently higher that in the initial conditions in Nima. Questioning the participants about that brought a relatively clear picture – places of origin, although equipped with tools of development, lacked the instrumental economic opportunity of finding a job. *Work*, the most frequently used word the research team heard in Nima, needs to be perceived as this instrument allowing people to expand their capabilities according to Sen's theory.

In other words, economic freedom is not only about ownership, income or capital but it is also about them giving a chance for further growth and leading a life 'one has a reason to value'. Work plays that role in Nima in two ways.

On one hand, work allows especially young people to become independent and make their own financial and lifestyle choices. That was often stressed in participants' comments. On the other hand, it was often mentioned that there was no work in the places of origin or work was limited to agriculture. That limits lifestyle choices but it also seems unsustainable from livelihood perspective. That lack of sustainability is often a reason to leave. Although access to amenities and goods is assured

in the place of origin, access to sustaining the growth of capabilities is hindered by the lack of job opportunities. That explains why people risk a sharp decline in material well-being in order to rebuild it over time in Nima – an environment where their capabilities could evolve.

What confirms Sen's work even more is the fact that income itself is not of first importance in migrants' stories. Obviously, respondents tried to maximize their income levels but access to work itself was a priority even if income stayed at very low levels.

Quantitative analysis seems to confirm that, trying to bridge migrants' length of stay with their income levels. Linear regression run on these variables showed almost no correlation (standardised beta of around 0,1) with the percent of data explained being not more than 1,2%. Also, conditions for linear regression were not properly met (Appendix 3).

As explained before, data gathered on income was porous and uncertain. First of all, the research team didn't put enough effort to ask additional questions which could clarify the big picture. Migrants often could not estimate how much they earned a day or even if so, a follow-up question about how many days a month they used to work was rarely asked. That was also caused by a certain reluctance in people's responses to this set of questions. It didn't seem to be caused by reluctance to the topic itself but by the precarious and uncertain state in which many migrants, especially the newly arrived ones, lived, not being able to answer.

Hence, it cannot be stated clearly whether income rose significantly over time albeit it can be stated that it was of secondary importance, compared to having a job at all. Quantitative analysis shows that as much as wealth used to grow significantly over time, income was less inclined to do so – correlations were weak but also the statistical robustness was lacking.

What can be confirmed is that income used to be higher with higher educational levels which aligns with Sen's framework of intertwined capabilities influencing each other. In that case it is social opportunities (Sen, 1999) influencing economic ones.

Income was also higher in the female group, perhaps because of less females arriving and thus more access to jobs traditionally associated with women.

As can be seen, the objective wealth's growth was quantitatively confirmed. That was not the case regarding income. Neither wealth and income's role in enhancing one's capabilities was confirmed in a quantitative manner clearly. Due to unsatisfactory data on income, the notion of capabilities was in fact dropped out from the conceptual model which from that point focused on material development. Nevertheless, clues regarding capabilities' growth in Nima could be found in qualitative aspects of this work, namely migrants' comments ("I have work", "I can feed my family", "I can send my children to school"; Appendix 1). Comments rarely referred to income itself, more to access to work in the first place. That seems to be telling from capabilities perspective.

Sub-question 2
What is the dynamic of migrants' development level's growth in an 'arrival city' (Saunders, 2011), juxtaposed with Accra's development level's increase over time?

As outlined in general conclusions, there is a quite clear 'goal seeking' behaviour characterising migrants' development level's growth, at least on the individual scale.

Linear regression was run on 'mean IWI score for a certain year of arrival' versus current IWI levels (Appendix 2). With a slope of 0,716 and half of data explained by regression, it strongly confirms the

growth of development levels. However, deeper quantitative analysis shows exponential nature of this growth. Exponential lines presented by logarithmic and power equations explain up to 60% and 68% of data respectively. These lines constituted the reference mode (Vennix, 1999; Sterman, 2000) for an updated conceptual model, also presented in the general conclusions. This model was tested with further regressions confirming correlations on assumed causal dependencies. The exponential nature of growth clearly confirms the 'catching up' dynamics of growth in the arrival city, often mentioned by Saunders in his work (2011).

The conceptual model shows that the higher initial level of development, the slower the 'catching up' rate. That is the only balancing force of the causal loop described by the model, which makes a whole loop balancing in nature. This rate of catching up is influenced positively by migrants' aspirational levels which reflects the arrival city's theory. The higher the 'catching up' rate, the higher the net IWI growth. That dependency was confirmed by the strongest correlation in the loop (Appendix 5). Subsequently, the higher the net IWI growth the higher the current wealth level is.

Data confirming Saunders' perspective on the workings of an arrival city were confirmed in two ways. First, the reference mode confirmed it and then, it was confirmed again by the updated causal loop diagram. They both present the same type of systemic archetype (Sterman, 2000) called 'a goal seeking behaviour'. As stressed in the methodological section, it was never clear if Saunders in his work refers to an s-shaped or the goal seeking nature of growth. Empirical research confirmed that at least regarding the sample of migrants in Nima, goal seeking behaviour was exhibited.

Albeit, what do migrants catch up with in the first place? Data obtained from the Global Data Lab (2019) and Ghanaian 2012 census show steady growth of Accra's development levels. As stated already, the catching up rate was roughly estimated to be around 2,3 IWI points per year. For the whole city of Accra, it is around 1 IWI point per year in the period of the last 23 years (measured until 2017). That shows that migrants' development growth is almost 2,5 times faster than the growth of the city itself, again confirming both Saunders' and Piketty's claims of the catching up nature of development.

Nevertheless, the household perspective was not fully covered and again, pieces of qualitative information obtained shed some light on the scale of development. IWI score measured in this research largely focused on individual IWI levels but migrants often mentioned contributing to rural development with remittances. From that perspective, their households were often stretched between Nima and their places of origin. Whenever it wasn't, it can be assumed that material development of breadwinners contributed to their households' well-being.

Albeit, with this stretch observed both qualitatively (comments on helping parents and/or children in the place of origin) and quantitatively (46 respondents stated that family lived together with then, 51 stated separation from their families), the household development rate becomes more complex.

With the lack of job opportunities in rural areas, migrants' development seems stalled. Hence, most of possible development comes through the arrival city – is 'hassled' there and expedited back by migrants. Sometimes personal material development in Nima is observed and shared with one's family back home – in that case both parties draw from increased material well-being. However, in some cases migrant's well-being increase is suspended or delayed in order to send remittances. That was a case of Tahini Abdul Aziz (Appendix 1), a woman earning enough to rent a room for herself but deliberately choosing to stay without a home for years in order to send more money for her children attending school in the place of origin.

To conclude, as much as personal development level surely grows for Nima's migrants, with over a half of their households stretched between at least two locations, growth also becomes unevenly divided

between these. Most probably, if research was to be conducted only among solitaire migrants with no strong ties to places of origin (such were also often met), both material development growth and the 'catching up' rate could be much higher. Such comparative research is highly recommended.

Sub-question 3

How does migrants' wealth accumulation relate to Piketty's (2014) law of divergence and author's explanation of the exponential nature of capital's growth?

When it comes to Piketty's law of divergence, author himself calls it a 'historical reality' more than a 'logical necessity' (2014, p.512). What that means, among many other factors is that it can work differently in different contexts.

If the economy is growing slow, capital gets much importance. Income's growth rate higher than the economy's growth can somehow bridge the gap between the return from capital and return from growth of the economy. In a fast-growing economy, return on capital can partially lose its importance. Thus, even with steady, slowly-growing income, people can 'get by'. It holds true especially with growing purchasing power which was a case in Ghana for a long time. That could partially explain why growth of income is not observed in this thesis's empirical research and still the capital is slowly accumulated and contributes to people's well-being. Nevertheless, some participants reported 'market getting worse' (Appendix 1) which can be confirmed by growing inflation and recent trouble of GHS, the Ghanaian currency.

Despite that, there is exponential dynamic observed in the arrival city located in Nima. Summarising Piketty in the most straightforward way - accumulated wealth makes it easier to accumulate more wealth.

Piketty mentions exponential growth as it is observed mathematically – with a long initial phase of slow growth, quick consecutive phase of speeding up and finally shooting up greatly in a short time span.

However, the observed catching up rate behaves differently. A rate initially higher and slowing down gradually is confirmed in regard to Nima's newcomers. Growth is slowing down, not speeding up. That would suggest that migrants start with some level of development assured at the start (around 30 IWI points) and that their phase of development parallels not the first slow phase of exponential growth but the second one, quite fast. Albeit, it never reaches the 'shooting up' phase as most exponential growths never do – they operate in certain environments and these environments limit their growth. In that case, a symbolic limit can be Accra's IWI level, being around 67 IWI points in 2017. With research sample's IWI of around 50 points there is still way to go but it may at the same time close enough for the growth to start slow down. That is clearly visible in the reference mode diagram.

A good question would be why migrants skip the initial long phase of low growth. The answer seems to be placed, on one hand, in the very idea of the arrival city itself and in Nima's characteristic on the other.

Migrants come to an arrival city simply because the area has a confirmed opinion of a place with a short way of development. It has the right density, information flow, job opportunities and infrastructure to enable this growth. Perhaps this is what one of the respondents meant saying "The more people in the area, the more job opportunities" (Appendix 1). Of course, this is not true in the latter phase of development slowing down, but it is surely true in the second, relatively quick phase.

Perhaps speaking from her own experience, she knew only that phase and she described it as she knew it – giving evidence of Nima experiencing this phase.

In addition to that, Saunders (2011) claims that successful migrants or their descendants often move out to 'better' areas, making new space for newcomers. From that point of view, arrival city always stays 'locked' in this fast-growth phase for a long time (longer than migrants' single generation time span), acquiring and confirming its reputation and attracting more migrants – thus, growing.

Nima confirms why migrants can experience the second phase already, even if they stay homeless. It has its infrastructure already in place with sewage system, concrete roads or electricity easily available. That, according to Saunders, constitutes a successful arrival city. In other words, Piketty's 'wealth' - taken as access to goods, is already accumulated in the area on a certain level, facilitating further faster growth. This seems to be confirmed by data presented in Appendix 6.

General conclusions

The main research question of this thesis was:

What are the dynamics of economic development (measured by change in International Wealth Index) of migrants settling and settled in the arrival city of Accra?

The arrival city is a complex system of interdependent factors fuelling or stemming the growth of wealth of its inhabitants.

In this thesis, it was assumed from the start that the material success of the arrival city is equalized with the material success of its inhabitants. Hence, when speaking of economic development dynamics of the arrival city as described in Saunders' work (2014), the quantitatively depicted story of migrants' development was taken as a point of reference. After all, they create the arrival city which in that sense is not simply a spatial entity within a city but functions more as a geographically located set of opportunities and limitations for individual's or households' growth. Since per definition an arrival city is always 'in the making ', it is always a starting point for someone's arrival.

Qualitative research of migrants' material well-being was based on International Wealth Index – a robust methodology developed for cross-country measurement and comparison of wealth levels (Smits & Steendijk, 2015). Data was gathered in a representative sample of migrants in Nima, Accra and three consecutive levels of IWI were computed – pre-arrival IWI, IWI at the moment of arrival and current (2019) IWI level.

People arriving in the arrival city of Nima often rely on previously accumulated capital and opportunities. However, surprisingly often they experience a sharp decline in well-being levels as well.

IWI pre-arrival	IWI arrival	IWI 2019
42,90	29,98	46,11

Table 15 Mean IWI levels measured by research
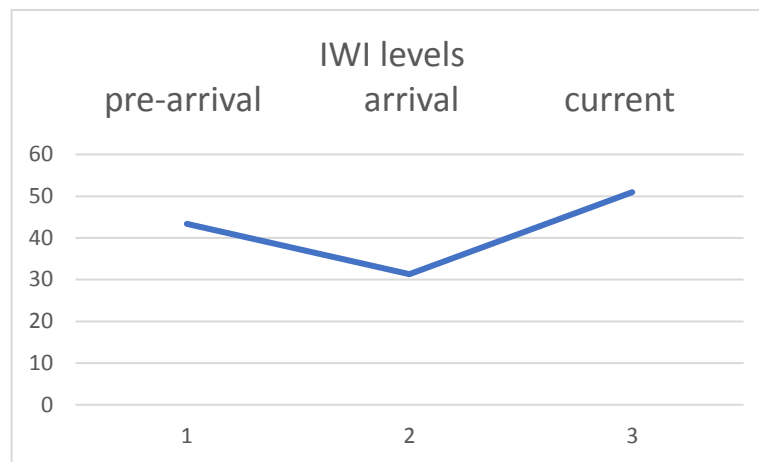
Figure 29 Graphic representation of IWI levels change over time

Mean values of 108 participants' IWI scores show a pattern: migrants often experience a drop in IWI level at the moment of the arrival. Mean values indicate a modest decline of around 10 points but individual surveys show a much larger spread.

The IWI score of arrival oscillates around the value of 30. With the average time of 7 years spent in Nima it grows over the pre-arrival levels to the mean value of around 50 points.

Accra's IWI level growth over time as well. For the period between 1995 and 2017 the observed growth was almost 20 points which gives a pace of around 1 IWI point per year.

With mean time of stay in Nima being 7 years and IWI values of 29,98 (arrival) and 46,11 (2019) the mean annual IWI growth is 2,3 IWI points per year.

Conclusions based on mean values seem a good point of reference for generalisations however, they don't expose the intrinsic, non-linear dynamics of the arrival city system. In order to unravel these, system dynamics tools were used, namely a conceptual causal loop diagram. CLD, updated with research discoveries, exhibit a 'goal seeking behaviour' of the system matching one of the methodology's archetype behaviours (Sterman, 2000).
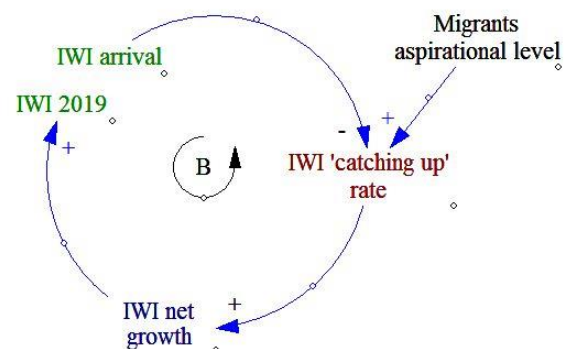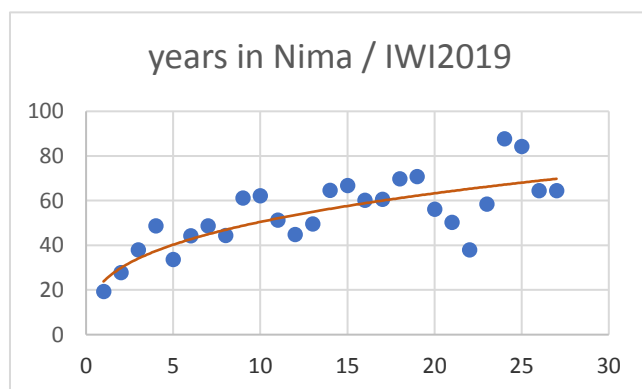
Figure 30 Reference mode and the updated conceptual model

Hence, the answer to the main research question is two-fold.

