THE BLACK BOX OF CULTURAL TRANSMISSION

An empirical analysis of the evolution of social capital.

Thesis for the degree
Master of philosophy in Economics

Department of Economics
UNIVERSITY OF OSLO

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January 2014

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Printed in Norway by Reprosentralen, University of Oslo

PREFACE

This thesis marks the end of my 8 year long journey towards a 5 year master degree in the philosophy of economics. After several detours and disturbances of other social sciences, exploring different career paths and musical ambitions I am grateful to the people who have pushed me, slapped me, helped me or otherwise motivated me through these years.

First of all I would like to thank my supervisor Andreas Kotsadam for the amount of time and dedication he put into my thesis. At times when I felt that everything was falling apart, Andreas was always calm, positive, encouraging and in a fatherly way telling me that everything would work out in the end. Thanks for fruitful discussions, empirical advice, a crucial and great do-file, and for always leaving the door open.

Thanks to Mari Mamre and all the people (whose names I will not mention) who occupied the ESOP office more or less "legally" during my work with this thesis. Thanks for the discussions, technical advice and for creating a great working environment. A special thanks to Mari, Frikk and Eirik who even took the time to read over this thesis and give me a last feedback! Thanks to all my fellow students in economics who during these years shared their time with me over coffee or lunch. Thanks to Lene Sandvik for our time on the bachelor level together. Important years! A special thanks to Marte Grønvold for countless hours working on seminars, preparing for exams. Thanks for the friendship, and for sharing the ups and downs of our academic journey. Thanks to Lewi Østberg-Bekkesletten for all the important, albeit more or less academic, lunches and cups of coffee the last couple of years. You made so many of my days!

Thanks to the Centre for the Study of Equality, Social Organization and Performance who granted me with free office space and unlimited access to coffee and a great collegial environment in the 10th floor.

Finally I would like to thank my wife for her patience, flexibility, money and loving support. Even after the birth of Sixten you've done everything needed to smooth my last months of exams and writing. I love you!

Even Joachim Aarebrot Winje
Oslo, 09.01.2014

SUMMARY

Social capital have gained wide acceptance within the economic discourse in the recent decades. Researchers have argued that social capital and culture influence a wide range of economic and political outcomes such as economic growth, institutional efficiency, financial development, historical persistence, etc. Still, to the best of my knowledge, cultural transmission and the long-term persistence of social capital have mainly been explored theoretically. In this thesis I build on the empirical work of Nunn and Wantchekon on the African slave trade and individual trust, and aim to contribute to the understanding of the evolutionary aspect of social capital. I define social capital as a set of beliefs and values that fosters cooperation. This allows me to utilize the complementarities of the models of Tabellini (2008a) and Guiso et al. (2008a) and combine them into a more applied framework of social capital. Here I claim that values and beliefs interact and reinforce each other though inter- and intragenerational transmission, social norms, and economic incentives leading to a two way micro-macro relationship and the existence of multiple equilibria of social capital. Tabellini also claims that, in a democratic political context, institutions and values are endogenous adding the possibility of hysteresis in the evolution of social capital.

Empirically I replicate and expand the work by Nunn and Wantchekon (2011) on the slave trade in Africa and the origins of mistrust. They find that people whose ancestors were more affected by the slave trade exhibit lower individual trust today, and provide strong evidence for a causal link. I test whether this causal relationship can be attributed to the evolutionary process of social capital posed above, and the relative importance of this "external" channel. Nunn and Wantchekon claim that values, norms and beliefs are internal and transmitted from parents to children over time and draw a clear line between the individual and the external environment. The social capital framework, developed in chapter two, would predict that the

adverse effects from the slave trade would also lead to a decrease in the return to cooperation on a broader level, hampering the diffusion of social capital, *indirectly* affecting society as a whole both at the macro- and micro level.

The estimated result of my empirical analysis suggest that the causal effect between ethnic slave trade exposure and individual trust is indeed a product of a two way micro-macro relationship and the existence of multiple equilibria of social capital. The decomposition of the causal effect of the slave trade to an external and internal ceteris paribus effect shows that the "external" micro-macro channel is by far the most important channel of causality. In fact when I control for regional levels of social capital the direct channel of causality, is only significant for trust in relatives and neighbours, and the effect is significantly smaller than the benchmark estimated causal effect.

These results are from a limited sample of 17 countries that experienced an ongoing slave trade exposure of over 400 years, and individual trust is measured only 100 years later. Still the results suggest that we cannot expect the adverse effects of the slave trade to simply vanish with time. The external validity of my findings to other types of shocks to social capital is not clear cut. But my findings are in line with the theoretical work on the evolution of social capital and consistent with other empirical findings regarding individual accumulation to new external environments, etc. If generalized though, the social capital framework ads a new channel of causality and persistence in relation to different economic and political shocks.

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1. INTRODUCTION

"Virtually every commercial transaction has within itself an element of trust,"

Nobel-prize winning economist Kenneth Arrow

Social capital have gained wide acceptance within the economic discourse in the recent decades. Nobel-prize winning economist Kenneth Arrow (1972) wrote "Virtually every commercial transaction has within itself an element of trust, certainly any transactions conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence". Researchers have later argued that social capital influence a wide range of economic and political outcomes. Arrow (1972) and Fukuyama (1995) highlights social capital's importance for general economic success. Others have used it to explain economic growth (Guiso, Sapienza et al. 2008b, Algan and Cahuc 2010), institutional efficiency (La Porta 1997), financial development (Guiso, Sapienza et al. 2004), historical persistence (Guiso et al. 2008a and 2008b, Tabellini 2008a, Nunn 2012), etc.

Putnam (1993), one of the pioneers of the concept, attributes differences in social capital to different historical experiences. Guiso et al (2008b) find strong support for Putnam's conjecture that the differences in social capital between the North and South of Italy can be traced back to the free-city-states in the middle ages. With the exception of success stories like the Asian Tigers, or more recently China and India, economic development have exhibited a very similar persistence. In the same vein as Putnam, economist have argued that history plays an important role, although there's no general consensus on what historical factors that really matter. Acemoglu, Johnson and Robinson (2001) attribute the differences in economic development to different colonial experiences and its effect on the institutional

quality[1]. Glaeser et al. (2004) on the other hand argues that they're picking up the effect of historical human capital heterogeneity. In the African context Michalopoulos and Papaioannou (2013) find that the pre-colonial institutional development play a major role in predicting the level of regional economic development today. Nathan Nunn (2008) provide strong evidence for a causal link between slave trade exposure and current economic performance, and claims that culture (or social capital) is the missing link in the ongoing debate of institutions and long-term growth (Nunn 2012). The similarities of historical persistence in social capital and economic performance, and the established link between the two, suggest that social capital could be an important factor in the persistence of economic performance.

Even though social capital has empirically been connected to a range of economic outcomes, the cultural transmission mechanism is still a black box. To the best of my knowledge, cultural transmission and the long-term evolution of social capital have mainly been explored theoretically. The motivation for this thesis is thus to empirically investigate some of the evolutionary aspects of social capital. More specifically, building on the empirical work of Nunn and Wantchekon (2011), I look for empirical evidence of a two way micro-macro relationship and the existence of multiple equilibria in the evolution of social capital.

According to Putnam (1996) social capital represent "features of social life – networks, norms, trust – that enable participants to act together more effectively to pursue shared objectives." Putnam thus views social capital as mostly a group feature. Economic research on social capital have been mostly focused on the community level, but networks, norms or trust are not just products of historical accidents. Even community levels of social capital are a product of individual level actions, and group features and social norms influence individual trust and trustworthiness (See Glaeser, Laibson et al. 1999, Alesina and La Ferrara 2002, etc.). I follow Guiso et al (2008a) in their definition of social capital as a "set of beliefs and values that fosters cooperation". This allows us to treat social capital both as an individual and an aggregated group feature which enables us to better understand its transmission mechanism and long-term persistence.

Empirically I replicate and expand the empirical research of Nathan Nunn & Leonard Wantchekon on the long term effects of Africa's slave trade (Nunn 2008) and the origins of

[1] The authors claim that institutions are very persistent. Tabellini (2008a) argues that this is due to the endogenous relationship of social capital and institutional quality.

mistrust in Africa (Nunn and Wantchekon 2011), using their data on individual trust[2] and ethnic slave trade exposure. In the latter paper Nunn and Wantchekon examine whether the slave trade could affect current economic outcomes through the evolution of a culture of mistrust. They find that people whose ancestors were more affected by the slave trade exhibit lower individual trust today, and provide strong evidence for a causal link. Deconinck and Verpoorten's (2013) replication of the empirical analysis using the 2008 Afrobarometer survey further confirms the findings. Nunn and Wantchekon (2011) uses a rules-of-thumb framework to explain how a culture of mistrust could *develop*. In an environment of insecurity such as the slave trade with tricking, kidnapping and where even friends and family member sold each other into slavery, norms of mistrust would yield a higher payoff than a rule-of-trust causing culture of mistrust to evolve. The question of why such a culture of mistrust is still evident today is left open, and not tested for. Nunn and Wantchekon's aim is to empirically estimate the long term causal effects of the slave trade on trust, rather than to explain the mechanisms of cultural transmission. In this sense they too leave the latter as a black box.

Using insights from the theoretical models of Tabellini (2008a) and Guiso, Sapienza and Zingales (2008a) I develop my hypothesis below. Both are concerned with the formation, evolution and persistence of Social Capital, and how it interacts with economic incentives to cooperate. They also highlight the importance of path dependency and multiple equilibria in determining the long term persistence of historical shocks to social capital and its effect on economic outcomes. Tabellini is mainly concerned with the transmission of *values* and how this affects the scope of cooperation of society. Guiso et al. on the other hand is focuses on the cultural transmission of *beliefs* or trust, taking trustworthiness as exogenously given. In reality there are several ways that trust and trustworthiness may interact and mutually reinforce each other. Following the empirical evidence of Glaeser et al. (2000) and Reuben (2009) I treat values and beliefs as endogenous to each other. Social capital is formed by both. Utilizing the complementarities of the two models I combine them into a more coherent applied theoretical framework of social capital. Here I claim that values and beliefs interact and reinforce each other through inter- and intragenerational transmission, social norms, and economic incentives.

My hypothesis is that social capital evolves through a two way micro-macro relationship with the existence of multiple equilibria. Replicating and expanding the empirical work by Nunn and Wantchekon (2011) I test whether the causal relationship they find can be attributed to

[2] The data on individual trust is from the third Afrobarometer survey in 2005.

such an evolutionary process of social capital, and the relative importance of this "external" micro-macro channel. Nunn and Wantchekon claim that values, norms and beliefs are internal and transmitted from parents to children over time. They draw a clear line between the individual and the external environment such as rule of law and the trustworthiness of others. The social capital framework, developed in chapter two, predicts that the adverse effects from the slave trade also would lead to a decrease in the return to cooperation on a broader level, hampering the diffusion of social capital, *indirectly* affecting society as a whole both at the macro- and micro level.

