

Autocracy and Human Capital

Eric C. C. Chang
echang@msu.edu
Associate Professor
Department of Political Science
Michigan State University

Wen-Chin Wu
wenchinwu@sinica.edu.tw
Assistant Research Fellow
Institute of Political Science
Academia Sinica

Abstract

This paper examines the logic of human capital formation in authoritarian regimes based on theories of inequality and regime transition as well as the well-known prospect of upward mobility (POUM). Our central argument is that by investing in human capital, dictators can effectively boost citizens' perceived level of social mobility. Consequently, dictators can preemptively ameliorate the pressure for redistribution from the poor and neutralize threats of revolution facing the regime. In other words, we argue that dictators invest in human capital as a way to consolidate their authoritarian regimes. Our cross-national analysis that covers more than 80 authoritarian regimes from 1970 to 2009 shows that higher levels of education spending lead to a lower probability of regime breakdown in autocracies. We further use a causal mediation analysis to show that our causal mechanisms run from the effect of human capital on citizens' preference for redistribution to the regime consolidation in authoritarian countries.

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I. Introduction

This paper examines the logic of human capital formation in authoritarian regimes. We ask why autocratic regimes choose to invest in human capital, or the stock of productive skills the labor force possesses (Goldin 2016). Specifically, we ask, why would authoritarian regimes engage in human capital formation and forego the lucrative rents when they face no political competition? Moreover, given the fact that educated citizens are more likely to demand political reforms, why would authoritarian regimes commit political suicide by enlightening their own populations?

Commonly defined as “the knowledge, skills, competencies and other attributes embodied in individuals or groups of individuals acquired during their life and used to produce goods, services or ideas in market circumstances” (OECD 2001), a burgeoning literature in comparative political economy highlights the importance of human capital in economic growth and development. Human capital is regarded as an invisible yet critically important asset, as it increases productivity and wages among individuals at the micro level (Becker 1964; Mincer 1974; Psacharopoulos and Patrinos 2004). At the macro level, studies of the endogenous growth model have also identified human capital inputs as one of the most important determinants of economic growth. Other studies have further related human capital to higher life expectancy (Jayachandran and Lleras-Muney 2009), better environmental quality (Goetz, Debertin, and Pagoulatos 1998), and reduced crime rates (Lochner 2004).

Despite the extensive literature on human capital formation in democracies, however, little is known about the political economy of human capital in authoritarian regimes. This omission is unfortunate, as human capital formation in autocracies represents an empirical anomaly that the literature on human capital cannot fully explain. Specifically, conventional wisdom holds that autocracies are much less likely to invest in human capital than their democratic counterparts (Ansell 2010; Baum and Lake 2003; Brown and Hunter 2004; Bueno de Mesquita *et al.* 2003). The intuition is that, without facing real political competition and without being held accountable to a broader constituency, ruling elites in autocracies have greater incentive to engage in rent-seeking at the expense of public good provision.

Beneath the logic of this intuition, however, is substantial variation in human capital formation within authoritarian regimes. For example, many former authoritarian regimes in East Asia and Eastern Europe have placed an emphasis on education, especially in engineering and natural sciences (Hayhoe 1995). Arne Duncan, the former U.S. Department of Education Secretary, once stated at a 2009 congressional hearing that American students are at a comparative disadvantage against Chinese students because the latter “are going to school 25 to 30 percent longer than we are.” In fact, China (or Asian countries in general) are not exceptional in their decision to significantly invest in education and accumulate human capital. As Figure 1 clearly indicates, a substantial number of authoritarian regimes, as defined by the polity score or the dataset constructed by Geddes *et al.* (2014), have actually invested more in education than ordinary democracies. So why would these authoritarian regimes engage in human capital formation and give up the lucrative rents? And, given the prescription of modernization theory that educated citizens are more likely to demand political reforms and challenge authoritarian regimes (Lipset 1959), why would these authoritarian regimes essentially commit political suicide by investing in human capital and enlightening their own population?