First of all, the main dynamic of migrants' economic development is evident growth. The arrival itself, however generally preceded by a decline in well-being, is a starting point towards higher wealth access in the future.

Secondly, this growth itself is characterised by a goal seeking behaviour. What that means is that well-being growth is quicker at the start, presenting a rather quick 'catching up' dynamics and it slows down along the way as it approaches the 'goal'.

The goal itself stays in the black box of the arrival city's opportunities and limitations nexus. It might refer to micro-scale factors such as migrants reaching their maximum capabilities (Sen, 1999) in a given environment (based on their education, initial financial levels, gender, health and social access). One among many suggestions might be the words of one of the participants: "Without education, I still see opportunities lying on the streets. I just don't know how to pick them up" (Appendix 1).

The goal might be the carrying capacity of Nima itself, driven by macro-scale factors such as population density, jobs availability or infrastructural conditions. However, as one of the female participants put it: "The more people in the area, the more job opportunities" (Appendix 1). This apparently systemic reasoning explains the welcoming spirit of Nima well. It should also be examined by further research but surely, as a first-hand expertise, it needs be taken into account. What is certain is that it resonates well with Saunders' description of the arrival city's spirit.

Most probably, the goal towards which migrant's well-being growth heads is a mix of both macro- and micro-scale factors. Nevertheless, answering that question exceeds the scope of this thesis.

When speaking about the inflow to Nima, certain things need to be pointed out about the outflow. Saunders's concept (2011) assumes an outflow of inhabitants (successful migrants) towards better, more comfortable and prestigious locations within the city. This research, focused quantitatively on current in-migrants could not provide insight into that.

Saunders claims that 'everyone' wants to leave the arrival city by moving out physically or by transforming the city (2011). Informal conversations and comments included in the surveys would suggest that both of these patterns take place in Nima. Also, Saunders seems less focused on the third possibility which means parents staying in Nima for good and their children, equipped with more social, economic and educational capabilities leaving Nima.

In that vein, many quite wealthy, settled migrants didn't show any will to leave for other locations. In other words, with a certain level of wealth Nima can be a good place to live. That would suggest that Nima with its central position and decent infrastructure has started to become and established, core neighbourhood of Accra. In that case, its 'arrival city' features would 'dry up' over time and newcomers would seek for a new life in less equipped, cheaper and emerging places such as Old Fadama.

For now, Nima still plays its role as one of the main arrival cities of Accra. Nevertheless, it seems to be caught in a phase which every arrival city experiences eventually – for some it is barely a 'transition place' whereas for others it is already a home.

Recommendations for further research

This thesis focused of confirming empirically whether the arrival city in fact gives such broad opportunities of material development growth. This seems to have been confirmed by this work. However, the factors influencing this development growth have not been specified and their impact on migrants have not been assessed.

Still in the arrival city framework, it would seem scientifically relevant to measure at least two aspects of material well-being: the impact of consecutive IWI elements on well-being on one hand and the links between income and wealth on the other hand.

IWI proved to be a reliable and robust measurement of wealth, providing detailed insight into individual's material condition. It would be interesting to follow up on that and measure the impact of certain aspects of material wellbeing on its overall growth: for instance, the access to electricity and wealth accumulation, access to sanitary conditions, or ownership of a phone juxtaposed with wealth accumulation. That could help to estimate which factors seem crucial in given circumstances. This kind of overview could be easily done even with the dataset gathered during this research.

On the other hand, links between income and wealth, especially taken into account critical economic theories, could be investigated with more detail within the arrival city theory. This research didn't allow to do that facing the lack of properly gathered data regarding income itself. However, the role of income in wealth accumulation is something that could provide valuable insight for policy makers approaching arrival cities in practice.

Also, as mentioned before, researching solitaire migrants and juxtaposing them with the ones providing for their family far outside of Nima could provide a lot of insight into the dynamics of material growth on the individual and household scale separately.

To conclude, research material obtained in the process of writing this thesis leaves a lot of room for further studies. With more than 50 variables gathered, even with a relatively modest sample of 108 people, it still contains many interesting juxtapositions and regressions which the scope of this thesis didn't allow to explore. Some insights can be easily obtained from the data already, some needs further quantitative inquiry.

It seems that system dynamics also has a big potential in exploring the mechanisms behind broad concepts such as an arrival city or migration to cities in general. Actually, it is not a new concept. Jay W. Forrester wrote his 'Urban Dynamics' already in the year 1960. The ongoing works of a powerful institutions such as the Millennium Institute are focused on creating systemic models for countries regarding development and they receive a lot of recognition.

It seems that an arrival city, bridging migration and urbanisation issues in a coherent way can be a powerful framework for future research if provided with more quantitative tools. That brings to another suggestion direction of research regarding, again, Nima. Longitudinal data could be used (if obtained) bridging the origins of Nima with this thesis's research findings and thus, presenting a full story of an arrival city.

International Wealth Index, although already quite universal and certainly tested from its mathematical robustness could be further developed in order to fit reality-on-site better. For instance, in the current system, the same value is given to having 1 and 0 rooms available for sleep. In reality, having one room or no room at all makes a great practical difference from the perspective of material well-being and possible wealth accumulation. Currently, IWI is not sensitive to these differences.

On the other hand, IWI's universality establishes its limitations. Having a set-in-stone set of variables or objects might reflect statistically common set of belongings but sometimes it simply does not fit. For instance, as much as having a car was simply not accessible for migrants in Nima but it could have been assumed that it was on their 'bucket list' of prestige and development, having a bicycle seemed irrelevant and redundant in the dense area of Nima. At the same time, migrants often stated that they used to have bicycles back in the rural areas.

What that means is that IWI set does not fit rural and urban realities equally. At the same time, the division between rural and urban often gets increasingly blurred these days. This is not a simple task though, but certainly creating two comparable sets of IWI factors could be one solution. The other option could be introducing one 'slack' variable for objects perceived as relevant but not included in the set – or the opposite, allowing respondents to point out an irrelevant factor for them not to decrease their IWI score with something they would never obtain anyway.

The other important aspect of developing the IWI project would be specifying the elements which are sensitive to cultural or developmental differences. One example would be water access, mentioned in the previous section. IWI guidelines mention 'private, piper-water' however what 'private means' could be specified more for in case of migrants in Nima private often meant 'accessible at the compound' where usually dozens of people lived. Especially the three factors subject to grading (water, toilet, floor; the rest of the factors is binary) should be scrutinized and specified more.

Recommendations for policy makers

As claimed from the beginning of this thesis, the concept of an arrival city is a valuable framework for perceiving slum areas, informal neighbourhoods or any other non-recognized spatial entities. Even with regard to established, recognised structures as the Nima it can provide a lot of insight for policy design. Accra itself has multiple locations which can be easily called arrival cities - for instance Old Fadama. Nima's example, if taken from the arrival city perspective, can show how much basic infrastructure can foster people's material well-being and assure that they don't fall below some levels of basic aspect to amenities when they arrive in the city.

In that sense, recommendations for further research are linked with ones for policy makers. Further scientific evidence on the fact that arrival cities 'work', especially if accompanied with easily accessible and understandable computer simulations (again, system dynamics) can provide a powerful tool for decision-makers, assuming their good will. Vennix (1999) argues that models easily become a tool of political fights, providing many disturbing examples. That might be true – models are used mainly when they prove what a given party of the debate wants to prove. However, the awareness grows constantly and there is always some grey area of decision makers who genuinely seek for sustainable solutions. Moreover, this logic slowly reaches the highest institutional levels. UNDP local programs and the Sustainable Goal 11 mention 'slum upgrading' which aligns with Saunders' call for assistance and investments instead of deterioration and denial of arrival area's existence.

Urbanisation-migration nexus related issues seem to be increasingly pressing. Evidence from research such as this one proved that successful arrival cities exist if provided with basic infrastructure and amenities and that would be the main policy recommendation.

From that perspective, Nima was historically lucky. Growing around former military base, it had basic infrastructure and job opportunities on site quite early. After almost 8 decades it still functions as an

arrival area, even with a high degree of established residents. Places such as Old Fadama or Usshertown are growing too but they are not as well-equipped in amenities and for that reason they might become 'problematic' for sanitary reasons or might cause social unrest in the future. Most probably, in such case blame would be put on migrants themselves. However, this research shows that migrants have high levels of agency and persistence to get by. They organise themselves, know each other and are taught to cooperate. According to Saunders, they simply need some degree of assistance – not seen as providing for them but 'lending a hand'. This research seems to confirm this perspective, confirming migrants' ability to function well in propitious conditions. This thesis recommendation for policy makers would be to provide these basic conditions in terms of inclusive legal framework, security, sewage, roads or electricity to arrival areas which are newly created and with job opportunities deteriorating in the rural areas will most likely continue to be created.

Nima is already perceived as secure and, as stated before, has sewage system, paver roads and electricity. However, the system which allows house-owners to ask for 1 or 2 years rent in advance remains problematic. It cuts newcomers from accessing any housing and adds to overcrowding of rooms, forces them into debt or to live on the streets for years. That is surely one kind of improvements that requires state intervention.

Reflections on the research process

Research conducted in a West African state by a Polish student obtaining education in the Netherlands always triggers questions regarding its justification and validity. The issue of remaining and 'educational tourist' instead of a full-fetched researcher was something that had to be confronted with on numerous occasions throughout the process.

For instance, in Nima, when many participants without formal education could not speak English, Ms Ali Halid's insight and language skills were much more useful than these of the author of the thesis. What kept me relatively useful on the research site was a strong theoretical underpinning regarding the arrival city. That allowed asking additional questions or seeking clarification in the situations when, without this underpinning, respondents' answers would stay ambiguous and irrelevant in the analysis phase.

Hence, the question remains – shouldn't the Ghanaian students do such research themselves in the first place? Are Europeans students properly equipped to research Global South to justify their trip, the money spent or carbon dioxide emitted? On another level, can the educational purpose of a European institution justify involuntary strengthening of the problematic and toxic archetype of a white man, intellectually and technically more qualified to research the world than the local population?

The best example of this discrepancy of narratives was my and Ms Ali Halid's different approach to potential participants which I only noticed over time. First, I kept introducing myself as doing research for a university, asking people for their time. I tried to give myself more credibility by phrasing it this way. Instead, Ms Ali Halid often used the phrase 'school project' asking for people's *help*. There seems to be a profound semantic difference in asking for someone's time or for their help. Asking for help highlights the credibility of the participants, not the researcher and logically seems far more accurate. After all, the slum dwellers of Nima were the ones having the knowledge about the arrival city. Luckily for us, they were generous in sharing it.

I would suggest that this kind of overseas research (and I mean only students' level because academic professional research is something far more relevant) can be still meaningful as long as it remains *asking for help* – help to understand first and then to explain the complex world to others in Europe; not to gain further leverage but to explain the numerous misconceptions to the not-always-so-enlightened Europeans back home; to learn to approach the complex world with modesty and care.

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Appendix 1

Source Data Excel File (external)

Appendix 2

Mean IWI score for a certain year of arrival / years in Nima correlation

Linear regression analysis / Excel output

Independent variable: Years in Nima (only the ones present in research)

Dependent variable: Mean IWI score for a certain year of arrival

This regression shows correlation between mean IWI score per year and years spent in Nima but it excludes the years of arrival which were not present in the research completely. In other words, only length of stay which was actually encountered in the research was included.

This regression was checked in Excel instead of SPSS for technical reasons. 'MeanIWI2019spssNOBLANKS' was obtained by SPSS mean calculation but was described by the software as a 'string variable' and linear regression could not be rendered despite efforts to change the characteristics of the variable.

SPSS lets only a variable with all consecutive years present to be calculated although it eventually excludes the values which are missing from the calculation anyway. Excel allows to calculate a set of years with missing values because it simply juxtaposes the two tables and simulates regression lines afterwards.

Chart Title

$y = 14{,}504\ln(x) + 19{,}8$
$R^2 = 0{,}5977$

$y = 23{,}824x^{0{,}3261}$
$R^2 = 0{,}6861$
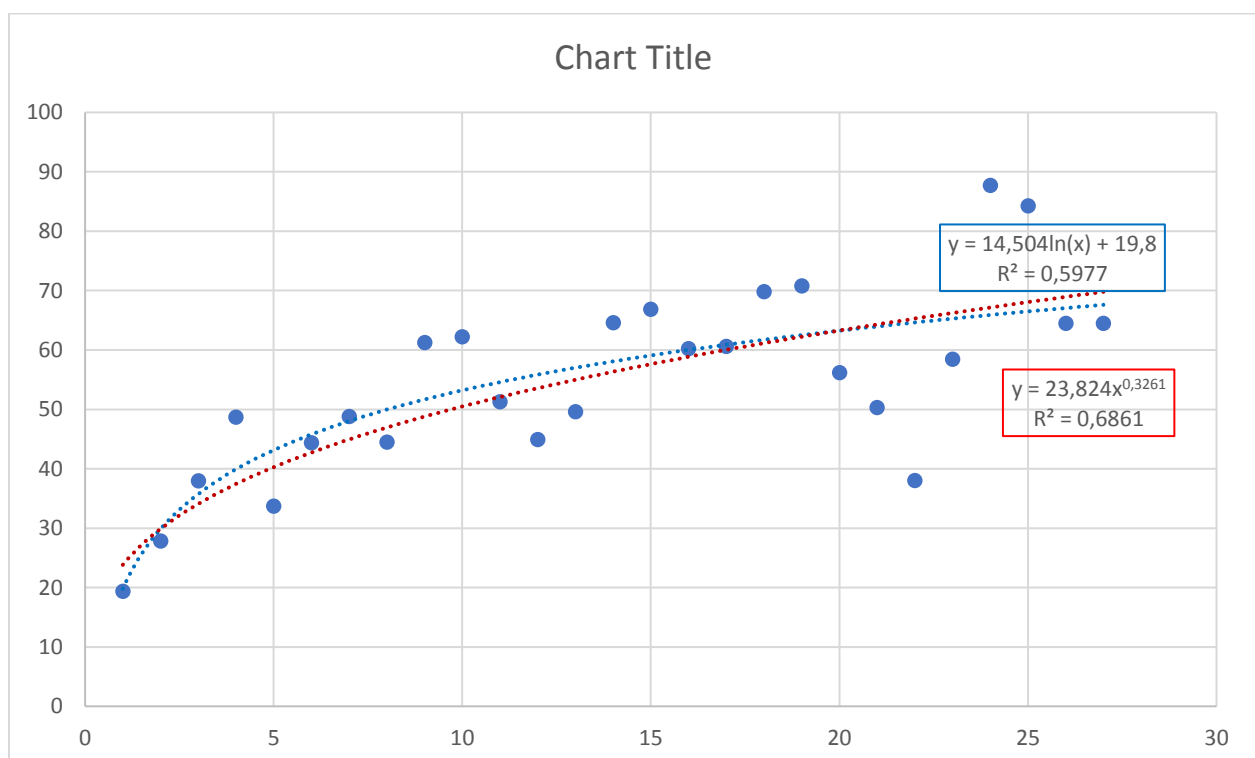
Not to cause any confusion, detailed data (obtained with SPSS but put in Excel afterwards) is presented below.

yrNIMAspssNOBLANKS	meanIWI2019spssNOBLANKS
0	19,35429
1	27,80429
2	37,95643
3	48,67778
4	33,66875
5	44,36714
6	48,76333
7	44,49111
8	61,23
9	62,21
10	51,28667
11	44,88
12	49,60667
13	64,595
14	66,87
15	60,205
17	60,57
18	69,83
19	70,785
20	56,15
24	50,315
25	38,02
26	58,44
31	87,71
32	84,27
46	64,45
47	64,45

Since Escel does not provide data on model statistical relevance and robustness, the respective regression from SPSS is also provided (with missing years present as the input but omitted by the software).