Adding a proxy for regional levels of social capital I compare the OLS estimates of Nunn and Wantchekon to my OLS estimates of the relationship between ethnic slave trade exposure and current individual trust. The estimated result confirms my ex-ante hypothesis, though not all of the assumed features of the social capital framework. I also decompose the causal effect of the slave trade to an external and internal ceteris paribus effects. I do this by replicating and expanding Nunn and Wantchekon's channels regression adding the same regional proxy. They use a location based slave trade measure to capture the effect on the individual from changes in the external environment. My results suggest that the "external" micro-macro channel is by far the most important, and that it also mediates the almost the entire estimated external channel of causality found by Nunn and Wantchekon. In fact when I control for regional levels of social capital the direct channel of causality, is only significant for trust in relatives and neighbours, and the effect is significantly smaller than the benchmark estimated causal effect

This thesis is structured as follows. In chapter two I give an overview of the theoretical models which I build my hypothesis on. I also discuss the complementarities of the models of Tabellini (Tabellini 2008a) and Guiso et al. (2008a). I combine them, by utilizing the endogenous and reinforcing attributes of trust and trustworthiness (Glaeser, La Porta et al. 2004, Reuben, Sapienza et al. 2009), to a more coherent applied theoretical framework. In chapter three I give a brief overview of the historical context of the African slave trade. Chapter four is a description of data used in the empirical analysis. Chapter five describes the empirical strategy and my equations before I report and discuss my results in chapter six. I further discuss my findings in chapter seven before I conclude in chapter eight.

2. FROM THEORETICAL BACKGROUND TO EMPIRICAL FRAMEWORK

2.1 Measured trust and social capital

Glaeser et al (2000) argues that working with survey data one have to be careful about the interpretation of answers to general trust questions. Trust questions like "in general would you say most people can be trusted" are often found in surveys such as the General Social Surveys or the Afrobarometer. In an experiment with Harvard undergraduates Glaeser et al. find a stronger correlation between questions about trust and observed trustworthiness rather than the observable levels of trust. When working empirically with survey based trust measures it's thus important to take the endogenous nature of measured trust into account.

Throughout this thesis I therefore follow Guiso et al in their definition of social capital as a "set of beliefs and values that facilitate cooperation among the members of a community" (Guiso, Sapienza et al. 2008a, p 3). Community in this context must be interpreted as a wide variety of spatial relationships, from clan-based small scale communities to globalized trade (Tabellini 2008a). The definition put forth by Guiso et al highlights the importance of trust (beliefs) *and* trustworthiness (values) in the formation and accumulation of social capital and allows us to treat social capital both as an individual and a group feature. It also highlights the complementarities between their own model and model of Tabellini. It is within this complementary framework I build my hypothesis. In my empirical analysis I therefore interpret the trust measures found in the Afrobarometer data as a proxy for social capital rather than an outcome in itself. Even though the data is the same, focusing on social capital

rather than trust alone allows for a more coherent theoretical framework and a natural micro-macro relationship in the aggregation of regional social capital as I will show below.

2.1 Formation vs. persistence

The social capital framework includes, but does not limit an analysis of social capital to the cultural anthropology approach used by Nunn and Wantchekon (2011). Their hypothesis builds on the formation of a "rule-of-thumb" optimization when information acquisition is either costly or imperfect. In these kinds of circumstances they claim that a "rule of mistrust" might yield a higher relative payoff than a "rule of trust", causing a culture of mistrust to evolve (Nunn and Wantchekon 2011).

The most notable difference between the framework used by Nunn and Wantchekon (2011) and the models of Tabellini (2008a) and Guiso (2008a) et al is the attempt by the latter to explain the persistence and evolution of social capital. Both mainly use the differences in economic performance and social capital between the north and the south of Italy, as highlighted by Putnam (1993)**,** as an empirical backbone. I follow Nunn and Wantchekon to Africa and look for evidence of equilibrium behaviour and a micro-macro connection between ethnic slave trade, aggregated social capital at the regional level and individual trust as measured in the Afrobarometer survey.

Intergenerational transmission from parents to children is the cornerstone of both Guiso et al and Tabellini's models, but also an underlying assumption in Nunn and Wantchekon's paper. They claim that norms, beliefs and rules-of thumb are all internal to the individual and transmitted from parents to their children (Nunn and Wantchekon 2011). The authors aim to estimate the causal impact of the slave trade on individual trust today, but are not concerned with how these beliefs and rules evolve over time and why we should still see such an effect.

The cultural anthropology framework can help explain the formation of a culture of mistrust at a micro level and the emergence of individual beliefs *affecting* aggregated social capital, and is in my view a good compliment to the model of Tabellini and Guiso et al. It highlights the relationship between beliefs and information, but stops short of explaining the evolution of social capital, its persistence and the micro-macro relationship I find at the aggregated regional level.

2.2 The model of Tabellini

Tabellini's model (2008a) is built around the intergenerational transmission of values, and how these values endogenously evolve and interact with the economic and political environment. Parents are altruistic and optimally choose which values to pass on to their children but they evaluate the well-being of their children in terms of their own preferences and values. He builds his model around a one-shot prisoner's dilemma game. In material payoffs both "players" will gain form not cooperating or cheating, irrespective of their opponents actions. A strategy of cheating strictly dominates a cooperative one (Watson 2008). But the decision to cooperate is not a purely material one. He also assumes that people are motivated by a non-economical pay-off which you get from cooperating, or from your "good conduct". This non-economic gain is determined by individual values and decays with social, economic or spatial distance. Thus cooperation is harder to sustain in more distant relationship, and values become more important as the spatial distance increase. Tabellini (2008a) defines a trustworthy individual as an individual with values that sustain cooperation over a larger distance relative to the none-trustworthy. Tabellini's model is designed to capture the difference between general and limited morality often stressed by sociologists. Norms of limited morality only apply to a limited, narrow circle of friends and relatives, while generalized morality applies for all individuals in general. Individuals who have internalized a norm of general morality will cooperate over a larger distance.

The non-economical payoff in Tabellini's game relates to "warm glow preferences" as described by Andreoni (1990). Such individuals are described as "impure altruists" since ones "good behaviour" is not only motivated by the effect ones actions has on others (or the environment etc.) but also on an internal psychological payoff, and not necessarily related to any external outcome. "Warm glow preferences" explains people's decision to exert effort or induce self-regulation in situations where one does not reap any non-psychological welfare gains. In this context the players value the act of cooperation itself, but implicitly also value the welfare of others, and mostly those closest to themselves. This assumption is in line with the empirical findings of Alesina and La Ferrara (2002) who finds that people have more trust in people who are similar to themselves. Glaeser et al (2000) also find support for this link within their experiment among Harvard undergraduates. In their experiment higher social connections increased the amount being sent and received between individuals in a trust game. Tabellini's distinction between different scopes of cooperation also relates to the

established relationship between ethnic fractionalization and long-term economic growth (Easterly and Levine 1997).

The values that the parents optimally choose to pass on to their children, is a function of the level of cooperation in society. If more people cooperate, expected payoff from cooperation increase, expanding the scope (distance) where cooperation is sustainable (Tabellini 2008a). This motivates (more) parents to educate their children with "better" values, leading to a higher proportion of trustworthy individuals in the next generation. In Tabellini's (2008a) model this creates a complementarity between values and behaviour. This leads to the possibility of multiple equilibria that evolve over time reflecting "historical features of the external environment" (Tabellini 2008a). Ceteris paribus a diffuse shift in the trustworthiness (directly) or a change in the external environment of a society will affect the level of cooperation for generations to come.

The expected pay-off from cooperation also increases with institutional quality. In the prisoner dilemma game better legal enforcement is reflected by a smaller expected benefit of cheating and a smaller loss from being cheated (Tabellini 2008a). As a result better formal legal enforcement will expand the scope of cooperation, for the current and future generations, generating a positive shift in the equilibrium of society. A positive shift in strength of the informal institutions such as social norm etc. will have the opposite effect. This shift only applies to a narrow circle of transactions with a highly localized society. In this case Tabellini shows how values can become less important, and that values and local enforcement work as substitutes rather than the mutually reinforcing effect they have in the generalized sphere.

Tabellini (Tabellini 2008a)also show that if people are allowed to choose their own institutions through political voting, the equilibrium will be path dependent. If limited morality prevails[3], people will opt for lax institutional regulations and the economy will end up in a steady state with weak law enforcement, breeding (even) poorer values, and little cooperation. The opposite will be true where norms of generalized morality dominate[4]. Taking into account the possible endogenous nature of institutions, the model would not only predict multiple equilibria but also hysteresis. A negative shock could trap a society in a bad equilibrium where limited morality prevails, even if the shock was only temporary.

[3] untrustworthy individuals the majority
[4] majority of trustworthy individuals

2.3 The model of Guiso, Sapienza and Zingales

Tabellini's model alone fails to explain the persistent, path dependency of social capital in the absence of democratic institutions. Voting disappeared in city states of Italy around 500 years ago, only to be introduced at a national level in the 20th century. Guiso et al. (2008a) develop a complementary model based on the cultural transmission of beliefs, showing how an equilibrium can be path dependent even without assuming anything about institutional structures of society. They build an overlapping generation model, where children absorb priors (beliefs) from their parents. After experiencing the "real world", these individuals update their beliefs and transmit new priors to their children again. In this overlapping generation model parents value future and current benefits differently putting more weight on the misfortune of their children at an early stage. In terms of preferences Guiso et al assumes that parents exhibit a present bias in relation to their children's welfare. Parents thus endow their children with a more conservative set of beliefs than their own.

The priors children are endowed with affect an individual's decision to trust other members of society and whether they will participate in anonymous trade. If these priors are sufficiently pessimistic individuals will withdraw from the market and do not invest. This strategy minimizes losses but prevents any update on the true distribution of honest people in society. Learning is assumed to only come from participation in economic trade and intergenerational transmission. In real life people do not only learn from their own direct experiences but also through the experience of others. According to Guiso et al (2008a) this latter channel of intergenerational learning is generally weaker. If you do not trust others to begin with they also claim that it's not unreasonable that you would have difficulties learning from your external environment.

Combining their overlapping generation model with a Berg, Dickhaut, McCabe (1995) trust game Guiso et al. show that if the net benefit from cooperation is not sufficiently high, a society starting with a diffuse prior will be trapped in a mistrust equilibrium. The net benefit of cooperation is a function of the share of honest persons in society, the amount returned from the honest receivers, and decreasing in the amount lost when sent to a none-trustworthy individual (Guiso, Sapienza et al. 2008a). Even a temporary shock to the benefit of cooperation can permanently shift the equilibrium to a cooperative one.

In this context a society's starting point will be crucial for the formation of social capital. In a high trust society people will engage in trade and update their priors, learning the true value of the trustworthiness in society and transmit these (positive) beliefs on to the next generation. A society starting out with pessimistic priors and with little trust in others might be trapped in a low trust, low trade equilibrium irrespective of the true level of trustworthiness in society. A positive or negative shock to the trust level (from the benefits of cooperation), might permanently shift the equilibrium of a society. This makes social capital formation, in the model of Guiso et al, path dependent.

2.4 Living in an empirical world

Both of the models above are set in strict theoretical environment, but most of the stark assumptions are made for the ease of analytic traceability which we can relax when working empirically with social capital.

Guiso et al (2008a) models the evolution of trust taking trustworthiness (values) as exogenously given. Tabellini's focus is on the evolution of values and its effect on the trustworthiness of individuals and the scope of cooperation with society. In Tabellini's model the values parents choose to pass on to their children is a function of the level of cooperation in society. This implicit imply a degree of trust (beliefs) in others as a function of the level of trustworthiness in society, although he does not use this term himself.