[Figure 1 about here]

The next section of this paper offers a theory to solve this puzzle. To preview the argument, we suggest that dictators invest in human capital as a way of alleviating pressure for redistribution and thus consolidating their authoritarian regimes. Our argument is grounded in the prospect of upward mobility (POUM) model as well as theories of inequality and regime transition. The POUM model posits that countries in which voters perceive relatively high social mobility will opt for low levels of redistribution since they expect to become rich in the near future (Benabou and Ok 2001). On the other hand, recent studies have conceptualized regime transition as a game of redistribution (Acemoglu and Robinson 2001, 2005). The essence of this perspective is that the perception of high inequality, combined with demand for redistribution, can lead to conflicts of economic interest between different economic classes. These redistributive demands and pressures, if not properly addressed, can, in turn, result in political instability and even the breakdown of authoritarian regimes (Acemoglu and Robinson 2005; Alesina and Perotti 1996; Boix 2003). We offer a theoretical synthesis that weaves together insights from these two models, arguing that dictators can effectively boost citizens' perceived level of social mobility by investing in human capital. In doing so, dictators can preemptively ameliorate the pressure for redistribution from the poor and neutralize threats of revolution facing the regime. Meanwhile, we suggest that social mobility helps citizens, especially those suffering from economic hardship, to stay optimistic about their futures and remain supportive of their current regime. Social mobility can therefore also directly contribute to greater support for authoritarian regimes through the mechanism of prospective economic voting. In other words, the logical chain in this paper runs from the effect of human capital on citizens' preferences for redistribution to the regime consolidation in authoritarian countries.

To test these hypotheses, this paper compiles a dataset that covers more than 80 authoritarian regimes from 1970 to 2009. We first find that, at the macro level, more government expenditure on education, a common measurement of human capital formation, leads to a lower probability of regime breakdown in autocracies. Then we proceed to explicitly test the causal mechanism to examine whether human capital indeed increases citizens' perception of social mobility, and importantly, whether citizens who perceive higher levels of social mobility are indeed more likely to support their authoritarian regimes. Utilizing a causal mediation analysis with the Asian Barometer Survey data in nine East Asian autocracies, we find highly supportive individual-level empirical evidence that provides a strong micro-foundation of our theory.

This paper contributes to the growing literature on authoritarian politics. Currently, many scholars emphasize dictators' use of pseudo-democratic institutions to enhance authoritarian survival. For instance, authoritarian elections and parties enable dictators to co-opt ruling elites and opposition groups within society (Gandhi 2008; Magaloni 2006; Svoboda 2012). Yet the literature has disproportionately emphasized the autocrats' adaptation of political institutions over the use of various economic policies to sustain their rules. Although some recent studies have shown that varieties of authoritarian regimes and institutions lead to different policy choices, such as labor policy (Kim and Gandhi 2010), trade liberalization (Hankla and Kuthy 2013), and allocation of foreign aid (Wright 2008), our understanding of authoritarian politics

still lags behind because this line of research simply treats the choice of policies as a direct by-product of institutional arrangements. As Pepinsky (2014, 633) forcefully points out, however, political institutions may just be epiphenomena of other fundamental political issues that motivate regime behavior. By focusing on how the provision of human capital eases the pressure of redistribution for authoritarian regimes, this paper adds the supply side of the economic policy to the literature and thus contributes to a fuller understanding of the political economy of authoritarian regimes.

2. Theory

2.1. Inter-Class Conflicts Over Redistribution and Political Instability

Dictators constantly face threats to their reign. In his influential work, Svobik (2012) identifies two major challenges facing authoritarian regimes. The first challenge involves the ruling elites with whom dictators share power. In what he refers to as the problem of power-sharing, Svobik shows that more than two-thirds of authoritarian regimes were toppled by other ruling elites inside the power circle. He persuasively concludes the dominant mode of political conflict in dictatorships is the power struggle between ruling elites. The second challenge, which Svobik calls the authoritarian control problem, involves the masses revolting. As the Arab Spring movement exemplified, many authoritarian regimes in North Africa and the Middle East were overthrown by popular uprisings ignited by street protests orchestrated by ordinary citizens.