Independent variable: Years in Nima (0-47)

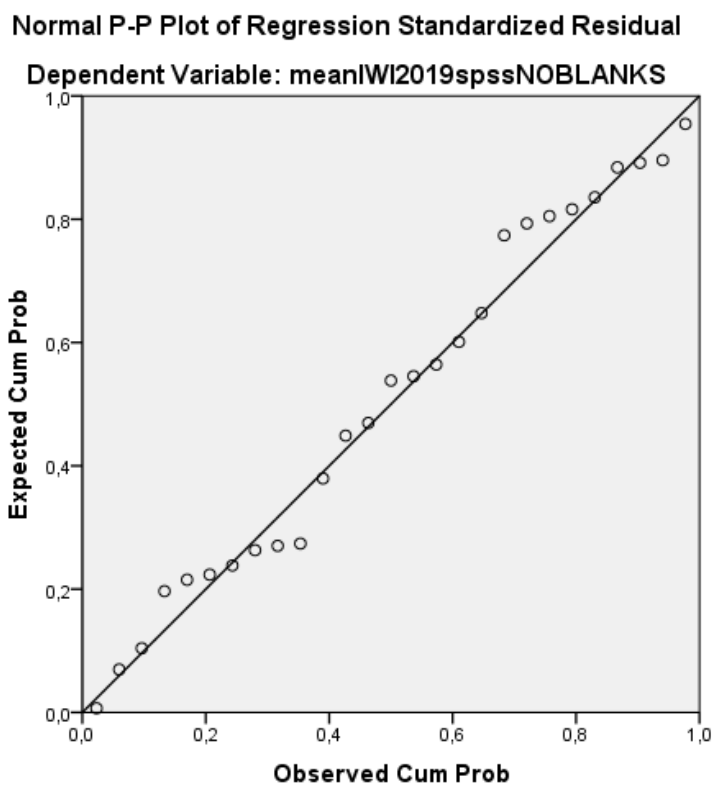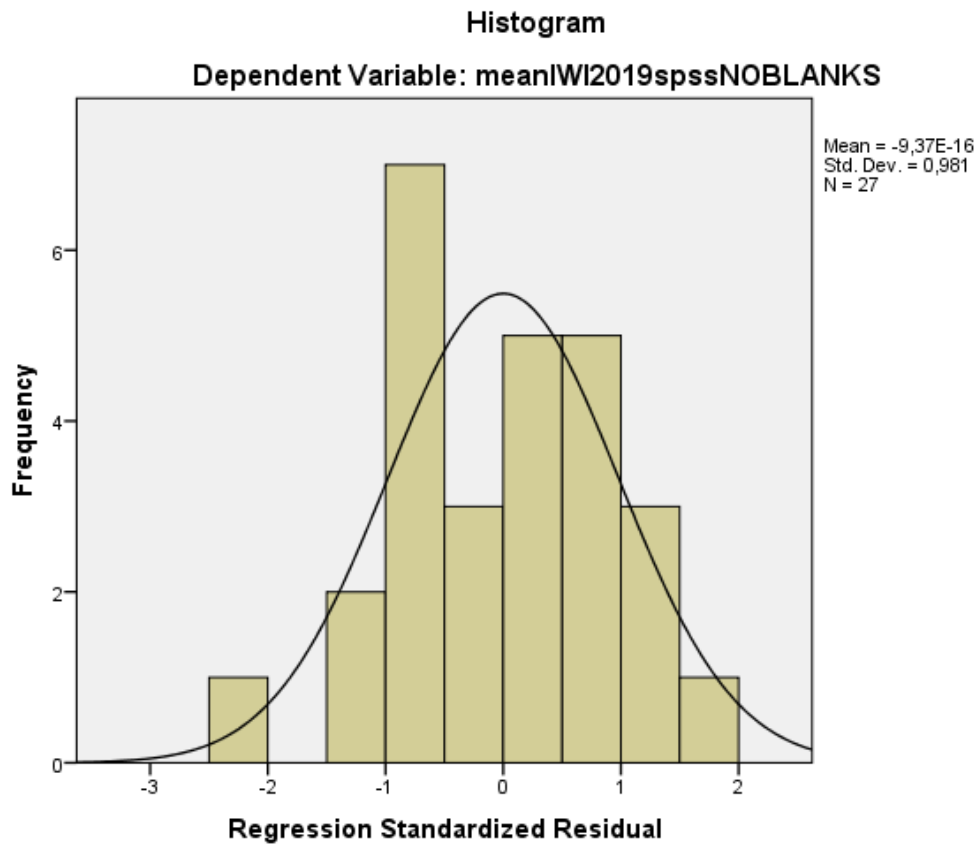Dependent variable: Mean IWI score for a certain year of arrival

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,716[a]	,513	,494	11,231288800 000000	1,108

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3322,209	1	3322,209	26,337	,000[b]
	Residual	3153,546	25	126,142		
	Total	6475,755	26			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	35,966	4,206		8,552	,000		
	yrNIMAspss	1,424	,278	,716	5,132	,000	1,000	1,000

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	yrNIMAspss
1	1	1,858	1,000	,07	,07
	2	,142	3,615	,93	,93

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	35,965885160 00000	72,993850710 00000	54,479868460 00000	11,303860080 000000	27
Residual	-27,853088380 000000	18,988607410 000000	-,00000000000 0011	11,013184760 000000	27
Std. Predicted Value	-1,638	1,638	,000	1,000	27
Std. Residual	-2,480	1,691	,000	,981	27

Histogram

Dependent Variable: meanIWI2019spssNOBLANKS

Mean = -9,37E-16
Std. Dev. = 0,981
N = 27

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: meanIWI2019spssNOBLANKS

Scatterplot
Dependent Variable: meanIWI2019spssNOBLANKS

meanIWI2019spssNOBLANKS
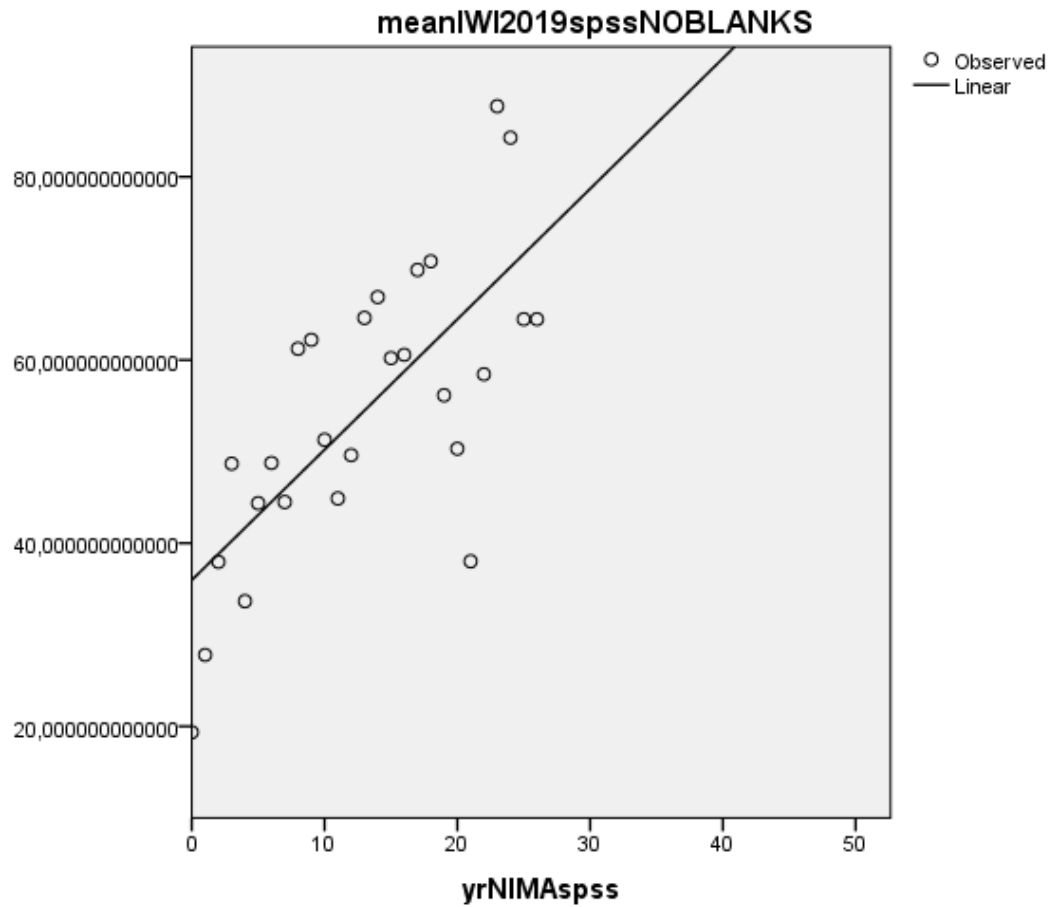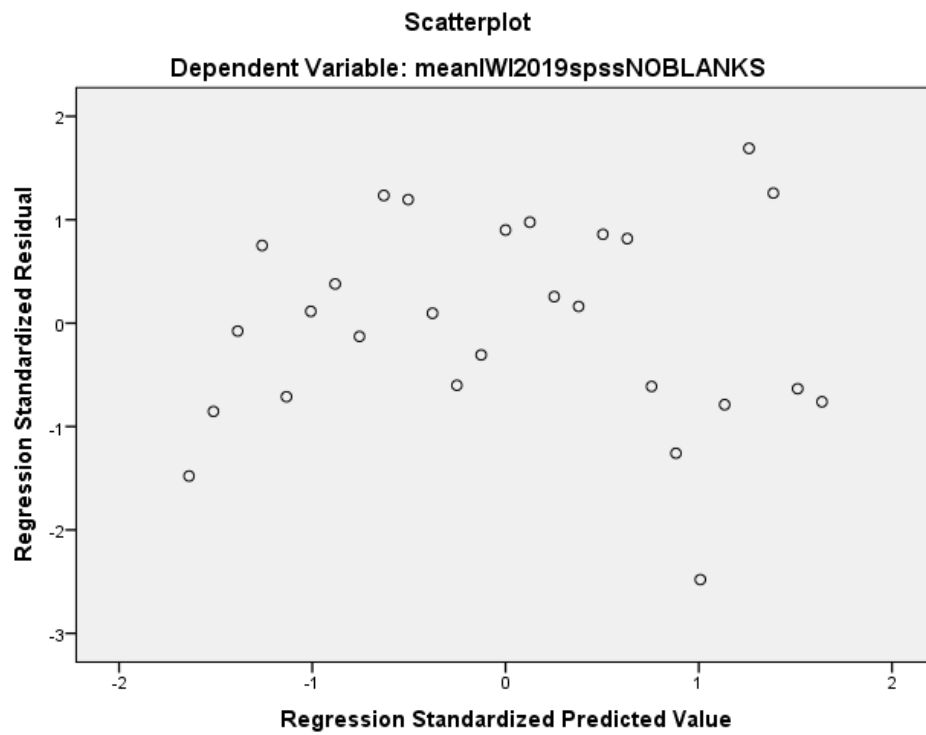
Appendix 3

Time spent in Nima and income 2019 correlation

Linear regression analysis / SPSS output

Independent variable: time spent in Nima by migrants

Dependent variable: income 2019

Model Summary[b]

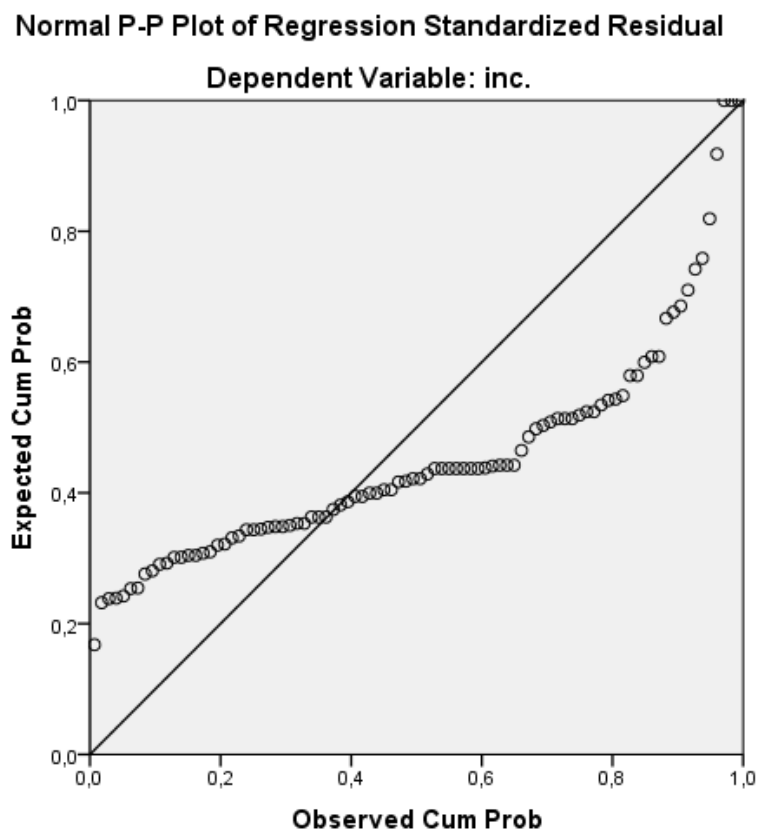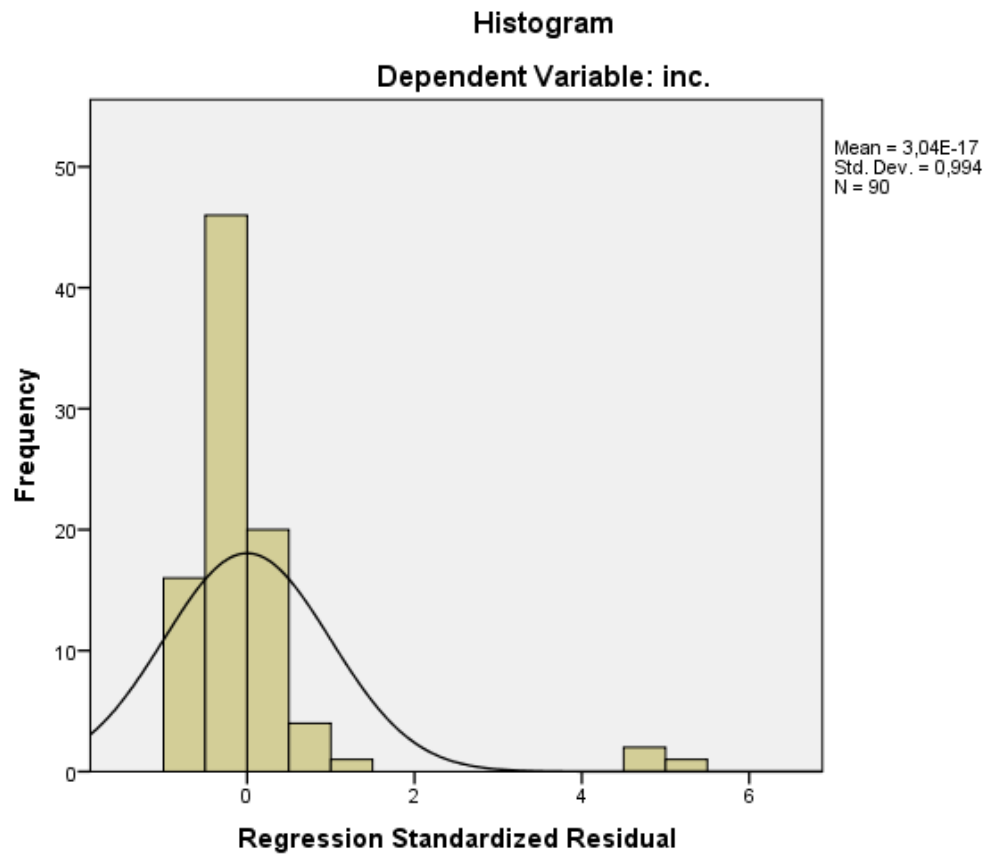| Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,111[a]	,012	,001	916,183	1,774

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	913788,497	1	913788,497	1,089	,300[b]
	Residual	73866390,390	88	839390,800		
	Total	74780178,890	89			

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	521,120	132,576		3,931	,000		
	yrs in Nima	11,946	11,449	,111	1,043	,300	1,000	1,000

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	yrs in Nima
1	1	1,685	1,000	,16	,16
	2	,315	2,313	,84	,84

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	521,12	1082,57	615,89	101,328	90
Residual	-882,567	4799,695	,000	911,021	90
Std. Predicted Value	-,935	4,606	,000	1,000	90
Std. Residual	-,963	5,239	,000	,994	90

Histogram

Dependent Variable: inc.