In reality there could be several ways for beliefs or trust and trustworthiness to interact and mutually reinforce each other. In an experiment among MBA students from Northwestern University, Rueben et al. (2009) finds a strong relationship between beliefs and values. The more the players believe others will return, the more they return themselves. Most importantly the amount returned is heavily influenced by the expectations of the sender. Thus a sender with pessimistic beliefs will actually cause the responder to behave in an untrustworthy manner. This of course will further confirm the senders original pessimistic prior. Reuben et al thus find that mistrust is self-fulfilling. Taking norms and social pressure into account, Guiso et al. also highlights that it would also be easier to teach a child to be trustworthy when the general expectation (belief) is that most people will be trustworthy. Both channels would only strengthen the results of both Tabellini and Guiso et al.

The GSZ (2008a) model also makes a strong assumption regarding social interaction and the "learning process". Tabellini differentiates between different scopes of cooperation and social

and economic interaction. Guiso et al. on the other hand only focus on the generalized sphere, and the participation in anonymous trade. The authors assume that individuals only learn through intergenerational channel and not intragenerational one. Even if people do not take part in anonymous trade as the GSZ (2008a) model assumes, it's hard to think of a society where people live their lives in complete isolation. Social and economic interactions within a community, between neighbours and relatives will prevail even if an individual removes herself from anonymous trade as they show. In the context of Tabellini's model this would mean that in "closer circles", even people who are endowed with little generalized trust (or morality as Tabellini coins it) will "match" their priors to their surrounding environment. Guiso et al claims that intra-generational learning only will strengthen the persistence of mistrust (Guiso, Sapienza et al. 2008a). However without making any further assumptions about the level of diffusion, or endogeneity, of values and beliefs, it's not clear that this is the case. If people are in general trustworthy then a mistrust equilibrium will be stable if an only if no-one trades anonymously or if no-one is learning from the once who does.

Tabellini's model is perhaps the most realistic and coherent model of social interaction and captures important aspect in the strategic complementarities of norms, economic incentives and behavior. But alone Tabellini's model fails to explain the persistent and path dependency of social capital in the absence of democratic institutions. Working with empirical data within an African context, this is an important shortcoming. It also falls short of explaining why the trust level of second generation immigrants are so highly correlated with their country of origin, and why it takes several generations to "fully adopt" to their trust environment (Guiso, Sapienza et al. 2008a). This is another important aspect when looking at slave trade exposure that ended 100 years ago, with heterogeneous exposure, high degree of relocation, and its effect on current levels of trust.

However utilizing the insight of Reuben et al we can relax the stark assumptions of the GSZ model above without losing its insight in the evolutionary process of beliefs Tabellini's model is lacking. Focusing on social capital as defined above we can exploit the complementarity of the two models, giving a much more coherent and realistic conceptual framework to work with. It is within this complementary framework I build my hypothesis. The framework highlights the historical and evolutionary process and the persistence of social capital. When values and beliefs interact and reinforce each other through an interplay of inter and intra-generational cultural transmission, social norms and economic incentives this creates a two way micro-macro relationship with multiple equilibria and the possibility of hysteresis in

aggregated social capital. The empirical analysis following in chapter six test whether the relationship between slave trade exposure and individual trust found by Nunn and Wantchekon (2011) is driven by such a two way micro-macro relationship in the evolution of social capital.

3. HISTORICAL CONTEXT AND CAUSAL CHANNELS

3.1 Historical background

The African slave trade took place between the 15th through to the 19th century. The most well-known and largest being the trans-Atlantic. The volume of the African slave trade was unprecedented. During the trans-Atlantic slave trade alone approximately 12 million slaves were captured (Nunn and Wantchekon 2011). In addition to this a large number of people were killed in the raids or marching towards the coast. According to Patrick Manning (1983, p 171) the African population would have been twice as big as it was in 1850, if it wasn't for the slave trade.

Though most slaves were taken in village and state raids (Northrup 1978), the African slave trade penetrated deep into the social workings of the continent. Slave merchants and raiders formed strategic alliances with different groups within states and communities. Where groups of villages had developed into larger federations, the different villages now tended to turn on each other (Nunn 2008). As a result ties between villages weakened, as did the formation of larger communities with broader ethnical boundaries. Kusimba (2004, p 66) writes "insecurity confined people within ethnic boundaries construction spheres of interaction". This directly relates to Tabellini's notion of limited morality where cooperation can only be sustained within a smaller circle of individuals.

In this state of insecurity individuals could partially protect themselves by acquiring guns and other types of modern weapons to defend themselves. These weapons could only be obtained from Europeans in return for slaves (Nunn 2008). People therefore also began to turn on others within their own village, neighbours, friends and even families, through local

kidnapping, or other types of small scale violence (Hawthorne 2003). This of course caused further insecurity within communities leading to an even greater need for protection. Historians have named this the "gun-slave cycle" (Lovejoy 2000). In a sample of 144 slaves in Free Town, Sierra Leone collected during the 1840s Sigismund Koelle (1854) found that the most common way for enslavement, was by kidnapping. Maybe most interesting is the fact that 20 present of the sample had been sold into slavery by family members.

In general the slave trade led to decreased political instability and the collapse of many of the existing forms of government structures (Lovejoy 2000). According to Alfonso, King of Congo's letter to the Portuguese there were traders in every corner of his country, enslaving and kidnapping people. Even his own family was not protected against the slave traders (Vansina 1966). These events were partly responsible for the breakdown of this once powerful state (Inikori 2003). In many places pre-existing states and institutional structures were replaced by warlords, unable or unwilling to develop stable state structures (Colson 1969). The slave trade also affected the existing legal system (Nunn 2008). In Koelle's sample 20 present enter into enslavement through the judicial system. In many cases false accusations of witchcraft, adultery or theft were put forth. Before the slave trade the punishment, if found guilty, would be beatings, exile or paying a compensation. During the slave trade many were sentenced into slavery (Nunn and Wantchekon 2011). Leaders often supported this abuse of the legal system, protecting themselves and their community form raiders by paying slaves as tribute (Klein 2001, Hawthorne 2003).

3.2 Channels of causality and summary

The slave trade penetrated all layers of society, from states and federations, judicial systems and all the way down to the household level. This suggests that slave trade *directly* affected both the internal trust and trustworthiness (beliefs and values) of the individuals who were exposed to the slave trade, and their external environment. This is confirmed by the findings of Nunn and Wantchekon (2011). Individuals whose ancestors were heavily exposed to the slave trade still have lower trust, in their neighbours, family members, local council, co-ethnics and people from other ethnicities, today. They also find that the slave trade affects current individual trust both through an internal and external channel, drawing a clear line between the two. They claim that norms, beliefs and rules-of-thumb are all internal to the individual, and thus not effected by institutional quality, trustworthiness of others, etc. which

they claim to be purely external. Utilizing the social capital framework developed above the impact of the individual slave trade exposure would also lead to a decrease in the return to cooperation on a broader level, hampering the diffusion of social capital, and *indirectly* affecting society again, both at macro- and micro level. Such an additional two way macro-micro channel incorporates the endogenous relationship between inter and intra-generational cultural transmission, social norms and economic incentives left out by Nunn and Wantchekon (2011). I do not contest their estimated causal effect, but their separation of the individual from the social aspects of their external environment. If social capital is truly social then we need take this aspect into account to better understand its persistence, historical evolution and formation.

The empirical analysis following in chapter six replicates and expands the work of Nathan Nunn and Leonard Wantchekon (2011), testing whether the causal relationship they find is a product of such a two way micro-macro relationship and the existence of multiple equilibria in aggregated regional trust.

4. DATA

In this thesis I am replicating and expanding the empirical work of Nathan Nunn and Leonard Wantchekon (2011), using their data. This section therefore will mainly be referring to their description of the survey- and slave export data. For descriptive tables, etc. see the online appendix of "The origins of mistrust in Africa" (Nunn and Wantchekon 2011)

4.1 Afrobarometer data

The individual-level data are taken from the third Afrobarometer survey in 2005. The Afrobarometer is an independent research project that measures social, economic and political atmosphere in Africa. These surveys are based on interviews of a random sample of individuals and are representative at the national level. The 2005 survey covers 17 African countries. Form the 2005 survey we have a sample of 21.822 individual observations. Nunn and Wantchekon remove 120 respondents that have missing or inconclusive information regarding their ethnicity. The Nunn and Wantchekon sample therefore have 21.702 observations. In addition to the observations dropped by Nunn and Wantchekon (2011) I also drop the regions with 20 or less respondents to get a more representative regional proxy. In total 170 observations. In my analysis I therefore only have 21.532 observations. As shown in chapter six and the appendix the results of Nunn and Wantchekon (2011) are robust to the omission of these observations.

The data on individual trust corresponds to the respondents' answers to questions on how much they trust their relatives, neighbours, local government council, co-ethnics and people

of other ethnicities. Four different answers are available; not at all, just a little, somewhat and a lot. The data show that the respondents have more trust in people close to them self than more distant relationships (Nunn and Wantchekon 2011). This adds reliability to the model of Tabellini who highlights the different scopes (social and economic distance) where cooperation is sustainable. Despite this fact 7 present of the sample do not trust their relatives at all, while 18 present report that they only trust their relatives a little (Nunn and Wantchekon 2011). In other words 25 present only have a little or no trust in their relatives[5].

Nunn and Wantchekon assign a number to each categorical answer in the Afrobarometer survey. This constructs a measure of individual trust going from 0 corresponding to "not at all", to 3 "a lot". The individual trust measure is the dependent variable in both the replication and expansion of Nunn and Wantchekon's estimations.

4.2 Regional trust

I also construct a proxy for the average regional[6] trust or more precisely a proxy for regional levels of social capital, at the respondents' current location. I construct this variable by first removing the individual observations "in question". Then I collapse the remaining individual trust observations to regional means, and assign the means back to the individual. I then construct one regional proxy for each measure of trust using the weighted average of the four other regional trust measures, to reduce potential reflection issues (Manski 1993). The number of individuals within each region varies. The average amount of observations is 213, and the median is 144. I don't claim that the constructed variable is representative for the true regional trust levels. It can still serve as a proxy for regional trust. The fact that we see such a strong relationship between individual trust and the regional proxies supports its validity. The assumed existence of such a macro-micro relationship rest on the social capital framework, but are strengthen by empirical findings such as the evolution of the social capital among US immigrants (Guiso, Sapienza et al. 2004, Tabellini 2008b) the effect of different community characteristic found by Alesina and La Ferrara (2002) and the established relationship between ethnic fractionalization and long-term economic growth (Easterly and Levine 1997).

[5] For a full description of the responses to each question see the online appendix of "The Slave Trade and the origin of mistrust" (Nunn and Wantchekon 2011).
[6] Regional level is an aggregated level below country and above the district level.

4.3 Data on ethnic slave trade exports

Nunn and Wantchekon's (2011) data on the number of slaves taken from each ethnicity relies on the country level estimates of Nunn (2008)[7]. The estimates were constructed combining the amount of slaves shipped form all ports and regions of Africa with data on the slaves' ethnic identities. The empirical analysis is restricted to the transatlantic and Indian slave trade as the data on the red sea and trans-Saharan slave trades did not have detailed enough information on the ethnicity of the slaves taken (Nunn and Wantchekon 2011). The omission of these two slave trade routes will likely have little impact on the analysis. This is due to the fact that the countries most affected by them are not included in the Afrobarometer data. Nunn and Wantchekon also show that their results are robust to omitting Kenya and Mali, who shipped a significant number of slaves during the red sea or trans-Saharan slave trades.