Mean = 3,04E-17
Std. Dev. = 0,994
N = 90

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: inc.

Scatterplot

Dependent Variable: inc.

inc.
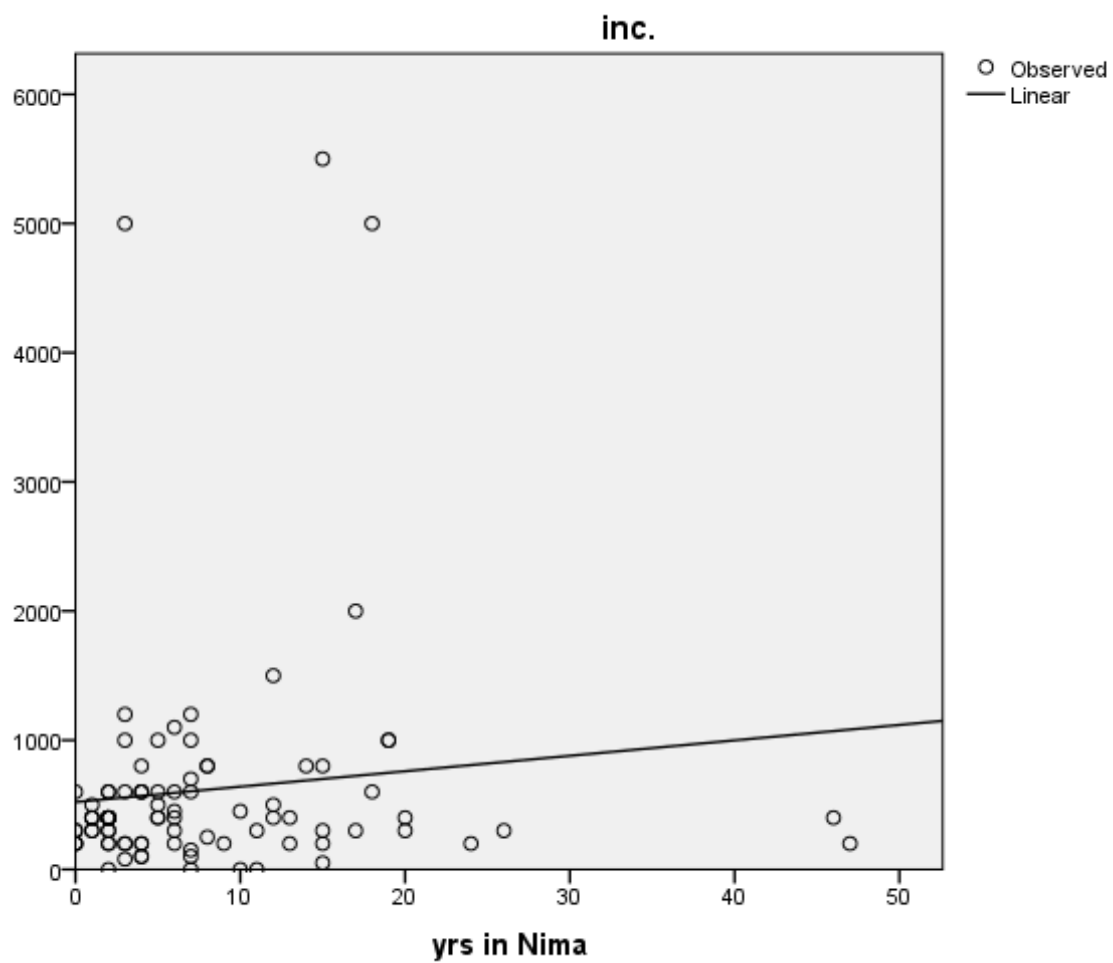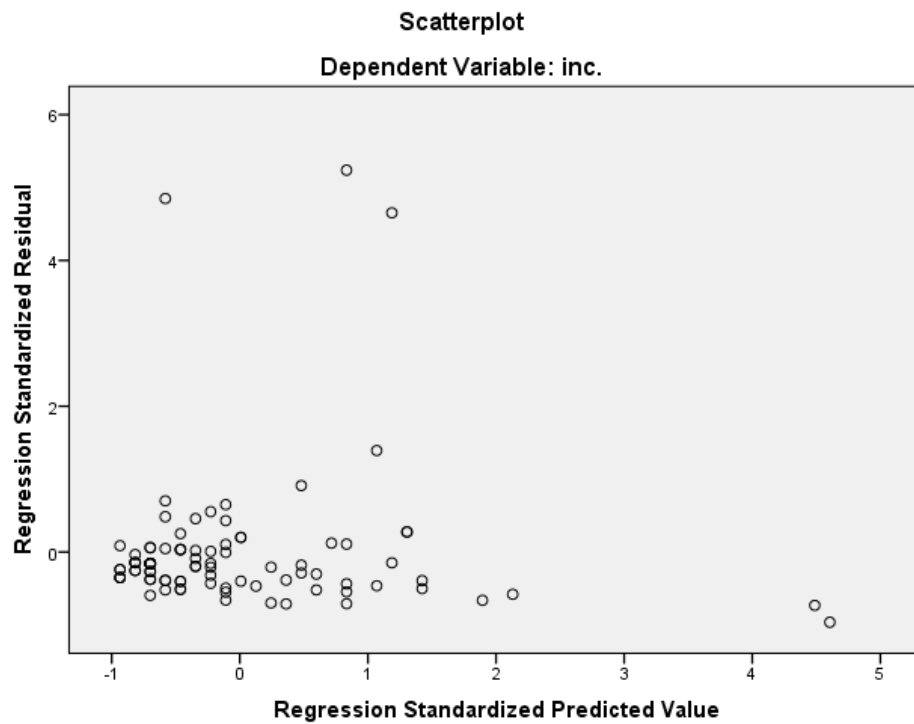
Appendix 4

Time spent in Nima and IWI 2019 correlation

Linear regression analisys / SPSS output

Independent variable: time spent in Nima by migrants
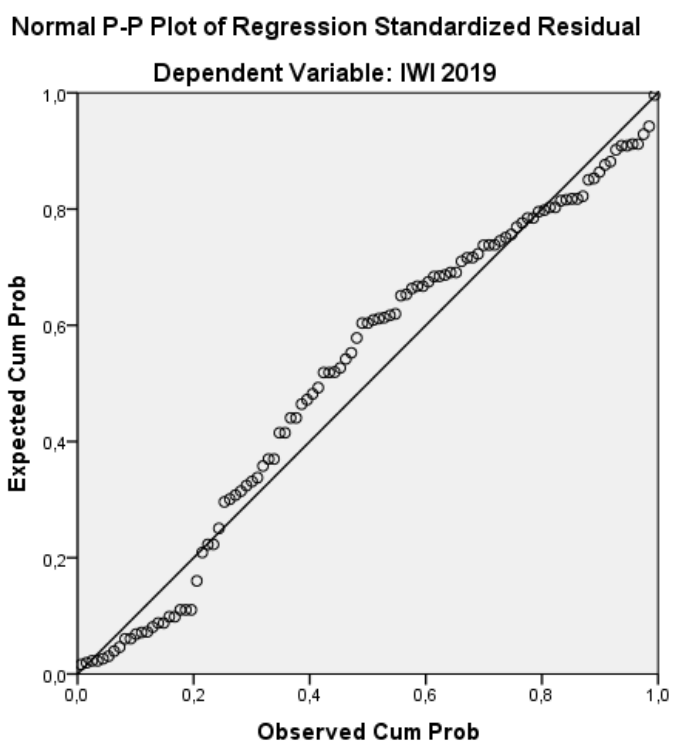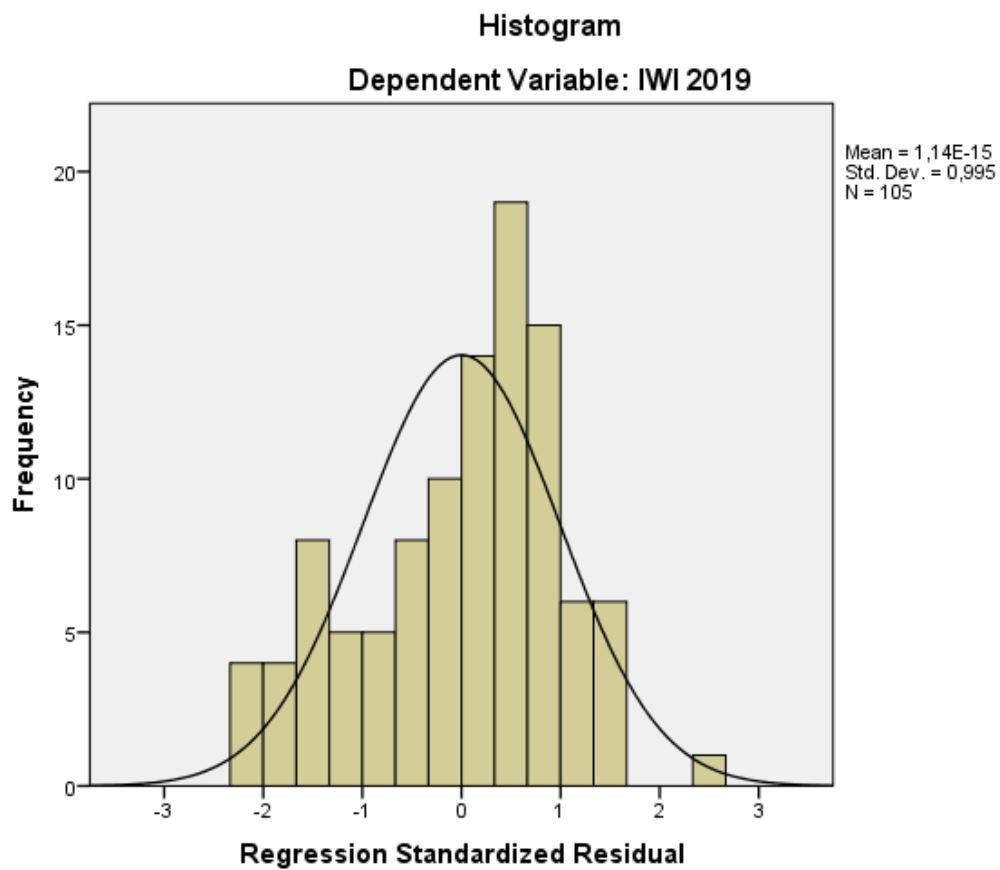
Dependent variable: IWI 2019

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,506[a]	,256	,249	17,34799	1,612

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10660,452	1	10660,452	35,422	,000[b]
	Residual	30998,122	103	300,953		
	Total	41658,574	104			

Coefficients[a]									
		Unstandardized Coefficients		Standardized Coefficients				Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.		Tolerance	VIF
1	(Constant)	36,489	2,341		15,584	,000			
	yrs in Nima	1,136	,191	,506	5,952	,000		1,000	1,000

Collinearity Diagnostics[a]					
			Condition	Variance Proportions	
Model	Dimension	Eigenvalue	Index	(Constant)	yrs in Nima
1	1	1,691	1,000	,15	,15
	2	,309	2,338	,85	,85

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	36,4887	89,8631	46,1145	10,12444	105
Residual	-37,03120	46,22443	,00000	17,26438	105
Std. Predicted Value	-,951	4,321	,000	1,000	105
Std. Residual	-2,135	2,665	,000	,995	105