Nunn and Wantchekon links the historical data on the ethnicities of the slaves captured during the slave trade with the ethnic classifications mapped by G.P. Murdock (1959). The classification used by Murdock is very similar to the ones used by the Afrobarometer survey, facilitating the final transition[8]. For descriptive figures, of the ethnic slave trade exposure, see Nunn and Wantchekon (2011).

[7] For further details on the slave trade data see Nunn and Wantchekon (2011) and Nunn (2008)
[8] For further details of the construction procedure see Nunn (2008)

5. EMPIRICAL STRATEGY AND EQUATION

5.1 Empirical Strategy

I aim to determine whether the causal effect of the slave trade on current levels of individual trust is a product of a two way micro-macro relationship and the existence of multiple equilibria in aggregated social capital. Empirically I do this in a two-step procedure.

First I established the long-term causal impact of the slave trade by replication the estimations of Nunn and Wantchekon (2011) using equation (1) below. Secondly I expand their analysis by adding my constructed proxy for regional levels of social capital and estimate equation (2). The regional proxy needs to satisfy two conditions for my hypothesis to hold. First it needs be an economically and statistically significant explanatory variable for individual trust. Secondly it needs to significantly mediate some of the causal effect of ethnic slave trade exposure on current levels of individual trust. The latter is evaluated by examining the changes in the coefficient of ethnic slave trade exposure (β) when the regional proxy is added. Still if the two conditions hold, I need to show that the estimated relationship is not driven by omitted variables correlated with both individual trust and the regional trust proxy. To deal with the endogeneity issue I follow Nunn and Wantchekon (2011) who control for an extensive list of observable characteristics and several fixed effects, all described below. Further issues regarding the endogeneity of regional trust proxy is commented in section 6.3.

5.2 Equations

Nunn and Wantchekon's (2011) baseline equation is;

(1) $trust_{i,e,d,c} = \alpha_c + \beta slave\ exports_e + \boldsymbol{X'}_{i,e,d,c}\,\mathbf{T} + \boldsymbol{X'}_{d,c}\,\boldsymbol{\Omega} + \boldsymbol{X'}_{e}\,\boldsymbol{\Phi} + \varepsilon_{i,e,d,c}$

My baseline equation is:

(2) $trust_{i,e,d,r,c} = \alpha_c + \beta slave\ exports_e + \gamma regtrust_r + \boldsymbol{X'}_{i,e,d,c}\,\mathbf{T} + \boldsymbol{X'}_{d}\,\boldsymbol{\Omega} + \boldsymbol{X'}_{e}\,\boldsymbol{\Phi} + \varepsilon_{i,e,d,r,c}$

Here $trust_{i,e,d,r,c}$ is a measure of individual trust in relatives, neighbours, local council and trust in co-ethnics and people from other ethnicities. The subscripts *i* refer to individuals, *e* to ethnic groups, *r* to region, *d* to district and *c* to country.

Nunn and Wantchekon's coefficient of interest is β, the coefficient of the slave export variable. I am interested in γ, the coefficient of the regional trust proxy and the effect on β when expanding equation (1) with the new variable.

The vector $\boldsymbol{X'}_{i,e,d,c}$ is a vector of different individual-level covariates. This includes age, age squared, gender, a dummy indicating if the individual lives in an urban location, living condition, education, occupation and religion fixed effects. Many of these variables are meant to proxy for income which might be correlated to both the slave trade exposure (Nunn 2008) and trust (Alesina and La Ferrara 2002).

In the $\boldsymbol{X'}_{d}$ vector there are two district level variables. The first one is the ethnic fractionalization of the responders' district and the second a measure of the relative size of the responder's ethnicity to other within the district. The last one follows Alesina and La Ferrara's (2002) findings in the US, that a being a part of an ethnic minority might adversely affect your trust in others. As highlighted by William Easterly and Ross Levine (1997) there's a strong relationship between long-term growth and ethic fractionalization. If slave trade exposure is correlated with ethnic fractionalization again, this might lead to a biased estimator it's thus important to control for this variable.

5.2.1 Country fixed effects

Nunn and Wantchekon (2011) use country fixed effects, α_c, to capture country specific attributes that might affect individual trust. This could be factors such as government

regulations, institutional quality, etc. This means that their estimated relationship will be limited to a within country relationship.

Tabellini (2008a) claims that intuitions and culture are endogenous. If social capital or cooperation in a society is low then (through democratic voting) people will chose weak state enforcement. He also shows how weak institutions have an adverse effect on the diffusion of values and beliefs in the society. Culture and institutions thus mutually reinforce each other. Using country fixed effects may remove possible endogeneity problems, but also leaves out the potential adverse effect that the slave trade might have had on national institutional quality and government enforcement (directly and indirectly). The institutional design of the countries in question has not exhibited a nature of (democratic) persistency from the slave trade up until now on the other hand. Most importantly they have experienced heterogeneous exposure to different colonial institutions and settlement patterns. But still the effect of the slave trade on individual trust might have persisted through the colonial period. This could lead to the enforcement of "grabbing" or exploiting institutions "left" by some of colonizers which Acemuglo et al. (2001) claims to be very persistent. The extent to which national institutions play a role outside the major cities or capitals in most African countries are put to question by Michalopoulos and Papaioannou (2013), though. They find that the pre-colonial institutions play a major role in prediction the level of regional economic development today. Thus removing country specific attributes might not be too problematic, and our focus should rather be on the local or regional institutional level. Unfortunately I have not been able to find any institutional variables at the regional level, but any systematic relationship between regional institutions and aggregated trust should be picked up by the regional trust proxy. Nunn and Wantchekon control for *local* council trustworthiness. I will return this as I add these variables myself.

5.2.2 Historic differences and Colonial rule

Controlling for the impact of different colonial rule is very important in an African context. If the parts that were most affected by the slave trade are the same as the once adversely affected by colonial rule, we might be picking up this effect in our slave trade coefficient. Here we follow Acemoglu, Johnson and Robinson (2001). They argue that disease environment and pre-colonial prosperity were crucial to the institutional design established by the colonizers. The vector $\mathbf{X'_e}$ is meant to capture this colonial effect and other historical characteristics at the ethnicity-level. Nunn and Wantchekon (2011) control for the malaria ecology of the land inhabited by the ethnic groups, colonial-population density and a dummy variable for the

existence of a city in the land inhabited by each ethnic group in the year 1400. This vector also includes two proxies for the initial levels of prosperity; one variable indicating the settlement patterns of the ethnic groups and one indicating the sophistication of the "local" political institutions at the time of colonization. Michalopoulos and Papaioannou (2013) show that the latter is highly correlated with contemporary regional development. With the possibility of selection into slave trade this is thus an important observable to control for, if we are to establish a causal link between slave trade and current levels on individual trust.

Lastly the vector contains three variables to more directly measure the European influence during the colonial period.

5.2.3 Normalization of the slave trade measure

Due to the fact that the distribution of the slave trade export is highly left skewed (Nunn and Wantchekon 2011). I follow Nunn and Wantchekon in using the natural log of slave trade exports. To measure the impact of slave trade on the individuals in an ethnic group it would have been optimal to normalize the amount of slaves exported by the ethnic population. For the same amount of export, a highly populated ethnic group would probably be less affected on the individual level than a small group where a higher percentage was captured. Historical population data is unfortunately not available before the colonial period and is still missing for about 15% of the ethnicities. Nunn and Wantchekon (2011) instead use the size of the ethnic land area to proxy for this. They find a significant negative relationship between both of the log normalized slave trade measures and individual trust in neighbours. The coefficient of the colonial population normalization measure is -0.743, while the corresponding coefficient normalizing on land area is -0.159. If anything, finding a significant relationship using the most conservative measure is an even stronger argument for the impact of the slave trade on individual trust.

5.2.4 Clustering

Since several of the variables do not vary across individuals there's a potential for within-group correlation of the residuals in the sample (Angrist and Pischke 2009). In the data we have variables that only vary at the ethnic, district or regional level. To account for potential within group correlation Nunn and Wantchekon (2011) use standard errors adjusted for two-way clustering at the ethnicity and district level. However these standard errors are essentially identical to the reported standard errors clustered on ethnicity alone. For simplicity I therefore only use standard errors adjusted for regional clustering, as this is my highest aggregated

level. The results of Nunn and Wantchekon (2011) are robust to this change. I have also replicated their main OLS estimation using two-way clustering at the ethnicity and district level in the appendix.

5.3 Causality

Nunn and Wantchekon (2011) find a strong negative correlation between slave trade exposure and individual trust today. They also provide strong evidence for a causal relationship with the causality going from slave trade to individual trust.

First they control for an extensive list of variables, all describe above, to remove possible endogeneity issues from observable factors. Still there could be unobservable factors correlated with selection into the slave trade and current individual trust causing the estimator to be biased. Also, if individuals who were less trusty to begin with were the once that supplied the most slaves then the causality could go the other way. They assess the likelihood that unobservable factors are driving the estimated relationship, finding that the selection on unobservables would have to be three times as large as the selection on observables to account for the estimated relationship (Nunn and Wantchekon 2011).

The most convincing evidence, in my opinion, is their instrumental variable approach. Nunn and Wantchekon (2011) use an ethnic group's distance to the coast as an instrument for the number of slaves taken (Nunn and Wantchekon 2011). They construct the instrument using data from Murdock (Murdoock 1959) on the borders of ethnic groups in the eighteen hundreds. To be a valid instrument distance to coast needs to be relevant and excludable. That is at least partially correlated with the explanatory variable, and uncorrelated with the residuals (Wooldrigde 2010)

More formally this means that the instrumental variable needs to satisfy the following two conditions;

1. Covariance (distance to coast, slave exports) $\neq 0$
2. Covariance (distance to coast, residual) $= 0$

Since slaves were shipped from the coast (Nunn and Wantchekon 2011) logically the "demand for slaves" would be higher the closer to the coast you were located. The first stage of their two stage least square estimation shows that the relevance condition holds. The estimated relationship between the instrument and slave trade exposure is also negative as one

would expect. The second stage results are remarkably similar to their OLS estimates, but the causal interpretation still rest on the assumption that the exclusion restriction holds. In their second instrumental variable estimation they add variables such as fishing reliance, distance to Saharan trade, etc. that might be connected to trust via income, initial prosperity and correlated with distance to the coast. The estimated effects are still negative and similar to the previous ones. Nunn and Wantchekon (2011) also perform a falsification test to see if there exist a connection between individual trust and distance to the coast other than through the slave trade. They use data from the Asiabarometer and the World Value Surveys on trust in different parts of the world and only find this relationship within Africa. Finally a Durbin-Wu-Hausman test cannot reject the null hypothesis of the consistency of the OLS estimates which are very close to the magnitudes of their IV counterparts and highly significant.

All together there is strong evidence in the data that the estimated relationship is in fact causal and that the original OLS estimates are consistent and not driven by selection into the slave trade. For my analysis of evolution of social capital I will therefore only be using ordinary least squares, and replicate Nunn and Wantchekon's estimations with a full set of controls.

6. EMPIRICAL RESULTS

6.1. Ordinary least square estimations for the whole sample

6.1.1 Benchmark Nunn and Wantchekon replication

To establish the relationship between ethnic slave trade exposure and individual trust today I replicate Nunn and Wantchekon's (2011) OLS estimates with a full set of controls[9] using equation (1). The estimates are shown in table 1.