Histogram

Dependent Variable: IWI 2019

Mean = 1,14E-15
Std. Dev. = 0,995
N = 105

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: IWI 2019

Scatterplot
Dependent Variable: IWI 2019

IWI 2019
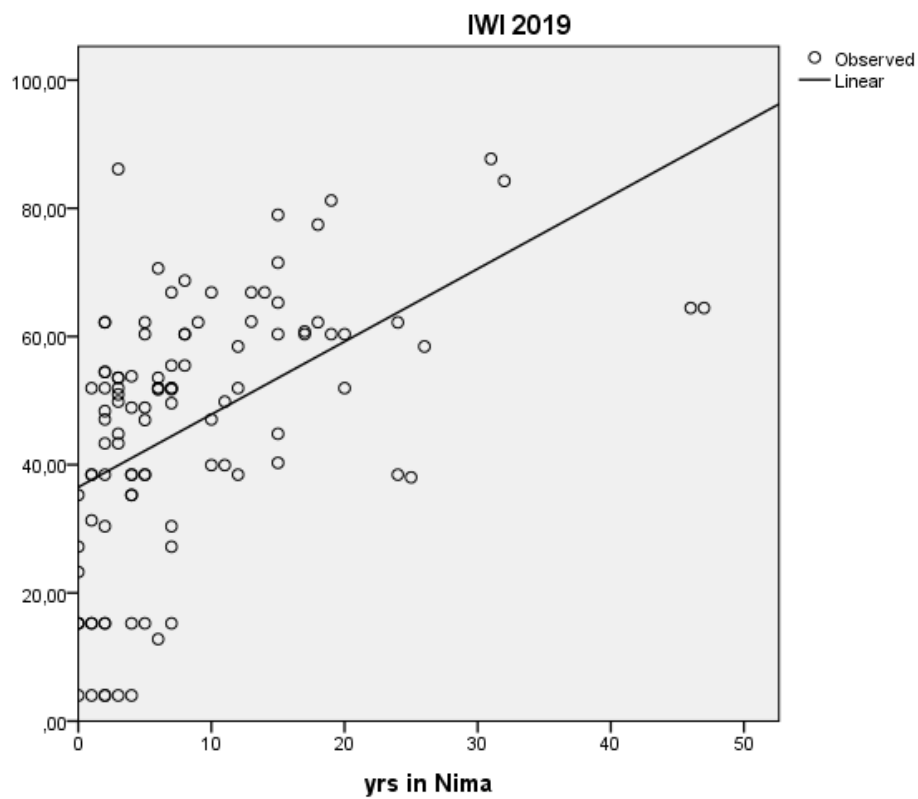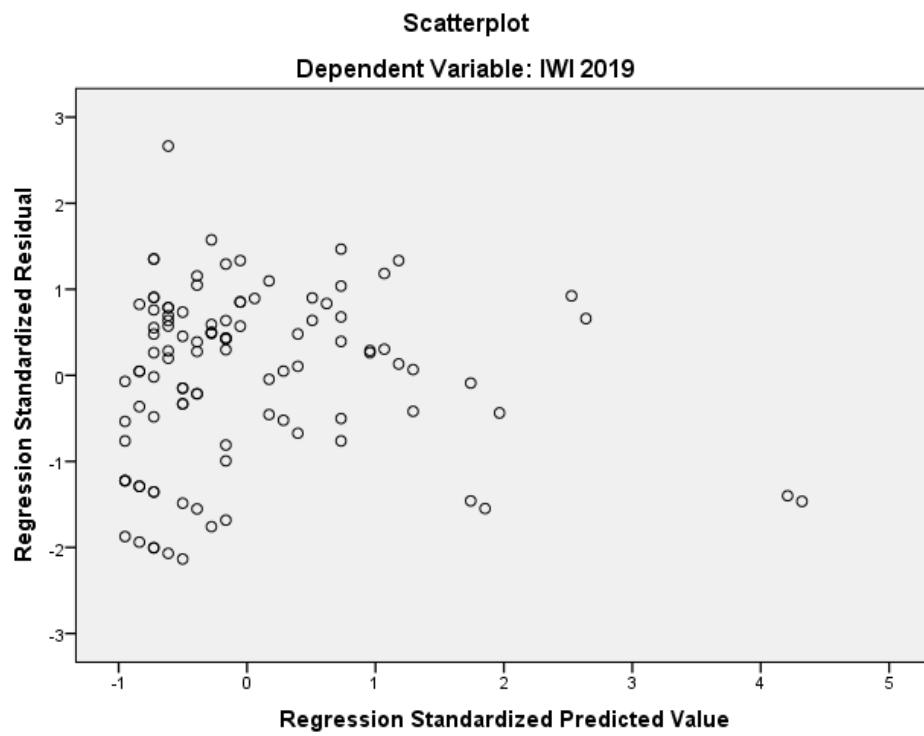
Appendix 5

Conceptual model adjustments (linear regression) / SPSS outputs

Step 1: IWI arrival (independent) / IWI 'catching up' rate (dependent)
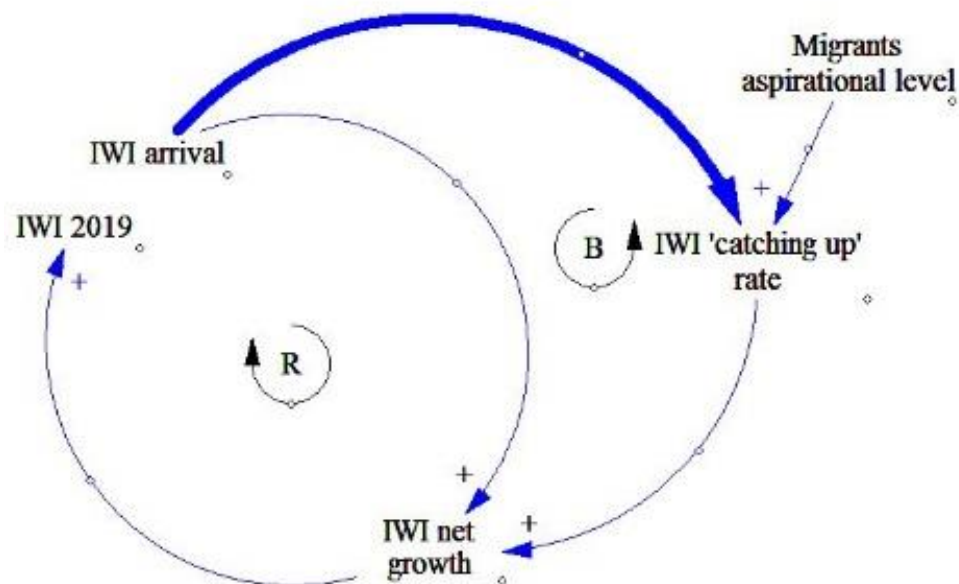
Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,521[a]	,272	,264	3,063568232000000	1,915

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	335,966	1	335,966	35,796	,000[b]
	Residual	901,003	96	9,385		
	Total	1236,969	97			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	5,936	,597		9,937	,000		
	IWI ARR.	-,099	,017	-,521	-5,983	,000	1,000	1,000

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	IWI ARR.
1	1	1,855	1,000	,07	,07
	2	,145	3,582	,93	,93

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-3,36251807200000	5,538554668000000	2,879142227000000	1,861065466000000	98
Residual	-5,538554668000001	10,441445350000000	,000000000000001	3,047735732000000	98
Std. Predicted Value	-3,354	1,429	,000	1,000	98
Std. Residual	-1,808	3,408	,000	,995	98

Histogram

Dependent Variable: IWI growth rate

Mean = 4,15E-16
Std. Dev. = 0,995
N = 98

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: IWI growth rate

Scatterplot
Dependent Variable: IWI growth rate

IWI growth rate
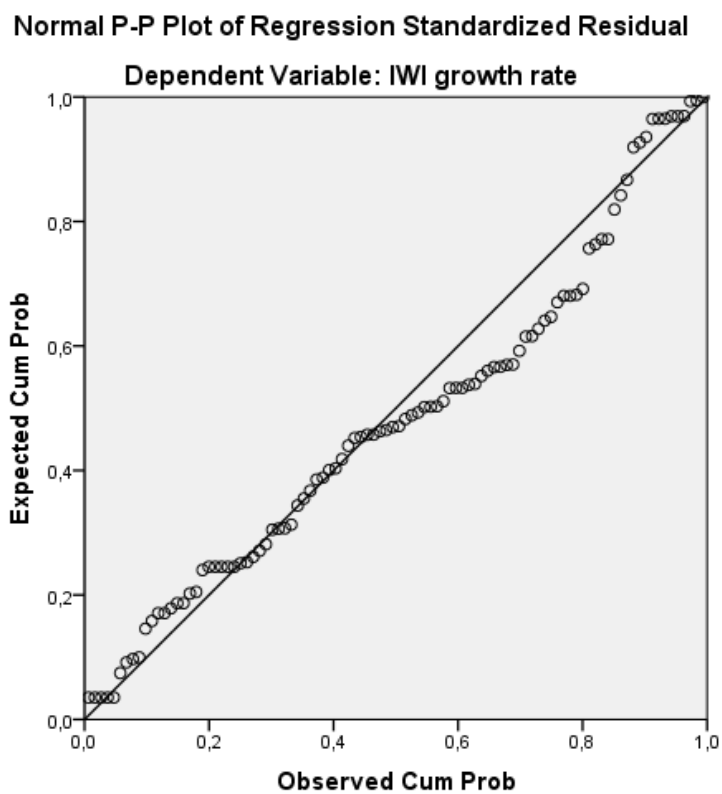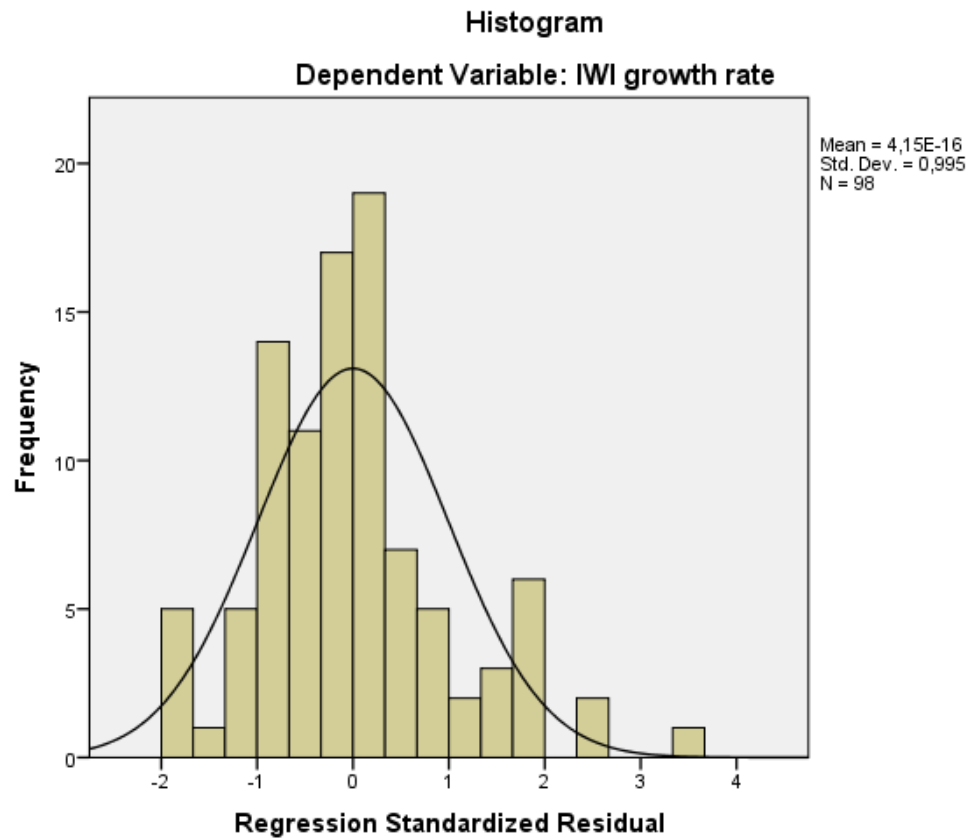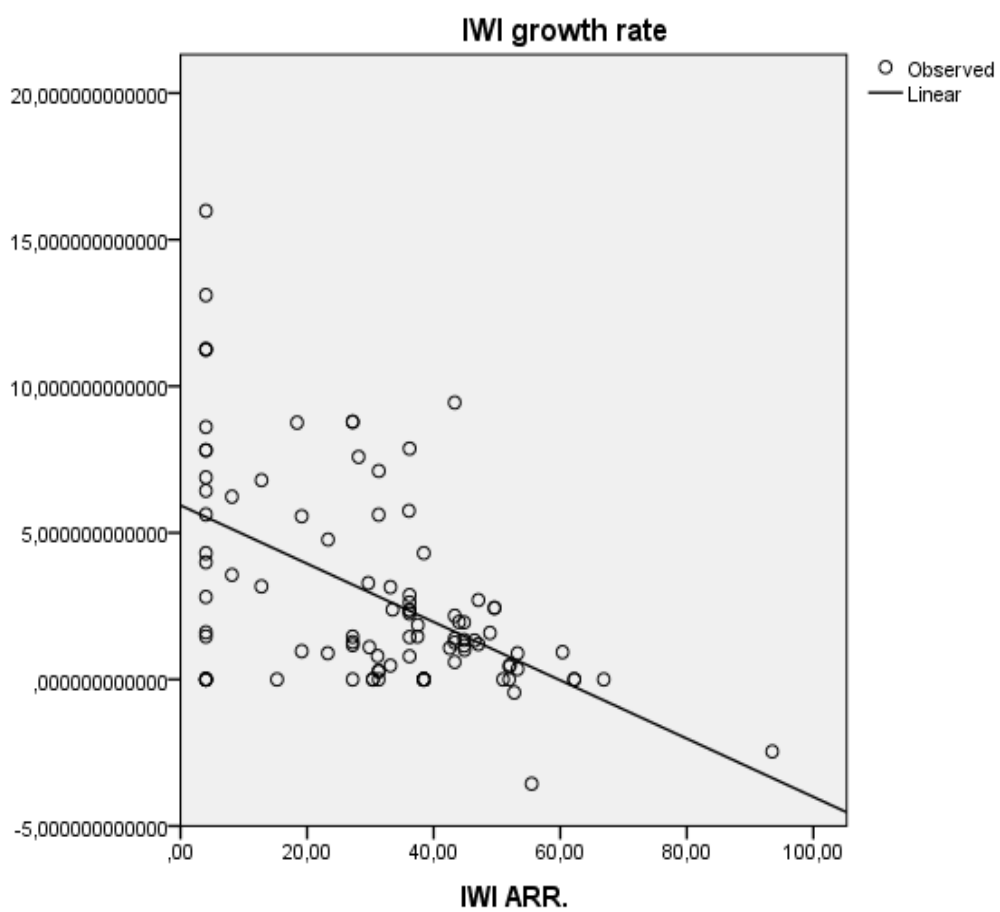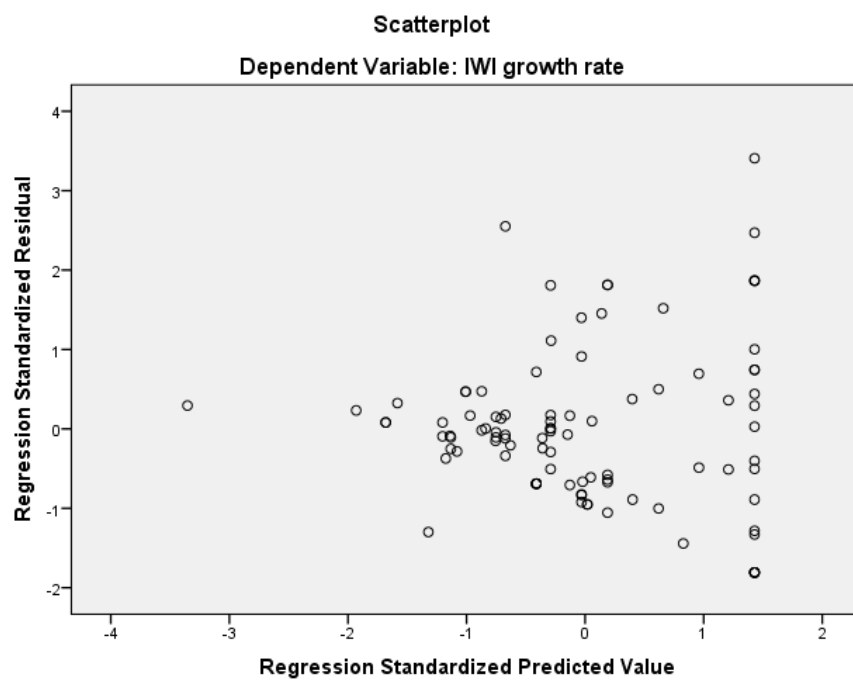
Step 2: IWI catching up rate (indep.) / IWI net growth (dependent)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,570[a]	,325	,318	13,56323	2,134

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8498,528	1	8498,528	46,197	,000[b]
	Residual	17660,263	96	183,961		
	Total	26158,791	97			

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	9,739	1,764		5,522	,000		
	IWI growth rate	2,621	,386	,570	6,797	,000	1,000	1,000

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	Variance Proportions IWI growth rate
1	1	1,630	1,000	,19	,19
	2	,370	2,098	,81	,81

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	,4076	51,6250	17,2856	9,36022	98
Residual	-27,97692	33,24599	,00000	13,49313	98
Std. Predicted Value	-1,803	3,669	,000	1,000	98
Std. Residual	-2,063	2,451	,000	,995	98
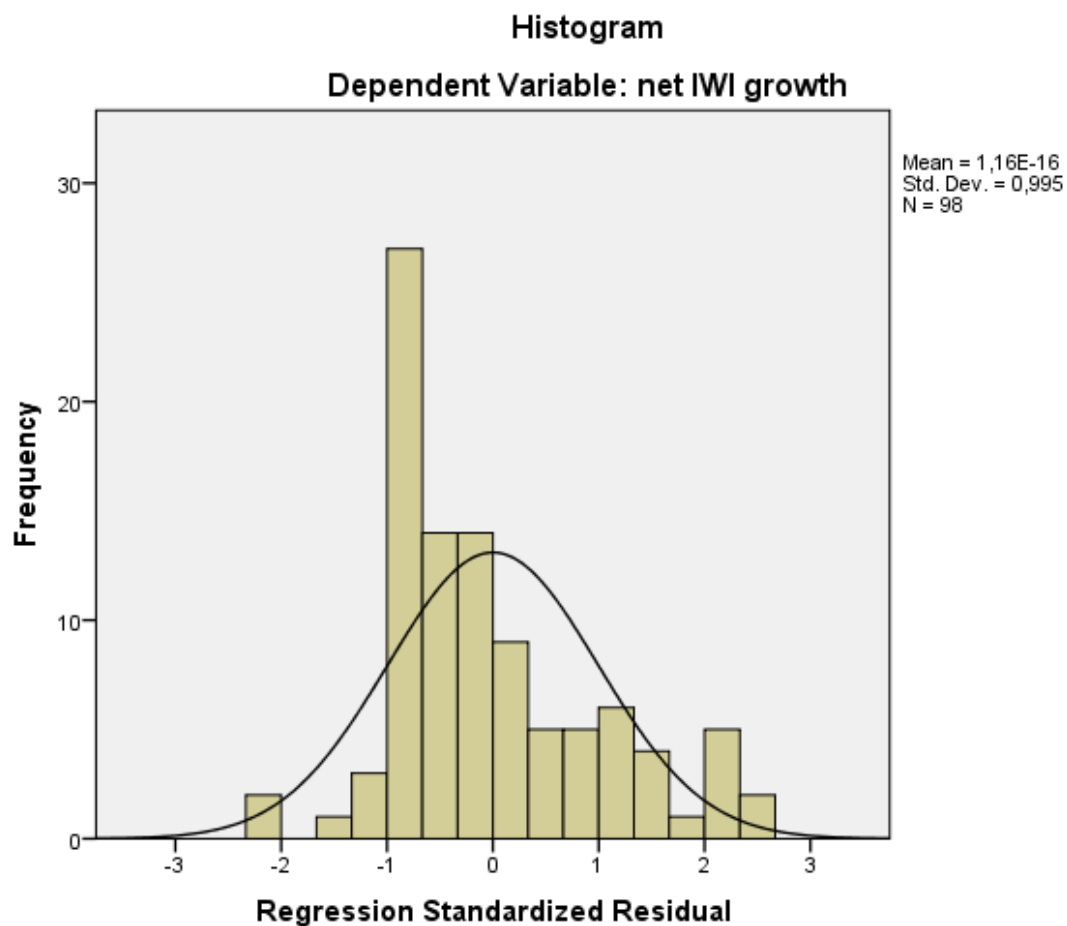
Histogram

Dependent Variable: net IWI growth

Mean = 1,16E-16
Std. Dev. = 0,995
N = 98

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: net IWI growth

Expected Cum Prob vs Observed Cum Prob

Scatterplot

Dependent Variable: net IWI growth

Regression Standardized Residual vs Regression Standardized Predicted Value
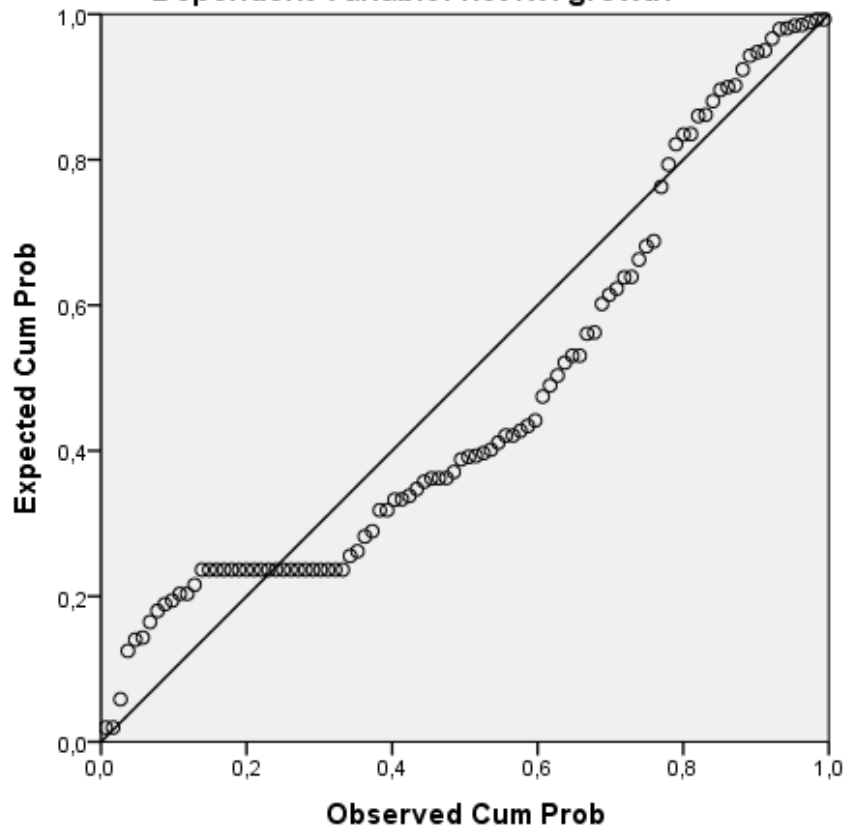
net IWI growth

IWI growth rate
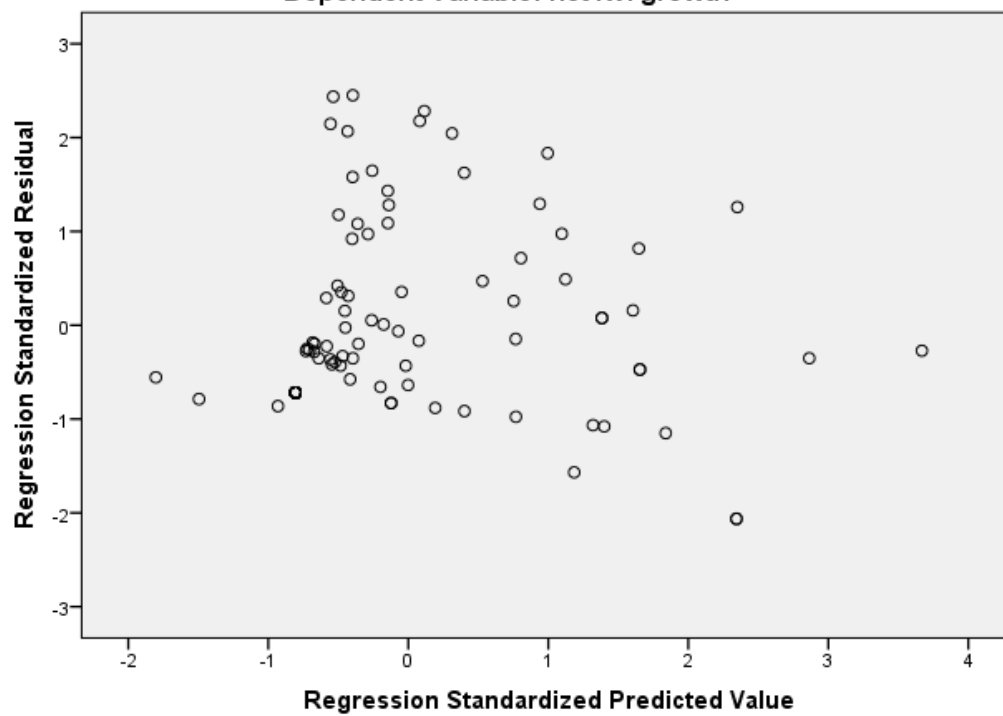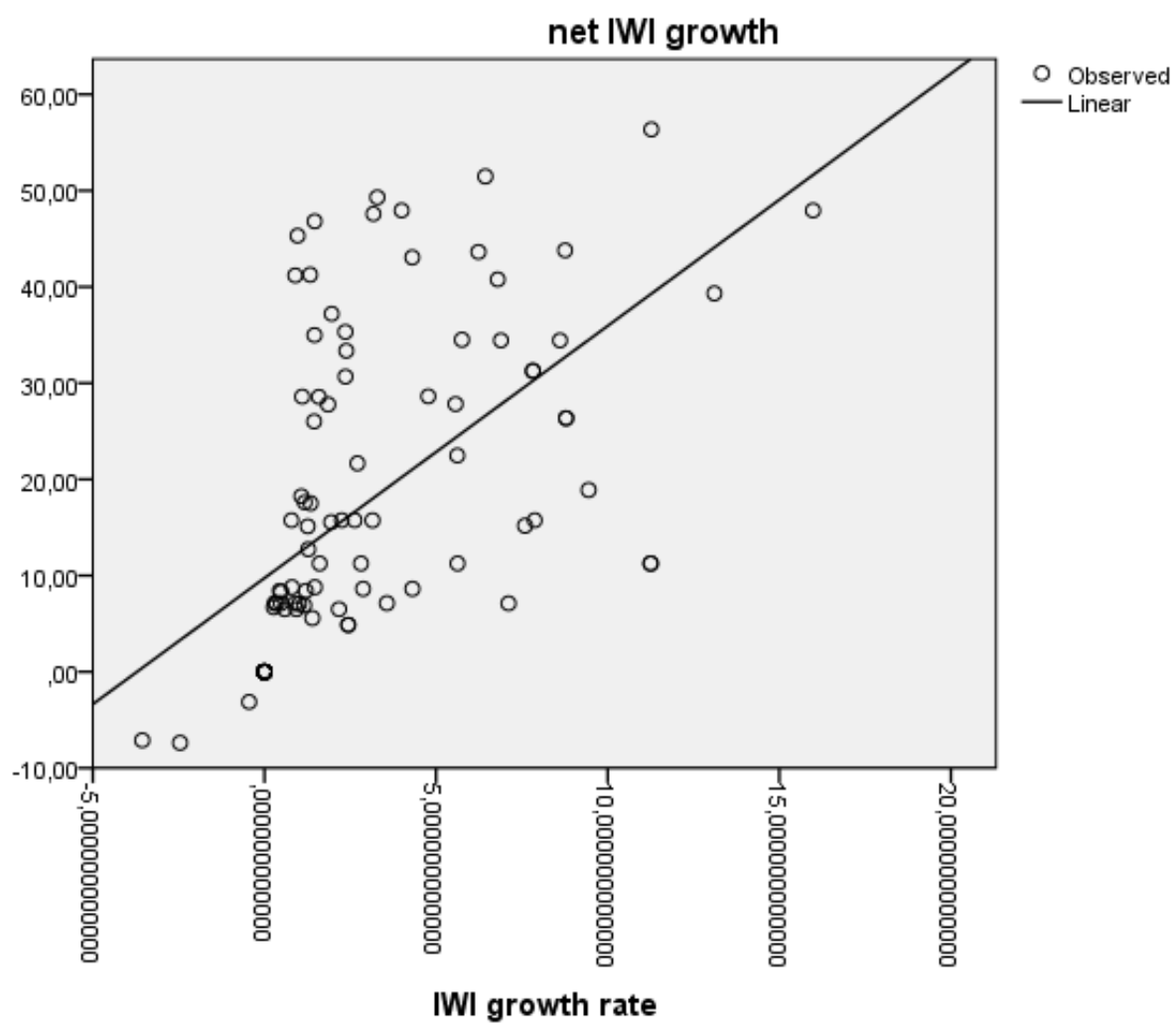
Step 3: IWI net growth (independent) / IWI 2019 (dependent)
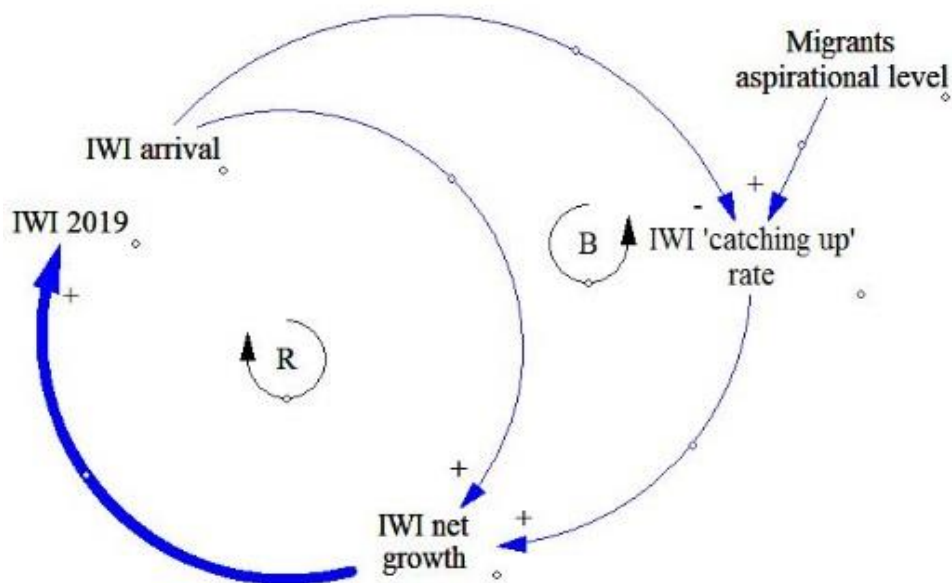
Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,502[a]	,252	,244	17,39650	1,306

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10486,824	1	10486,824	34,651	,000[b]
	Residual	31171,750	103	302,638		
	Total	41658,574	104			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	36,261	2,384		15,209	,000		
	net IWI growth	,611	,104	,502	5,887	,000	1,000	1,000

Collinearity Diagnostics[a]				Variance Proportions	
Model	Dimension	Eigenvalue	Condition Index	(Constant)	net IWI growth
1	1	1,702	1,000	,15	,15
	2	,298	2,390	,85	,85