Table 1 - Benchmark Nunn and Wantchekon OLS replication

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
ln(1+slave export/area)	-0.177***	-0.202***	-0.129***	-0.188***	-0.114***
	(0.0266)	(0.0324)	(0.0244)	(0.0347)	(0.0362)
Age	-0.00331	0.00717***	0.00323	0.00742***	0.0166***
	(0.00239)	(0.00254)	(0.00313)	(0.00264)	(0.00350)
Age^2	5.36e-05**	-4.21e-05	-2.16e-05	-5.89e-05**	-0.000136***
	(2.55e-05)	(2.79e-05)	(3.38e-05)	(2.76e-05)	(3.64e-05)
Urban dummy	-0.112***	-0.152***	-0.162***	-0.103***	-0.0783***
	(0.0255)	(0.0279)	(0.0312)	(0.0252)	(0.0276)
Full set of controls	Yes	Yes	Yes	Yes	Yes
Observations	16,571	16,541	15,772	16,498	16,335
R-squared	0.132	0.161	0.206	0.157	0.119
Reg. clusters	166	166	172	166	166

OLS estimates of equation one with a full set of controls including fixed effects. See chapter five for details. ln(1+slave export/area) is the natural log of the slave export normalized by land area at the ethnicity level. Standard errors clustered at the regional level in parentheses. P-values *** p<0.01, ** p<0.05, * p<0.1

[9] For details on the control variables please see section 4.2-4.4.

In the replication I only cluster at the regional level and the sample is smaller due to my omission of the regions with 20 or less observations. Their results however are robust these changes. None of the coefficients of interest, or their standard errors, change in any significant manner[10]. The results show a significant negative effect from slave trade exposure for all five trust measures. As discussed above, Nunn and Wantchekon provide strong evidence for the effect to be causal.

6.1.2 OLS with regional trust proxy

To examine the assumed two way micro-macro relationship and equilibrium behavior of social capital, I add the proxy for regional trust and estimate equation two. The estimates are shown in table two.

Table 2 - OLS estimation with regional trust proxy

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
ln(1+slave export/area)	-0.0752***	-0.0588***	-0.0589**	-0.0312	0.0226
	(0.0265)	(0.0192)	(0.0256)	(0.0245)	(0.0281)
Mean regional trust	0.621***	0.917***	0.412***	0.963***	0.783***
	(0.0732)	(0.0542)	(0.0585)	(0.0509)	(0.0632)
Age	-0.00489**	0.00511**	0.00247	0.00542**	0.0149***
	(0.00234)	(0.00254)	(0.00319)	(0.00251)	(0.00355)
Age^2	7.10e-05***	-1.95e-05	-1.39e-05	-3.72e-05	-0.000118***
	(2.51e-05)	(2.77e-05)	(3.44e-05)	(2.65e-05)	(3.69e-05)
Urban dummy	-0.0760***	-0.104***	-0.147***	-0.0545***	-0.0368
	(0.0249)	(0.0264)	(0.0302)	(0.0195)	(0.0238)
Full set of controls	Yes	Yes	Yes	Yes	Yes
Observations	16,571	16,541	15,595	16,498	16,335
R-squared	0.150	0.193	0.212	0.192	0.145
Reg. clusters	166	166	165	166	166

OLS estimates of equation two with a full set of controls including fixed effects. See chapter five for details. ln(1+slave export/area) is the natural log of the slave export normalized by land area at the ethnicity level. Mean regional trust is the five different constructed regional means. Standard errors clustered at the regional level in parentheses. P-values *** p<0.01, ** p<0.05, * p<0.1

The regional proxy needs to satisfy two conditions to support my hypothesis. First it needs to be a significant explanatory variable for individual trust. As we can see from table 2 the coefficient of mean regional trust is significant at a 1 percent level for all five trust measure and the assumed positive relationship is evident. The magnitudes of the coefficients are also highly significant, economically speaking. The average trust levels are measured on the same scale as individual trust. As described above the measure of trust in the data ranges from 0-3

[10] I've replicated Nunn and Wantchekon's (2011) OLS estimate with a full sample and two-way clustering at the district and ethnicity level in table 7 in the appendix.

and refers to the four alternative answers available to the responder, ranging from "not at all" (0) to "a lot" (3)[11]. The coefficient varies from 0.41 on trust in local council to 0.96 for intra group trust, which measures the extent to which the responder trust other people within their own ethnic group. On average a "one point" increase in regional trust levels would, all else equal, predict a 0.74 point increased in individual trust. On average 74% of the increase in average trust would be picked up by the individual. The estimates provide strong evidence for a macro-micro relationship between regional and individual trust and equilibrium behavior of aggregated social capital.

Secondly the regional trust proxy needs to mediate a significant portion of the estimated causal effect of slave trade exposure on individual trust. The benchmark Nunn and Wantchekon (2011) replication estimates this causal effect and we thus only need to compare the coefficients of the slave trade variable in table 1 to their counterparts in table 2.

The estimated slave trade coefficients in table 2 are significantly smaller than all their counterparts in table 1. The "direct channel"[12], is now only significant for three out of the five trust measures. On average the coefficients on trust in relatives, neighbours and local council have decreased with over 50% from the benchmark estimation in table 1. In other words the average trust level mediates over half of the originally estimated effect of the slave trade for these three trust measures. Most interesting is the effect on inter- and intra-group trust. The estimated "direct" effect of slave trade exposure on these two trusts measures is now numerically close to, and statistically indistinguishable from, zero.

The intra- and inter-group trust measures reflect the extent to which a person trusts people within her own ethnicity (intra) and people from her own country but from other ethnicities than her own. These two trust measures represent the most "distant" social and economic relationships in the data. I run a VIF test to check if these last results are driven by multicollinearity. The VIF scores are 3.91 for the regional average variable and 5.1 for the slave export variable for the intra group measure in column 4. For the inter group measure in column 5 the corresponding VIF values are 3.89 and 5.13. Thus we cannot attribute these changes in the slave trade coefficients to multicollinearity issues.

Adding the regional proxy also affects the coefficients of the urban dummy. The coefficient on the intragroup trust is significantly smaller (at a 10% significance level), and the

[11] Afrobarometer Round 3 - http://www.afrobarometer-online-analysis.com/aj/AJBrowserAB.jsp
[12] The coefficient of the ethnic slave trade exposure

coefficient for the intergroup trust measure is no longer significant. The others change, but are not statistically different from their table 1 counterparts. While this coefficient is not really that interesting in itself, these changes add reliability to the regional proxy, picking up regional differences from urbanization.

The estimates show a positive relationship between regional and individual trust. The regional trust proxy also mediates a significant part of the relationship between slave trade and individual trust. This suggests that social capital indeed exhibit equilibrium behavior and the existence of a two way micro-macro relationship. Still ethnic slave trade has a negative "direct" impact on individual trust for the three of the five trust measures, but the magnitude of this channel varies a lot across the social and economic distance. If I follow Nunn and Wantchekon's distinction between an internal and external channel of causality, my results suggest that the external (here the regional trust proxy) is much more important than the internal one. We see this by evaluating the reduction in the coefficient of the slave trade variable when we add the regional proxy. This is in stark contrast to the findings of Nunn and Wantchekon (2011). I will return to this in chapter 6.2 when I replicate their channels regression.

Lastly the age and age^2 variables which I include in most of my tables shows that the assumed present and personal bias, in the transmission of beliefs, in the model of Guiso et al. (2008a) fits the data[13]. This is also in line findings of Glaeser et al (2000). Age effects trust positively but at a decreasing rate.

6.1.3 OLS with regional proxy and local government quality controls

Tabellini (2008a) highlights the complimentary and reinforcing nature of institutions and social capital. Weak enforcement foster only limited cooperation, and hampers the dispersion of social capital. When social capital is low people choose weak law enforcement, and vice versa. Thus if people are allowed to choose their institutions through voting, then an equilibrium will be path dependent with the possibility of hysteresis.

In table 1 we see a significant negative relationship between slave trade and the responders' trust in their local government council. But people who were more affected by the slave trade also report more local government corruption, worse performance, etc. (Nunn and Wantchekon 2011). It is possible that what we are picking up is the slave trade's negative

[13] One rarity is worth to notice though, the negative impact of age on trust in relatives.

impact on the actual trustworthiness and quality of the local government council, rather than its effect on trust directly. The same goes for regional trust. In table 3 we see that the regional trust proxy mediated over 50% of the estimated benchmark relationship between slave trade exposure and trust in the local government. For this trust measure it could reflect a regionally homogenous impact on the local institutions.

If institutions are endogenous to social capital through voting, as Tabellini (2008a) claims, then the quality of the local government should affect not only how much you trust your local government but social capital in general. In the empirical framework this means that the local government quality controls should mediate some of the relationship between the slave trade and individual trust for all trust measures.

To control for this potential channel I have included controls for the perceived trustworthiness (corruption) and performance of the local council and report the updated estimates in table 4.

Table 3- OLS estimation of equation (2) with local government quality controls

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
ln(1+slave export/area)	-0.0824***	-0.0623***	-0.0320	-0.0355	0.0203
	(0.0302)	(0.0200)	(0.0207)	(0.0273)	(0.0298)
Mean regional trust	0.595***	0.870***	0.289***	0.925***	0.742***
	(0.0790)	(0.0543)	(0.0496)	(0.0549)	(0.0690)
Local council performance	0.0415***	0.0605***	0.377***	0.0673***	0.0653***
	(0.0140)	(0.0136)	(0.0161)	(0.0126)	(0.0121)
Corruption in local council	-0.0634***	-0.0943***	-0.223***	-0.0717***	-0.0576***
	(0.0138)	(0.0140)	(0.0146)	(0.0132)	(0.0134)
Age	-0.00597**	0.00448	0.00307	0.00439	0.0142***
	(0.00277)	(0.00290)	(0.00311)	(0.00288)	(0.00383)
Age^2	7.93e-05***	-1.66e-05	-3.31e-05	-2.87e-05	-0.000117***
	(2.95e-05)	(3.12e-05)	(3.35e-05)	(2.96e-05)	(4.00e-05)
Urban dummy	-0.0737***	-0.0932***	-0.0915***	-0.0412*	-0.0198
	(0.0276)	(0.0284)	(0.0225)	(0.0226)	(0.0251)
Full set of controls	Yes	Yes	Yes	Yes	Yes
Observations	13,426	13,404	13,180	13,383	13,265
R-squared	0.149	0.200	0.358	0.202	0.147
Reg. clusters	164	164	164	164	164

OLS estimates of equation two with a full set of controls including fixed effects and additional council trustworthiness variables. See chapter five for details. ln(1+slave export/area) is the natural log of the slave export normalized by land area at the ethnicity level. Mean regional trust is the five different constructed regional means. Standard errors clustered at the regional level in parentheses.
P-values *** p<0.01, ** p<0.05, * p<0.1

As Tabellini's model predicts there's a positive relationship between institutional quality and social capital. On the other hand, the relationship between slave trade, regional trust and individual trust is very robust to the inclusion of these variables. The only slave trade coefficient that reacts in any significant manner, when I add the local government controls, is the estimated coefficient on the trust in local council. The estimated coefficient drops almost another 50% and is now no longer significant. The coefficient of the regional trust proxy also drops approximately 30%[14]. Nunn and Wantchekon (Nunn and Wantchekon 2011) explore this aspect, but only for the estimated relationship with the trust in local government measure and by using fixed effects. Their results show that over a half of the benchmark estimated effect of slave trade *cannot* be explained by a detrition of the trustworthiness of the local government council. After controlling for regional trust the "direct" (or internal) channel between slave trade and individual trust in local council can only explain approximately 25% of the benchmark estimation in table 1[15].