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	31,7531	70,6842	46,1145	10,04166	105
Residual	-32,26062	54,36693	,00000	17,31266	105
Std. Predicted Value	-1,430	2,447	,000	1,000	105
Std. Residual	-1,854	3,125	,000	,995	105
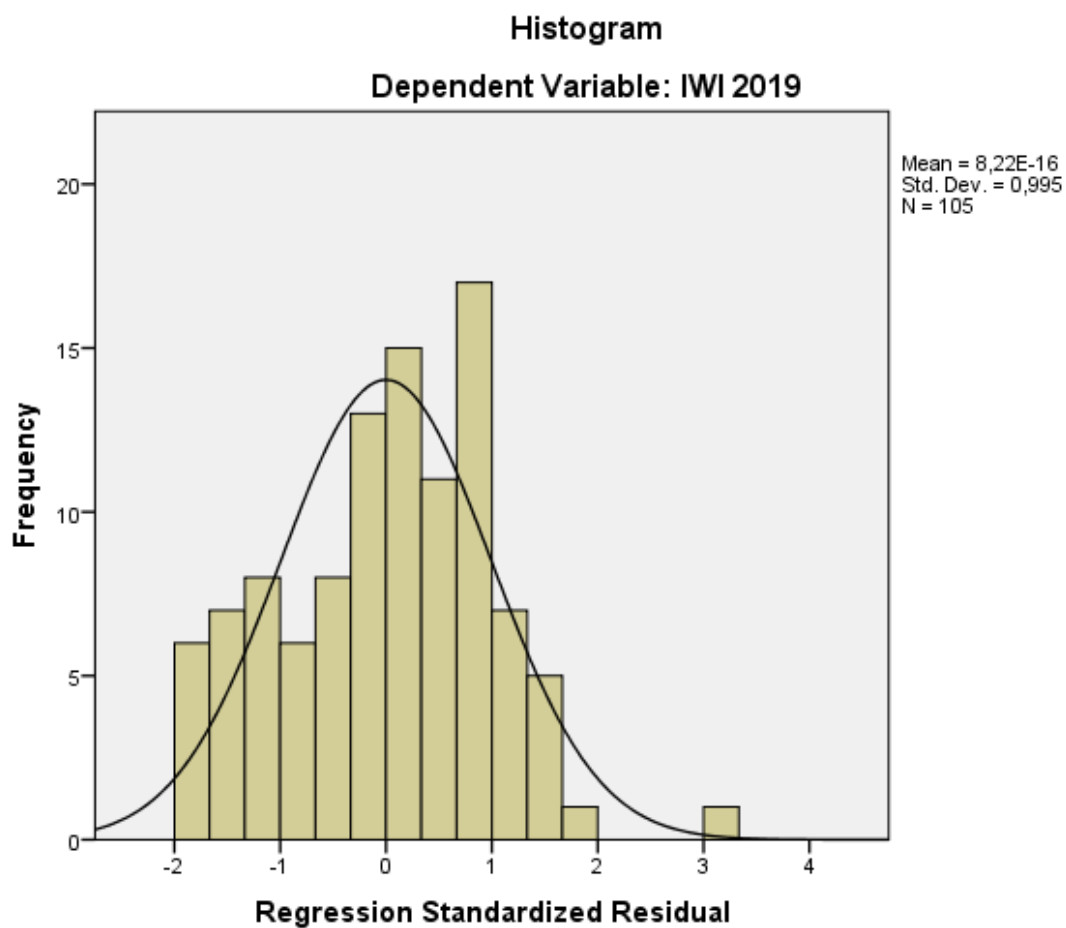
Histogram

Dependent Variable: IWI 2019

Mean = 8,22E-16
Std. Dev. = 0,995
N = 105

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: IWI 2019

Scatterplot

Dependent Variable: IWI 2019

IWI 2019

net IWI growth
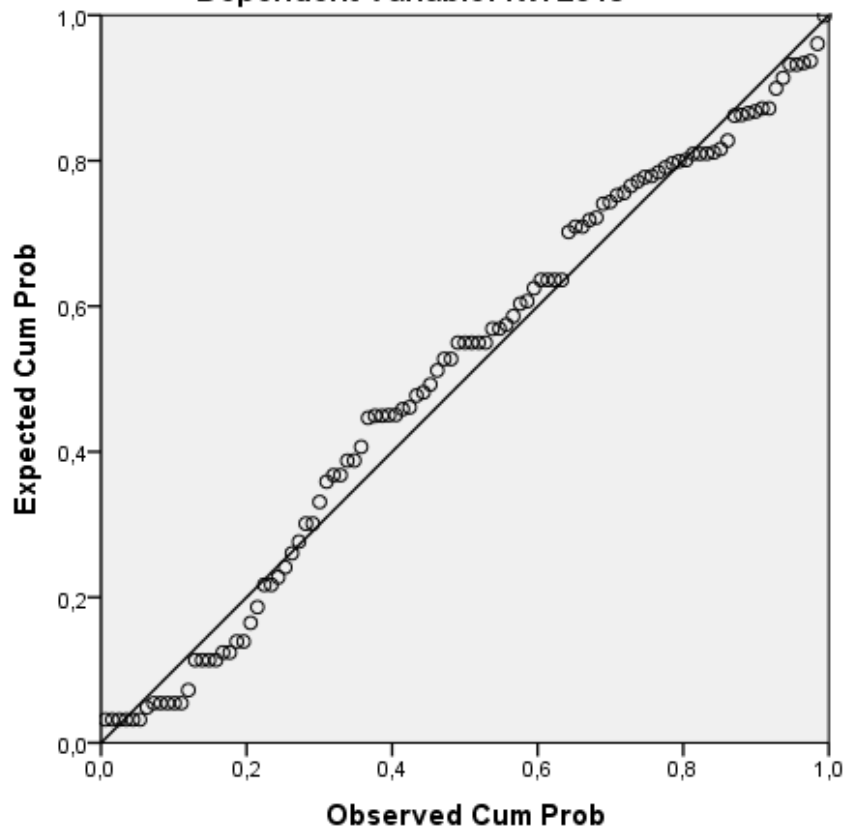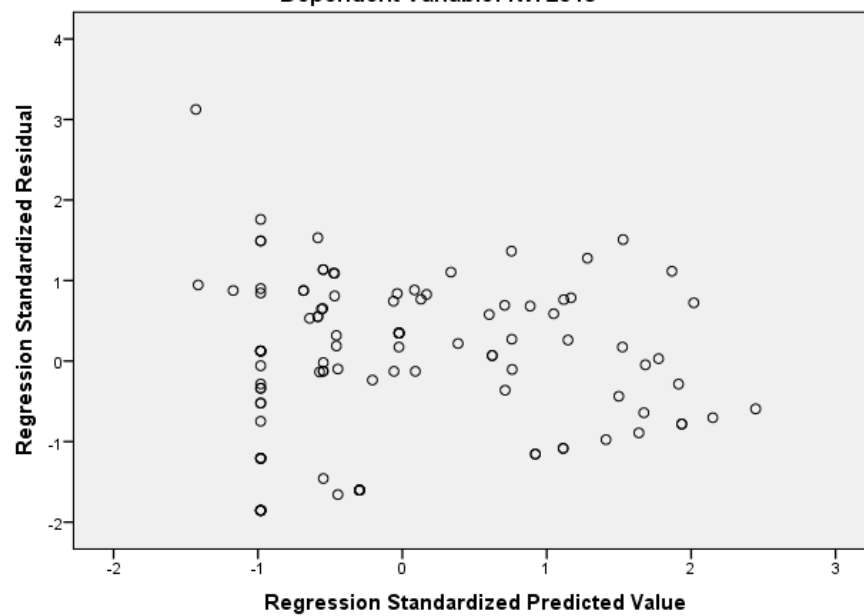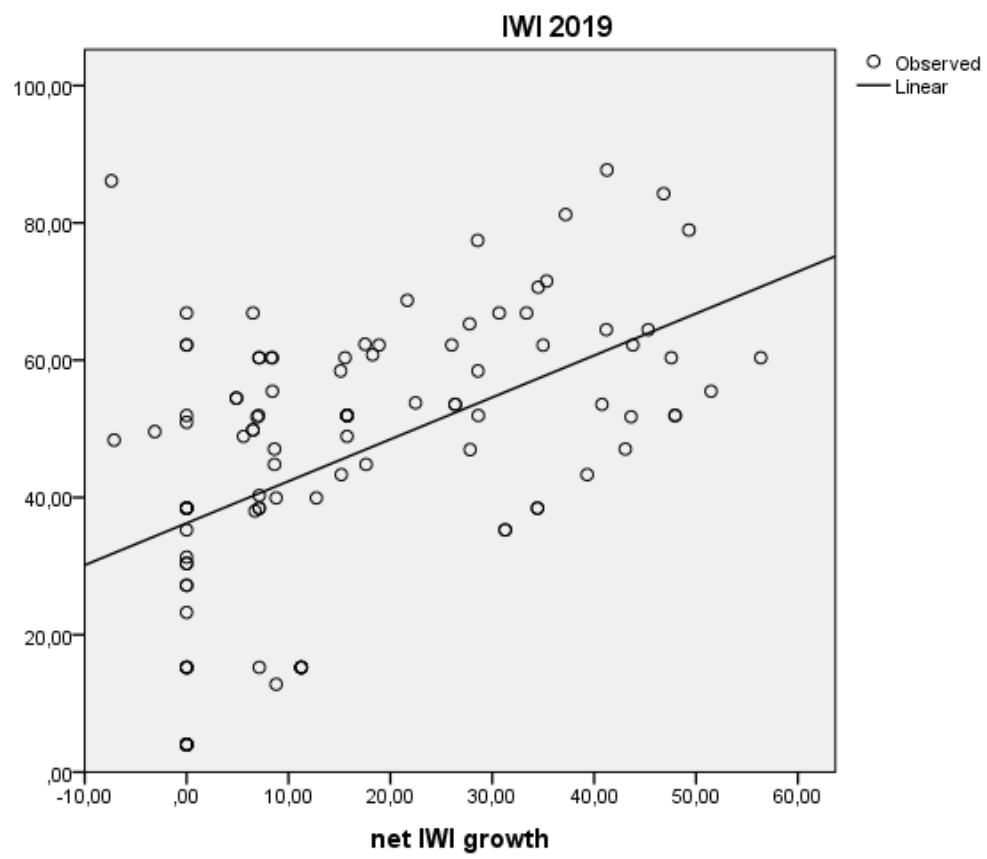
Step 4: IWI arrival (independent) / IWI net growth (dependent)
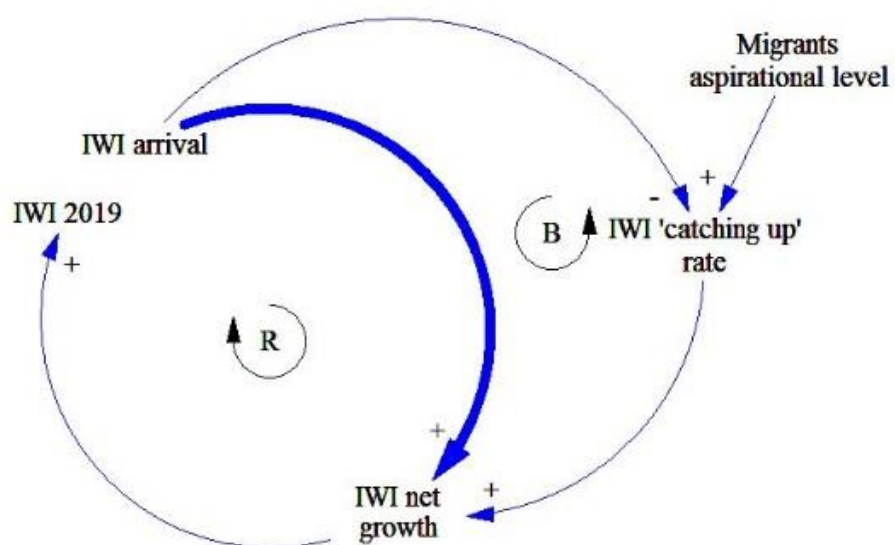
Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,347[a]	,120	,112	15,49572	1,788

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3378,821	1	3378,821	14,072	,000[b]
	Residual	24732,081	103	240,117		
	Total	28110,902	104			

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	25,392	2,895		8,772	,000		
	IWI ARR.	-,309	,082	-,347	-3,751	,000	1,000	1,000

**Collinearity Diagnostics[a]**

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions (Constant)	IWI ARR.
1	1	1,853	1,000	,07	,07
	2	,147	3,546	,93	,93

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-3,4822	24,1566	16,1332	5,69988	105
Residual	-24,15657	33,07756	,00000	15,42104	105
Std. Predicted Value	-3,441	1,408	,000	1,000	105
Std. Residual	-1,559	2,135	,000	,995	105

Histogram

Dependent Variable: net IWI growth

Mean = 3,79E-16
Std. Dev. = 0,995
N = 105
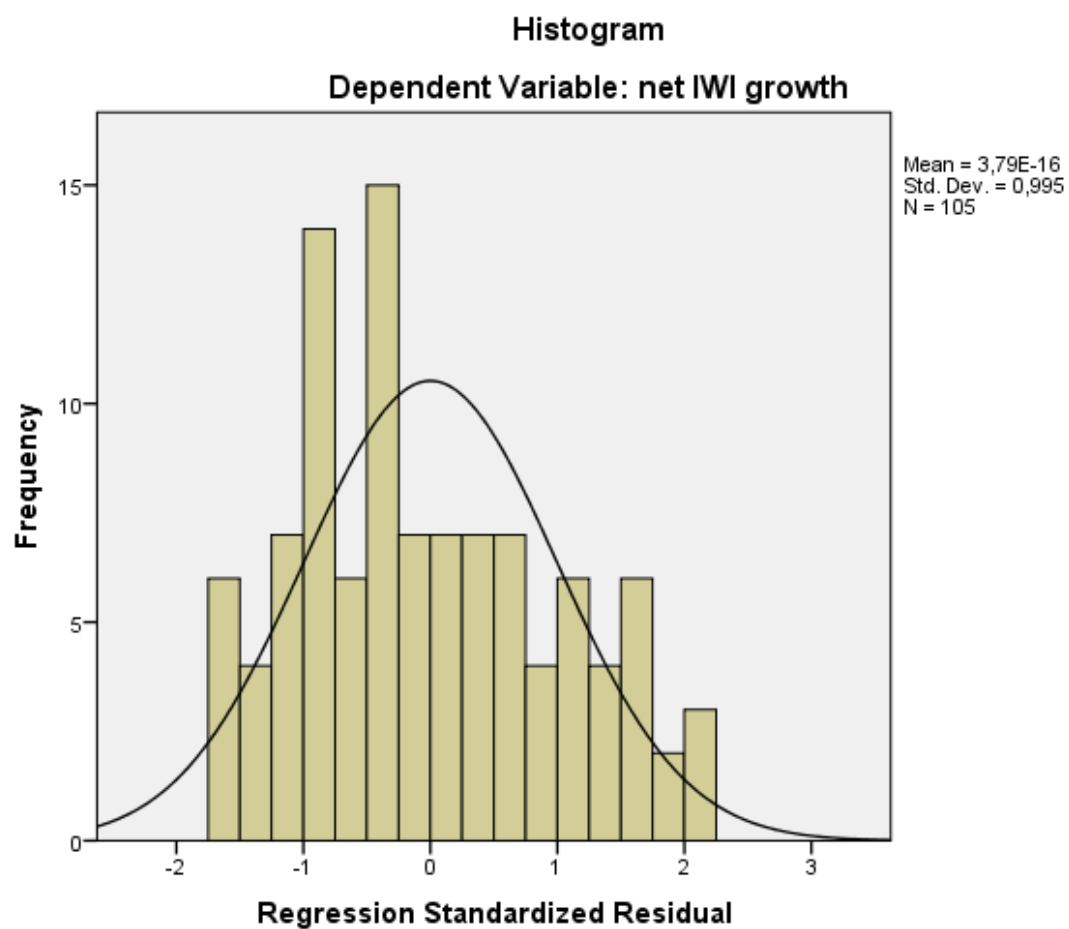
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: net IWI growth

Scatterplot

Dependent Variable: net IWI growth

IWI ARR.
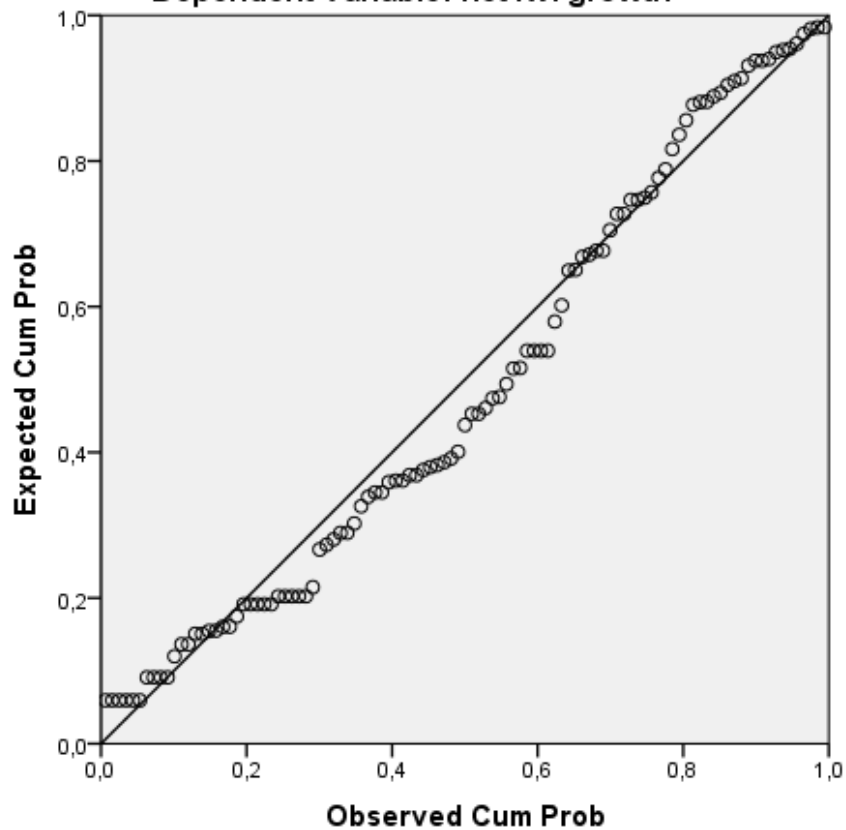
net IWI growth

Appendix 6
Reference mode at a certain spot on Nima's exponential line

This appendix covers the topic of Nima being already on such a developmental level that it allows 'goal seeking behaviour' instead of "s-shaped growth" which is another system dynamics archetype. The difference is that "s-shaped gro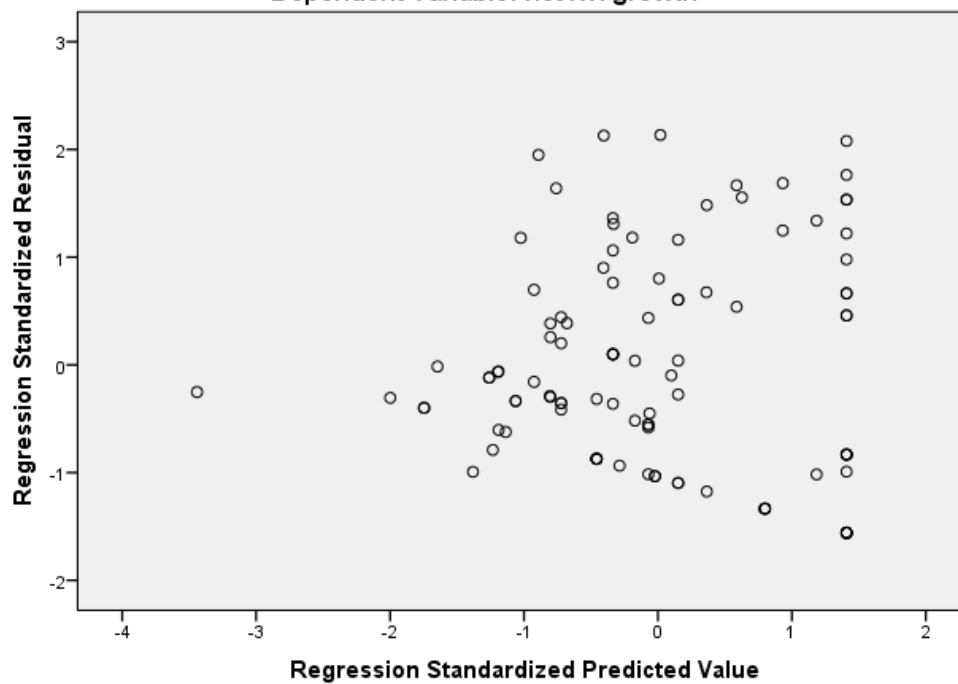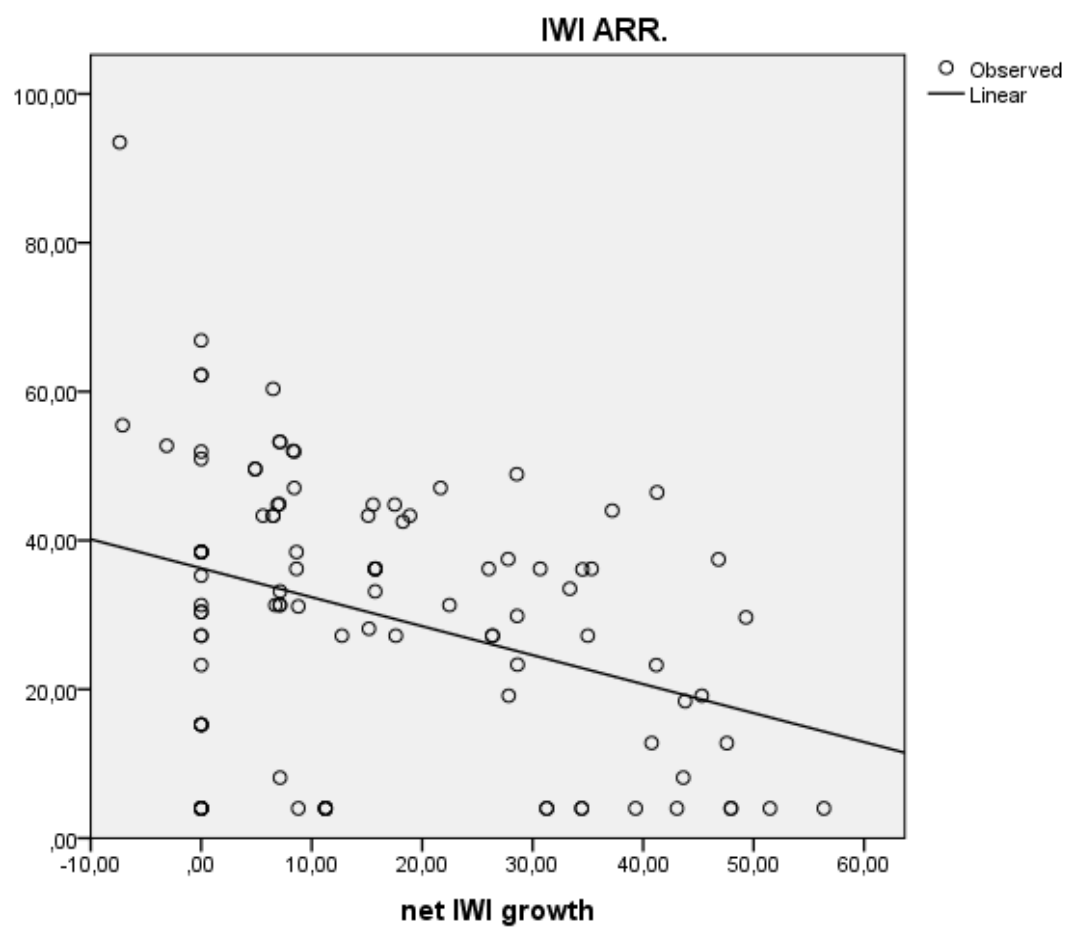wth" starts 'from scratch' which means a long phase of slow growth (slow accumulation). When the capital (or infrastructure) is settled and robust, growth speeds up and then it seeks its carrying capacity.

Argument being made here is that Nima with its concrete infrastructure, paved roads, electricity and sewage system along with its central location has already reached the level of development which allows faster growth.

That would explain why the dynamic behaviour found in Nima is not the whole "s-shaped growth" but its later phase – "a goal seeking behaviour".
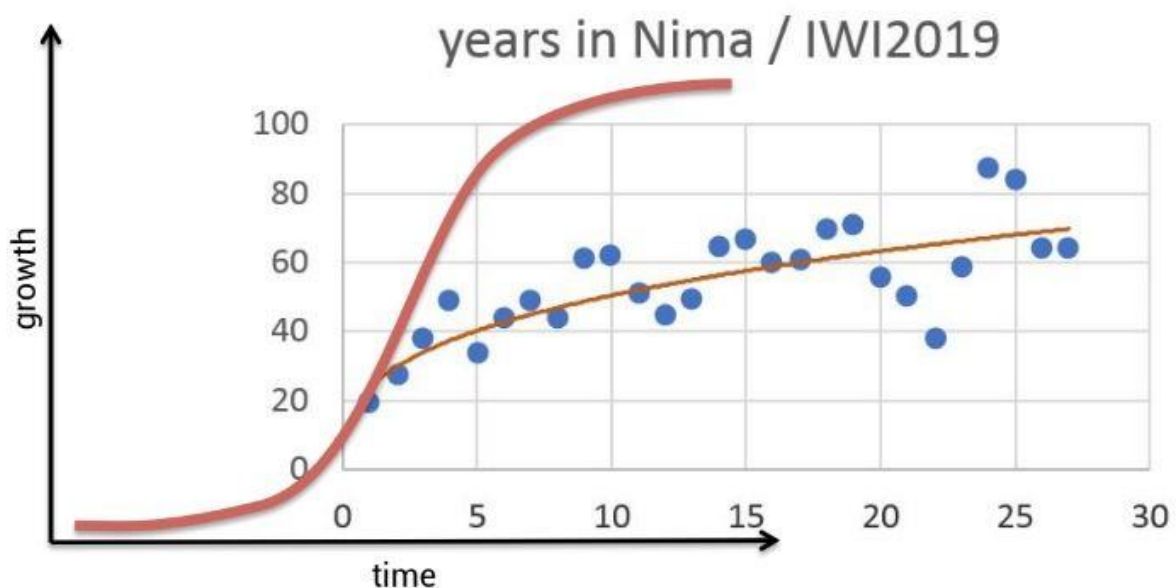
Data shows that in many cases outliers of the research (ones with lowest IWI scores) catch up faster than the ones with higher levels of initial IWI.

For instance, migrants from Burkina gain around 28 IWI points in only 5 years of stay, starting from low IWI levels. Ones from Ashanti, starting with high IWI level of around 40, gain only 20 points over 8 years.

		yrs in Nima	IWI ARR.	IWI 2019
		Mean	Mean	Mean
origin	*unknown*	5	36,32	42,73
	Ashanti	8	39,26	60,95
	Benin	2	4,00	4,00
	Burkina	5	19,14	46,97
	Central	22	38,31	54,42
	Eastern	12	24,01	58,24

Gambia	10	66,87	66,87
Kumasi	8	53,33	60,95
Niger	6	32,10	51,78
Nigeria	12	38,44	38,44
North East	5	18,41	43,58
Northern	8	21,11	36,13
Togo	4	17,08	29,20
Upper East	11	38,51	54,44
Upper West	7	41,63	49,40
Volta	13	37,61	62,07
Western	13	44,81	62,32

		IWI ARR. Mean	IWI 2019 Mean
electr.	0	13,04	33,32
	1	41,73	54,99
cheap.ut.	0	20,91	41,76
	1	39,96	50,91
electr.	0	13,04	33,32
	1	41,73	54,99
frige	0	26,96	44,46
	1	55,83	60,28
phone	0	24,67	45,39
	1	40,61	47,56

Also, access to particular amenities seems to confirm that. Newcomers with no initial electricity access gain 20 points overall when the ones with access to electricity from the start gain around 13. People without a phone also gain around 20 points when ones with phone from the start gain only 7 points.

The situation is even more evident with access to cheap utensils.

				IWI ARR.	IWI 2019
				Mean	Mean
water	2	water	2	29,00	43,81
			3	42,70	71,09
	3	water	3	41,95	85,99
toilet	1	toilet	1	7,07	11,58
			2	9,83	49,29
	2	toilet	1	15,60	15,60
			2	40,09	53,69
	3	toilet	2	44,01	81,21
floor	1	floor	1	7,51	12,04
			2	8,52	38,69
			3	11,15	53,40
	2	floor	1	11,73	11,73
			2	34,41	44,02
			3	39,71	63,56
	3	floor	3	44,32	57,92

When personal belongings might not depend so much on the infrastructure, access to toilet or housing conditions do.

Migrants with low access to toilet gain only 5 IWI points over time when the ones who acquired access to at least municipality toilets (very popular amenity) gain 40 IWI points (when toilet itself calculates for around 10 IWI points). It shows that access to proper infrastructure fosters gains in other fields, increasing capabilities according to Sen's theory (1999).

Similarly, migrants who are homeless at the start and acquire a proper shelter gain 30 IWI points when the ones who stay homeless gain around 5 points. Ones who go from homelessness to a high-quality housing gain over 40 points.

On the other hand, migrants with middle quality housing from the start gain only 10 IWI points over time. Ones going from middle to high levels acquire around 24 points.

That shows that, probably thanks to the infrastructure in Nima and opportunities found there, catching up rate of the poorest migrants is fastest.

Appendix 7

Income and IWI 2019 correlation

Correlation analysis / SPSS output

Independent variable: Income (present)

Dependent variable: IWI 2019

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,373[a]	,139	,129	18,05142	1,417

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4625,964	1	4625,964	14,196	,000[b]
	Residual	28675,121	88	325,854		
	Total	33301,085	89			

Coefficients[a]								
		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	40,875	2,296		17,800	,000		
	inc.	,008	,002	,373	3,768	,000	1,000	1,000

Collinearity Diagnostics[a]					
			Condition	Variance Proportions	
Model	Dimension	Eigenvalue	Index	(Constant)	inc.
1	1	1,560	1,000	,22	,22
	2	,440	1,883	,78	,78

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	40,8754	84,1338	45,7194	7,20952	90
Residual	-40,02144	32,46946	,00000	17,94972	90
Std. Predicted Value	-,672	5,328	,000	1,000	90
Std. Residual	-2,217	1,799	,000	,994	90

Histogram

Dependent Variable: IWI 2019

Mean = -9,40E-16
Std. Dev. = 0,994
N = 90

Dependent Variable: IWI 2019

Scatterplot

Dependent Variable: IWI 2019

IWI 2019