Even though we see a positive relationship between local government quality and individual trust, the poised *endogenous* relationship between institutions and social capital is not evident in this context. If so we should have seen an effect in the slave trade coefficients for all the trust measures, when we added the local government quality controls. One reason for this lack of reaction in the slave trade coefficient could be a result of the regional trust proxy already mediates a homogenous shift in the local government quality. If this was true then the coefficients of the local government controls should be larger when we exclude the regional proxy. In table 4 I have estimated equation (1) with the additional local government council variables for all trust measures. First the estimated relationship between the slave trade and individual trust are robust to inclusion of the local government controls. Secondly the coefficients of the added controls do not change significantly when the regional trust is omitted. Thus I cannot attribute the lack of "reaction" in the slave trade coefficients to a homogeneous shift in institutional quality at the regional level. The extent to which people are actually able choose their local government through voting, I do not know. Without the democratic aspect these institutions would theoretically be exogenous rather than endogenous to individual and regional social capital.

[14] These results are not due to the limited sample in this regression. Re-estimating equation two using the same sample as above, we actually find a larger and stronger relationship between slave trade exposure and individual trust for all trust measures except inter- group trust. This also explains why these estimated relationships between slave trade and individual trust in table three are higher than the estimates in table two. The estimated relationships for this limited sample are shown in table 8 in the appendix.

[15] It should be noted that Nunn and Wantchekon (2011) use fixed effects, a third trustworthiness variable. I have chosen only to use two of the three variables, as the "perceived willingness to listen to people" variable hardly affects the coefficients of interest and because there is almost 700 missing observations in addition to those already lost in my last estimation

Table 4- OLS estimation of equation (1) with local government controls

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
ln(1+slave export/area)	-0.175***	-0.189***	-0.0790***	-0.176***	-0.101***
	(0.0281)	(0.0306)	(0.0199)	(0.0356)	(0.0350)
Local council performance	0.0532***	0.0769***	0.379***	0.0846***	0.0801***
	(0.0142)	(0.0142)	(0.0160)	(0.0136)	(0.0130)
Corruption in local council	-0.0642***	-0.0970***	-0.227***	-0.0765***	-0.0624***
	(0.0142)	(0.0144)	(0.0148)	(0.0139)	(0.0139)
Full set of controls	Yes	Yes	Yes	Yes	Yes
Observations	13,426	13,404	13,350	13,383	13,265
R-squared	0.131	0.169	0.356	0.168	0.122
Reg. clusters	164	164	171	164	164

OLS estimates of equation one with a full set of controls including fixed effects and additional council trustworthiness variables. See chapter five for details. Age, age^2 and urban dummy omitted from table. ln(1+slave export/area) is the natural log of the slave export normalized by land area at the ethnicity level. Standard errors clustered at the regional level in parentheses. P-values *** p<0.01, ** p<0.05, * p<0.1

6.2 Channels of causality

By utilizing the social capital framework and a regional proxy variable I have tested whether the causal relationship found by Nunn and Wantchekon (2011) is a product of a two way micro-macro relationship and the existence of multiple equilibria in aggregated social capital. My claim is that through these mechanisms the regional trust proxy mediates a significant part of causality effect of slave trade exposure on individual trust. This indirectly separates the causal relationship of the benchmark estimations into an internal and external channel. As shown in section 6.1 my estimations suggest that the latter is the most important channel. This is in stark contrast to the conclusion of Nunn and Wantchekon (2011), who find the internal individual specific channel to be most important one. According to the authors the internal channel accounts for at least "half the reduce form relationship" (Nunn and Wantchekon 2011, p 3250). In this section I will replicate and expand Nunn and Wantchekon's "channels regression", to further examine the robustness of my results and the validity of the regional trust proxy.

6.2.1 Benchmark OLS replication of Nunn and Wantchekon channels regression

To separate the external and internal channel of causality Nunn and Wantchekon (2011) add an additional measure of slave trade exposure. This location based slave trade variable measures the slave trade exposure in the responders' current geographical area rather than among his or hers ethnic group. They do this by identifying which ethnicity that historically inhabited the area where the individual is currently living (Nunn and Wantchekon 2011). Their motivation for this exercise is to separate the internal and external channel of causality.

Nunn and Wantchekon claim that two slave export measures identify the two different channels by exploiting the fact that when people move their inherited and internal beliefs, values and norms move with them, even though the external environment changes.

The location based variable should capture the effect of the slave trade through the deterioration of legal and political institutions and the trustworthiness of others etc. The internal ethnicity based measure should therefore measure the impact of the slave trade on norms, values and beliefs, all internal to the individual according to the authors. Thus if internal norms etc. are the most important channel of causality, the correlation between mistrust and slave trade should be higher for the ethnicity based slave trade measure than the location based. If on the other hand the slave trade mostly affects individuals through the external environment, such as political institutions, the trustworthiness of others, etc. the location based measure should dominate. Since the two variables will be equal for none-movers, the movers are driving the identification of these coefficients[16].

Table 5 shows the estimated relationship using equation (1) with the location based slave trade measure included.[17]

The ethnicity based slave trade measure dominates in relationship to all five trust measures. If slave trade exposure also affects trustworthiness either directly or indriectly, one would expect that that the ethnicity based measure would be more important at least for within ethnicity trust and for individual trust in realatives. This measure would not neceserally represent trust in people living in the same location as the respondent but rather her relatives and same-ethnic individual in general. People who's ancestors have experienced the same slave trade exposure as the responder. The same logic does not hold for trust in neighbours though. Here one would exect the location based measure to dominate. This could reflect a trend to re-locate in neighbourhoods that are dominated by the same ethnicity as your own. The estimated internal channel for the between ethnicity trust measure is smaller in magnitude than the others but still highly significant

[16] More precisely the movers living in a location with different slave trade exposure then their ethnic origins are driving the identification. For 55% of the population the measures are equal. But only 41% have the same Murdoch identifier. The differences are mostly due to some coding differences in the data (Upper case/lower case and etc.) but also due to similar slave trade exposure in the two locations in some individuals.

[17] The estimates are not identical to the estimates in Table 10 of Nunn and Wantchekon's paper. This is due to a mistake in the published version of the paper, and the estimates I report are the correct ones. I have replicated channels of causality regression of Nunn and Wantchekon using the original sample and two-way clustering at the district and ethnicity level in table 9 in the appendix. The estimated coefficients are not identical to those reported by Nunn and Wantchekon. This has been brought to the attention of Nathan Nunn and verified by him.

The Nunn and Wanthcekon replication shows that before adding the regional proxy the internal channel is indeed the most important one. I have shown though that these direct (or internal) relationships decrease a lot when we control for regional trust, even before utilizing the new loaction based slave trade measure.

Table 5 - Benchmark Nunn and Wantchekon channels replication

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
Ethnicity-based slave trade measure	-0.153***	-0.180***	-0.0990***	-0.167***	-0.0859**
	(0.0258)	(0.0303)	(0.0255)	(0.0329)	(0.0336)
Location-based slave trade measure	-0.0601***	-0.0427*	-0.0692***	-0.0421*	-0.0502**
	(0.0215)	(0.0228)	(0.0190)	(0.0240)	(0.0252)
Age	-0.00354	0.00631**	0.00365	0.00680**	0.0154***
	(0.00242)	(0.00252)	(0.00322)	(0.00268)	(0.00326)
Age^2	5.65e-05**	-3.22e-05	-2.29e-05	-5.15e-05*	-0.000123***
	(2.59e-05)	(2.74e-05)	(3.48e-05)	(2.81e-05)	(3.46e-05)
Urban dummy	-0.118***	-0.153***	-0.170***	-0.108***	-0.0845***
	(0.0256)	(0.0272)	(0.0305)	(0.0234)	(0.0267)
Full set of controls	Yes	Yes	Yes	Yes	Yes
Observations	15,867	15,840	15,094	15,799	15,641
R-squared	0.135	0.160	0.207	0.152	0.119
Reg. clusters	166	166	172	166	166

OLS estimates of equation one with a full set of controls including fixed effects and the additional location based slave trade measure. See chapter five for details. The Ethnicity based slave trade measure is the same as I have used in the previous estimations. The location based slave trade measure is the natural log of the number of slaves taken from the respondent's current location normalized by land area. Standard errors clustered at the regional level in parentheses. P-values *** p<0.01, ** p<0.05, * p<0.1

6.2.2 Channels OLS regression with regional trust proxy

In table 6 I have reestimated equation 2 including the location based slave trade variable.

The estimated coefficients in table six are remarkably similar to their counterparts in table two. Statistically they're indistinguishable from my original OLS estimation. After controlling for regional trust the location based slave trade variable are no longer significant except for the trust in local council dependent variable[18]. The original estimations in section 6.1 thus yield thus the same statistical result with respect to the relationship between individual trust, regional trust and ethnic slave trade exposure as the mover's regression. It does so without controlling the location based slave trade measure, and when identification is driven by the whole sample. This strengthens the validity of the regional trust proxy and my interpretation of it as an external micro-macro channel of causality for the population as a whole.

[18] In table ten of the appendix I show that this is due to a negative impact on the actual trustworthiness of the local council, in line with the results in table three.

Table 6 - Channels OLS estimation with regional trust proxy

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
Ethnicity-based slave trade measure	-0.0722***	-0.0654***	-0.0425	-0.0382	0.0248
	(0.0263)	(0.0190)	(0.0261)	(0.0242)	(0.0268)
Location-based slave trade measure	-0.0256	0.0102	-0.0467**	0.0178	0.000400
	(0.0181)	(0.0166)	(0.0187)	(0.0185)	(0.0207)
Mean regional trust	0.602***	0.911***	0.401***	0.978***	0.787***
	(0.0750)	(0.0552)	(0.0589)	(0.0500)	(0.0652)
Age	-0.00511**	0.00424*	0.00292	0.00476*	0.0137***
	(0.00237)	(0.00250)	(0.00327)	(0.00256)	(0.00325)
Age^2	7.30e-05***	-1.05e-05	-1.61e-05	-3.05e-05	-0.000106***
	(2.55e-05)	(2.70e-05)	(3.54e-05)	(2.68e-05)	(3.45e-05)
Urban dummy	-0.0811***	-0.103***	-0.154***	-0.0554***	-0.0399*
	(0.0251)	(0.0261)	(0.0297)	(0.0182)	(0.0232)
Full set of controls	Yes	Yes	Yes	Yes	Yes
Observations	15,867	15,840	14,917	15,799	15,641
R-squared	0.151	0.190	0.213	0.187	0.144
Reg. clusters	166	166	165	166	166

OLS estimates of equation two with a full set of controls including fixed effects and the additional location based slave trade measure. See chapter five for details. The Ethnicity based slave trade measure is the same as I have used in the previous estimations. The location based slave trade measure is the natural log of the number of slaves taken from the respondent's current location normalized by land area. Mean regional trust is the five different constructed regional means. Standard errors clustered at the regional level in parentheses.
P-values *** p<0.01, ** p<0.05, * p<0.1

To sum up table 6 shows that the external channel is (still) by far the most important channel. As expected the slave trade exposure of the responder's current location mainly works through the regional trust channel. The coefficients of the ethnic slave trade exposure are not significantly different from the previous estimations. The only notable difference is that the location based slave trade coefficient relating to trust in local council, now is significant at a 10% level. This is however not surprising and relates to the result in table 3. After controlling for the actual trustworthiness of the local council the ethnicity based measure was no longer significant. In this sense this result shows that the location based slave trade measure used by Nunn and Wantchekon (2011) does pick up changes in the institutional quality. The estimated relationship between intra- and intergroup trust is still numerically and statistically indistinguishable from zero[19]. For the last two trust measure the internal channel can only account for approximately one half and one third of estimated benchmark relationship[20] between individual trust in relatives and neighbours respectively.

[19] I again preform a VIF test to test for multicollinearity with respect to inter- and intragroup trust. Again we cannot attribute lack of significance and the numerical estimations to multicollinearity issues.
[20] Benchmark relationship refers to the estimated results in table one.

6.3 Endogeneity

6.3.1 Endogeneity of the regional trust proxy

The estimations in the previous sections show strong support for a two way micro-macro relationship in evolution social capital. The results however rest on the assumption that the estimated relationship between the average trust proxy and individual trust is not driven by omitted variables. If there are variables (or unobservable factors) not included in the equations that are correlated with individual trust and the regional proxy then my estimated relationship will be biased and inconsistent. Following Nunn and Wantchekon (2011) in their extensive list of controls and fixed effects should have removed most of the potential sources of endogeneity. Country specific attributes are netted out through the fixed effects estimation. The same goes for living conditions, education, and occupation all meant to proxy for individual income. We've controlled for ethnic fractionalization which potentially could be correlated with both slave trade, regional and individual trust. We've also controlled for different historical factors. Here we followed Acemoglu, Johnson and Robinson (2001) and controlled for different colonial exposure. Furthermore we controlled for different levels of "initial prosperity" using indicator variables that quantify different precolonial settlement patterns of the different ethnic groups. Maybe the most important control variable in this context though was the control for the sophistication of the local political institutions at the time of colonization. Michalopoulos and Papaioannou (2013) show that latter is highly correlated with contemporary regional economic development which again could be correlated with individual trust through income, etc. Finally Nunn and Wantchekon (2011) show that after controlling for these variables, selection into slave trade is not an issue. While I cannot rule out that there are unobservable factors correlated with both individual trust and my constructed regional proxy, it seems unlikely that the main *results* from my estimations are *driven* by omitted variables.

6.3.2 Endogeneity within the mover's regression

Within the population of movers the regional trust proxy mediates a significant part of the causal effect from the ethnic slave trade exposure on individual trust. But if the average mover is not living in the same region as their ancestors there's no reason for slave trade exposure at the movers' historical origin should affect or work through the regional trust proxy at her current location. The opposite is true for the non-movers population. If the slave trade adversely effected (and still effects) individual beliefs, social norms, values, etc., one

would expect the micro-macro relationship to be an important mediating channel. Within the movers population this link is far less obvious.

One explanation could be that most movers move within the same region. In this case the slave trade exposure of the respondent's ethnic origin and current location would be affected by the same micro-macro relationship in the evolution of social capital. The only data I have regarding regions is from the Afrobarometer and the current region on the responder. Without additional data on the regional origin of the responders' ancestors, I am not able to or distinguish between regional- and non-regional movers[21]. If movers are dominated by regional-movers then a *second* explanation could be that the current regional trust is correlated with the regional trust at their ethnic origin for the regional-movers. If this is the case then I have an omitted variable bias in my estimation of the movers' regression. The estimated coefficient on regional trust will be biased and inconsistent, capturing relationship between individual- and regional trust in the responder current *and* historical region. The correlation between the two slave trade measures within the movers sample is 0.43[22] and the regional trust proxy mediates the impact of both the ethnic and "location based" slave trade exposure on individual trust[23]. Compared with non-movers the mover's individual trust is numerically and statistically less influenced by ethnic slave trade exposure and non-movers have a larger[24] relationship between individual trust and regional trust[25]. This suggests that the proxy is indeed endogenous in the movers' regression.

6.3.3 Consequences of possible endogeneity issues.

How does this affect the findings above? First a regression using only the non-movers in the sample confirms the reported relationship between slave trade exposure, regional trust and individual trust[26]. For the non-movers sample the historic and current region will be the same, removing any potential omitted variable bias with respect to the different regional trust proxies. If the movers are non-regional movers, then we're fine. If the movers sub sample is driven by regional movers then the decrease in the ethnic slave trade coefficient is most likely driven by a correlation between the two regional trust measures.

This is more of a limitation within the dataset then a problem though. The dataset I use in this thesis is cross-sectional and thus only vary in the spatial dimension and not in time. Most

[21] It should be possible though, using the information provided by the maps of G.P. Murdoch, to identify the responders' "historical region".
[22] See Nunn and Wantchekon (2011) appendix.
[23] See table six
[24] Only statistically higher for trust in neighbours and inter group trust.
[25] These results are reported in table eleven and twelve in the appendix.
[26] The OLS estimates of equation two using only the none-movers are shown in table twelve in the appendix.

importantly I do not have any information on the timing of the relocation of the movers. They might have lived in their new location for a year or for their whole life with their parents being the once to relocate. The extent to which they have been "under the influence" of a new social and economic environment will vary within the group. What I am looking for is evidence of a two way micro-macro relationship and equilibrium behavior of aggregated social capital, rather than the quantitative impact of relocation to a new external environment.

The mover's regression is thus still informative. The estimates show that the location based slave trade work through the regional trust levels in line with my hypothesis. The ethnic slave trade also works mainly through a shift regional social capital. Whether the decrease in the ethnic slave trade coefficient is affected by an omitted variable bias or not is actually not very important in this context. When you relocate you will still be highly influenced by the norms, beliefs and culture of you previous social context. As shown by Tabellini (2008b) and Guiso et al (2008a) it takes time to adapt to your new environment. The correlation between the two regional proxies simply confirms that regional trust in the responder's ethnic origin is still very important. This is in line with previous findings among US immigrants (Tabellini 2008b) and in post-divided Germany (Alesina and Fuchs-Schuendeln 2007, Rainer and Siedler 2009) and the theoretical model of Guiso et al. (2008a). With no information on the timing of the migration of the movers, it's more convincing than not to still find this kind of spatial relationship.

7. DISCUSSION AND SUMMARY

My estimated results in chapter 6 indicates that the causal effect of slave trade exposure on individual trust today is a result of a two way evolutionary process and the existence of multiple equilibria in aggregated social capital. Highlighted by the social capital framework developed in chapter 2 values and beliefs interact and reinforce each other through an interplay of inter and intra-generational cultural transmission, social norms and economic incentives. The regional trust proxy is a highly significant, statistically and economically, explanatory variable for individual trust. I argue that it's not likely that this result is driven by omitted variables. It also mediates a significant portion of the causal effect of the slave trade exposure. After including the constructed regional trust proxy and local government quality controls, most of the benchmark ceteris paribus causal effect of ethnic slave trade exposure and individual trust disappeared. For trust in local government, inter- and intragroup trust, the effect completely vanished. These variables represent the more distant spatial relationships, geographically and socially. These findings directly relate to the notion of generalized and limited morality highlighted by Guido Tabellini (2008a). He shows that more *abstract characteristics* such as rule of law, trustworthiness of others, etc., are crucial to sustain cooperation over a larger spatial distance. A negative shock, such as slave trade exposure, would hamper the dispersion and accumulation of social capital. It is not surprising then to see that these trust measures are most affected by the inclusion of the regional trust proxy. For the measures of trust in relatives and neighbours the direct link is still evident. It is however significantly smaller than the estimated benchmark relationship. Ethnic slave trade exposure can, all else equal, only account for one third and a half of the estimated benchmark causal effect on individual trust respectively. Again we can connect these findings to Tabellini's model (2008a). Cooperation in such a limited spatial sphere do not rest on the abstract

attributes of a "larger" society, but can be sustained by more informal enforcement such as social sanctions, reputation, etc. In this context it should also be noted that Tabellini defines a person who cooperate over a larger spatial distance more trustworthy than the more spatially confined.

Nunn and Wantchekon (2011) separate their internal and external channel of causality by utilizing a second location based measure of slave trade exposure. Indirectly my addition of the regional trust proxy separates the two by removing the external part from the coefficient of the ethnic slave trade exposure. The replication of Nunn and Wantchekon's (2011) channels regression show that they find the internal channel to be the most important one. My estimates on the other hand suggest the opposite. The first difference to notice is our interpretation of the two channels. Nunn and Wantchekon separates the two by claiming that values, beliefs and norms are all internal to the individual. As Nunn and Wantchekon writes "when individuals relocate their cultural beliefs, norms and values move with them, but their external environment is left behind" (Nunn and Wantchekon 2011, p 3247). This rigid dichotomy between the external environment and their internal channel I have already contested on a theoretical basis. Utilizing the social capital framework I instead claim that values, beliefs and norms evolve trough both horizontal and vertical cultural transmission. In other words social capital is transmitted from parents to children but also evolve in an interplay of social and economic interaction, social norms, and economic incentives which creates a two way micro-macro (or internal-external) relationship. It is therefore not surprising that our estimated "ceteris paribus" effect of slave trade exposure differ. In this respect the most important limitation of Nunn and Wantchekon's "mover regression" is the neglect of the temporal aspect among movers. We do not know how long the movers have been living in their new location, whether their ancestors migrated or if the respondent just moved herself. As discussed in section 6.3.3, and as highlighted by Nunn and Wantchekon themselves (2011, p 3227), it takes time to adjust to your new external environment (See Tabellini 2008b, Guiso et al. 2008, Rainer and Siedler 2009, Alesina and Fuchs-Schuendeln 2007). Within the theoretical framework of this paper, and following the evidence of a two way micro-macro relationship in the evolution of social capital, this lack of information is crucial. Without any information on the time of relocation, we can hardly expect the location based slave trade measure to fully mediate the external channel of causality. After adding the regional proxy and local government controls, we see a remarkably similar relationship between ethnic slave trade exposure and individual trust regardless of whether we control for location based slave

trade or not. A regression of the none-movers[27] further strengthens the validity of these findings, suggesting that the external channel, or the two way micro- macro relationship and the equilibrium tendencies of social capital, is indeed the most dominant factor.

The most important implication of these results is that we should not expect the negative impact of the slave trade to simply vanish with time. A priori the benchmark relationship could arise because the shock caused by the slave trade simply had not yet dissipated. The slave trade lasted over 400 years and we are evaluation its impact 100 years later. Alesina and Fuchs-Schuendeln (2007) show that it will take 20-40 years for individual attitude towards redistribution between eastern and western Germans to fully convergence . That is approximately as long as the "shock" lasted. But in this case the East Germans slowly adapted to the existing beliefs of the western. If slave trade adversely affects the equilibrium of social capital then, even with heterogeneous exposure to slave trade, individual beliefs will evolve "around" new equilibria. Thus the evidence above suggest that the adverse effect will be very persistent in line with the findings of Putnam (1993), Tabellini (2008b), etc. Tabellini (2008a) also highlights the possibility of hysteresis within a democratic political context. I did not find evidence of the latter in my empirical analysis. The use of country fixed effects removes a possible national institutional channel in this context. But as shown by Michalopoulos and Papaioannou (2013) regional development is much more related to pre-colonial regional institutions than national institutions. I do not find any link between the social capital at a regional level and local institutional quality. I cannot rule out that the proxy still mediates changes in regional institutions though. Optimally I would have preferred controlling for regional institutions and possible interactions with slave trade exposure, but unfortunately I could not find any data on this. The extents to which people are actually able choose their local (or regional) leaders and institutions through voting, I do not know. Without the democratic aspect these institutions would theoretically be exogenous rather than endogenous to individual and regional social capital. Except for the lack of evidence on the endogeneity of institutions the empirical results are in line with the theoretical framework developed in chapter two. The results confirm my main ex- ante hypothesis, but also the temporal aspect of the model of Guiso et al (2008a), and the effect of (local) institutional quality on cooperation (Tabellini 2008a). Trust increase with age but at a decreasing rate, and the relationship between local institutional quality and trust is positive. The argued

[27] Omitting the movers from the sample removes any potential bias arising from the correlation in social capital from the historic and current region.

relationship between the movers' historical region and current levels of trust also highlight how individuals slowly adjust to new external settings.

The social capital framework[28] (and findings of this thesis) could provide further insight on a wide range of economic discourses. Following the established link between social capital and economic growth (See Nunn 2008, Algan and Cahuc 2010, etc.) the evolutionary aspect of social capital, highlighted in this thesis, relates to the economics of conflict, ethnic fractionalization, natural resources, etc. Tabellini's (Tabellini 2008a) model is especially relevant to the findings of Mehlum et al. (2006) who finds that institutional quality determines whether a resource "boom" will be a curse or a blessing. As shown by Tabellini, and highlighted by the empirical results in this thesis, if the pay-off from cheating increases then this will hamper the dispersion of cooperative values and beliefs and vice versa. This suggests an additional channel of causality within the resource literature where a negative shock from resource boom also could affect the equilibrium of social capital for society as a whole. Pairing the findings of this thesis with the empirical evidence of Alesina and La Ferrara (2002) the prolonged financial crisis and high unemployment rates in southern Europe could persistently alter the equilibrium of social capital within the most affected regions. The extent to which my results can be generalized and implemented in such a different context is of course not clear cut though. These results are from a limited sample of 17 countries that experienced an ongoing slave trade exposure for over 400 years. But the results are in line with existing empirical and theoretical work from different social and economic contexts.

[28] See chapter two.

8. CONCLUSION

I this thesis I have followed Guiso, Sapienza and Zingales' definition of Social Capital as "a set of beliefs and values that facilitates cooperation among the members of a community" (Guiso, Sapienza et al. 2008a, p 3). Researchers have argued that social capital and culture influence a wide range of economic and political outcomes. To the best of my knowledge, cultural transmission and the long-term persistence of social capital have mainly been explored theoretically and is empirically still a black box. By utilizing the social capital framework developed in chapter two I have looked for empirical evidence of equilibrium behaviour and a two way micro-macro relationship in the evolution of social capital. I did so by replicating and expanding the empirical analysis of Nunn and Wantchekon (2011), testing whether I could the their effect of ethnic slave trade exposure on individual trust to such an interplay of inter and intra-generational cultural transmission, social norms and economic incentives. My results suggest that the causal relationship found by Nunn and Wantchekon is indeed a product of such a two way micro-macro relationship and the existence of multiple equilibria of social captial. The results also suggest that their rigid dichotomy between the external environment and individual's internal values and beliefs is misleading. Following their separation of an internal and external channel of causality I find that the external (micro-macro) channel is far more important than the direct ethnicity specific channel. I show that the regional proxy used in my estimations captures both the slave trade's external channel as defined by Nunn and Wantchekon, and the two-way evolution of social capital highlighted by the social capital framework. Nunn and Wantchekon find a significant causal effect from both channels for all trust measures. When I control for the two way micro-macro relationship the internal channel is only significant for trust in relatives, and neighbours. The estimated

relationship between these trust measures and slave trade exposure can now, ceteris paribus, only account for one third and one half of the estimated benchmark causal effect respectively.

To conclude I have a strong recommendation for future research in this area: If social capital is truly social in nature then we need to take this aspect into account to better understand its persistence, historical evolution and formation.

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APPENDIX:

Table 7 - Nunn and Wantchekon OLS replication using original sample and two way clustering

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
ln(1+slave export/area)	-0.178***	-0.202***	-0.129***	-0.188***	-0.115***
	(0.0317)	(0.0306)	(0.0215)	(0.0322)	(0.0297)
Age	-0.00340	0.00702***	0.00350	0.00744***	0.0166***
	(0.00273)	(0.00269)	(0.00321)	(0.00256)	(0.00277)
Age^2	5.43e-05*	-4.03e-05	-2.36e-05	-5.84e-05**	-0.000135***
	(2.89e-05)	(3.17e-05)	(3.86e-05)	(2.76e-05)	(2.91e-05)
Urban dummy	-0.112***	-0.153***	-0.163***	-0.106***	-0.0824**
	(0.0243)	(0.0316)	(0.0324)	(0.0312)	(0.0335)
Observations	16,709	16,679	15,905	16,636	16,473
Ethnisity clusters	147	147	146	147	147
District cluster	1,187	1,187	1,194	1,186	1,184
R-squared	0.130	0.160	0.206	0.155	0.119

OLS estimates of equation one with a full set of controls including fixed effects using the original sample of Nunn and Wanthcekon. See chapter four and five for details. ln(1+slave export/area) is the natural log of the slave export normalized by land area at the ethnicity level. Standard errors corrected for two-way clustering at the district and ethnicity level P-values *** p<0.01, ** p<0.05, * p<0.1

Table 8 - OLS estimation of equation (2) with limited sample.

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
ln(1+slave export/area)	-0.0893***	-0.0719***	-0.0792***	-0.0434*	0.0134
	(0.0312)	(0.0200)	(0.0268)	(0.0262)	(0.0289)
Mean regional trust	0.615***	0.905***	0.388***	0.963***	0.777***
	(0.0799)	(0.0537)	(0.0624)	(0.0528)	(0.0667)
Full set of controls	Yes	Yes	Yes	Yes	Yes
Observations	13,426	13,404	13,180	13,383	13,265
R-squared	0.143	0.188	0.218	0.194	0.140
Reg. clusters	164	164	164	164	164

OLS estimates of equation two with a full set of controls including fixed effects. See chapter five for details. Sample limited by dropping observations with missing values on local council performance or corruption in local council. Age, age^2 and urban dummy omitted from table. ln(1+slave export/area) is the natural log of the slave export normalized by land area at the ethnicity level. Mean regional trust is the five different constructed regional means. Standard errors clustered at the regional level in parentheses.
P-values *** p<0.01, ** p<0.05, * p<0.1

Table 9- Replication of Nunn and Wantchekon's movers regression using the original sample and two way clustering

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
Ethnicity-based slave trade measure	-0.155***	-0.182***	-0.0999***	-0.169***	-0.0895***
	(0.0287)	(0.0289)	(0.0230)	(0.0331)	(0.0300)
Location-based slave trade measure	-0.0580***	-0.0406**	-0.0677***	-0.0385*	-0.0470**
	(0.0159)	(0.0189)	(0.0175)	(0.0223)	(0.0239)
Age	-0.00361	0.00620**	0.00391	0.00687**	0.0155***
	(0.00291)	(0.00293)	(0.00340)	(0.00275)	(0.00267)
Age^2	5.71e-05*	-3.08e-05	-2.50e-05	-5.15e-05*	-0.000123***
	(3.27e-05)	(3.66e-05)	(4.03e-05)	(3.09e-05)	(2.85e-05)
Urban dummy	-0.119***	-0.155***	-0.172***	-0.111***	-0.0891**
	(0.0270)	(0.0311)	(0.0356)	(0.0291)	(0.0352)
Observations	15,999	15,972	15,221	15,931	15,773
R-squared	0.133	0.158	0.207	0.151	0.118
Number of clusters	146/269	145/272	145/272	146/269	146/269

OLS estimates of equation one with a full set of controls including fixed effects and the additional location based slave trade measure using the original sample of Nunn and Wantchekon. See chapter four and five for details. The Ethnicity based slave trade measure is the same as I have used in the previous estimations. The location based slave trade measure is the natural log of the number of slaves taken from the respondent's current location normalized by land area. Standard errors corrected for two-way clustering at the district and ethnicity level. P-values *** p<0.01, ** p<0.05, * p<0.1

Table 10 - OLS estimation of equation (1) for the none-movers sample.

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
ln(1+slave export/area)	-0.228***	-0.305***	-0.177***	-0.277***	-0.201***
	(0.0329)	(0.0398)	(0.0382)	(0.0464)	(0.0595)
Age	-0.00339	0.00778***	0.00245	0.00611*	0.0172***
	(0.00235)	(0.00291)	(0.00377)	(0.00319)	(0.00366)
Age^2	6.24e-05**	-4.57e-05	-3.41e-06	-4.81e-05	-0.000145***
	(2.45e-05)	(3.19e-05)	(4.12e-05)	(3.46e-05)	(3.99e-05)
Urban dummy	-0.117***	-0.144***	-0.136***	-0.115***	-0.0647**
	(0.0291)	(0.0330)	(0.0444)	(0.0291)	(0.0309)
Observations	9,148	9,133	8,712	9,100	9,007
R-squared	0.146	0.167	0.199	0.145	0.124
Reg. clusters	148	148	154	148	148

OLS estimates of equation two for none-movers with a full set of controls including fixed effects. See chapter five for details. ln(1+slave export/area) is the natural log of the slave export normalized by land area at the ethnicity level. Standard errors clustered at the regional level in parentheses. P-values *** p<0.01, ** p<0.05, * p<0.1

Table 11 - OLS estimation of equation (2) for the none-movers sample

	(1) Trust in Relatives	(2) Trust in Neighbours	(3) Trust in Local council	(4) Intragroup trust	(5) Intergroup trust
ln(1+slave export/area)	-0.0761*	-0.101***	-0.0918**	-0.0533	-0.00638
	(0.0407)	(0.0265)	(0.0452)	(0.0348)	(0.0531)
Mean regional trust	0.652***	0.951***	0.354***	1.003***	0.819***
	(0.0922)	(0.0659)	(0.0800)	(0.0687)	(0.0859)
Age	-0.00502**	0.00563*	0.00230	0.00416	0.0156***
	(0.00237)	(0.00295)	(0.00381)	(0.00306)	(0.00362)
Age^2	8.00e-05***	-2.28e-05	-2.62e-06	-2.75e-05	-0.000128***
	(2.48e-05)	(3.17e-05)	(4.15e-05)	(3.27e-05)	(3.91e-05)
Urban dummy	-0.0861***	-0.106***	-0.128***	-0.0786***	-0.0311
	(0.0273)	(0.0311)	(0.0437)	(0.0247)	(0.0272)
Full set of controls	Yes	Yes	Yes	Yes	Yes
Observations	9,148	9,133	8,546	9,100	9,007
R-squared	0.162	0.194	0.201	0.175	0.146
Reg. clusters	148	148	148	148	148

OLS estimates of equation one for none-movers with a full set of controls including fixed effects. See chapter five for details. ln(1+slave export/area) is the natural log of the slave export normalized by land area at the ethnicity level. Mean regional trust is the five different constructed regional means. Standard errors clustered at the regional level in parentheses. P-values *** p<0.01, ** p<0.05, * p<0.1