Recent studies in authoritarian politics have strived to understand how dictators manage these various threats. One dominant view suggests that dictators use pseudo-democratic institutions like elections, parties, and legislatures to deter the threat from ruling elites and thereby sustain their power. For instance, elections allow dictators to efficiently distribute the spoils of office to ruling elites (Blaydes 2013), enable authoritarian regimes to demonstrate their regime's invincibility and deter challengers (Magaloni 2006), and allow dictators to divide and conquer the opposition (Lust-Okar 2004). Meanwhile, Svobik (2012) argues that parties and legislatures facilitate the exchange of information and thus greater transparency among ruling elites. Importantly, these information and monitoring mechanisms help reduce miscommunication and misunderstanding between dictators and ruling elites and thus contribute to greater regime stability.

While these studies provide important insights into how dictators manage their relationship with the ruling elites, much remains to be known about how authoritarian leaders maintain their relationship with society as a whole. Specifically, one important threat to authoritarian regimes is the conflict over redistribution that rising inequality induces. As Lasswell's famously said many decades ago, the struggle over "who gets what, when, [and] how" lies at the heart of politics. Indeed, even in the context of authoritarian regimes, conflicts over redistribution prompted by and escalated under high levels of economic inequality are arguably some of the most important sources of political instability. Indeed, history is rife with examples where glaring socio-economic inequality results in political revolution, as evidenced by the 1789 French revolution and the 1949 Chinese communist revolution.

The Meltzer-Richard model of redistribution and its extension to models of democratic transitions explicitly formalizes the idea that redistributive demand, triggered by rising inequality, can lead to regime instability. In their seminal work, Meltzer and Richard (1981) show that when the wage of mean income earners is higher than that of median income earners, the median voter, who determines the level of redistribution, supports higher levels of redistribution and higher tax rates on their richer fellow citizens in order to increase his own welfare. Importantly, they predict that the demand for redistribution increases with the level of inequality.

While subsequent studies engage in a lengthy debate over the conditions under which the Metzler-Richard model would hold, if it holds at all,¹ we are more interested in the discussion of how citizens' demand for redistribution will trigger regime transition. Building on the Meltzer-Richard model, Acemoglu and Robinson (2001, 2005) explicitly place inter-class conflict induced by economic inequality at the core of citizens' preferences for political regimes. Specifically, they suggest the poor majority of a population in an authoritarian regime with high inequality will support democratization because democracy should benefit the poor and advance their material well-being. Knack and Keefer (1997) also argue that democracy allows the median voter to ally with the poorer half of citizens and redistribute wealth from the rich because of its majority rule. Additionally, as income inequality rises, the poor's redistributive gain from democracy increases. Therefore, the rise of inequality further intensifies the inter-class conflict over redistribution and escalates the power struggle over the change of political regime.²

In sum, this prominent approach in political economy identifies high inequality and citizens' demand for redistribution as potential threats to regime stability for authoritarian regimes.³ As Schofield and Levinson (2008, 269) explain, inequality "imply[s] enough of a

¹ For instance, Lupu and Pontusson (2011) argue that it is the structure of inequality, rather than the level of inequality, that matters for redistribution. Specifically, the median voter demands redistribution when she stands closer to the poor rather than to the rich. Meanwhile, many empirical studies follow what is commonly known as the "Robin Hood Paradox," suggesting that, contrary to the prediction of Metzler-Richard model, many democracies with low (high) levels of inequality actually redistribute more (less).

² In equilibrium, the occurrence of democratic transition depends on how dictators and the rich compromise with the poor. Acemoglu and Robinson (2005) propose an inverted U-shaped relationship between inequality and democratic transition. On the one hand, rich citizens have strong incentives to resist redistribution via costly repression when inequality is high. On the other hand, poor citizens have little incentive to initiate revolution when inequality is low because they will not benefit much from the post-revolution redistribution. According to Acemoglu and Robinson, democratization is thus most likely to happen when the level of inequality is at the middle level. Most importantly, Acemoglu and Robinson (2001, 2005) argue that democratic transition emerges as a solution to the time-inconsistency and credibility problems surrounding redistribution by allowing the median voter to dictate policies in the future. Meanwhile, as a larger wealth gap makes revolutions more appealing to the poor, the power balance between the rich and the poor shifts toward the latter. However, the poor's advantageous momentum is unlikely to persist forever. Consequently, the poor are incentivized to ride the wave of rising inequality and demand democracy in order to preserve their political power.

³ It is important to note that economic inequality poses a severe threat to the survival and consolidation of democracies as well. For instance, Houle (2009) finds that a higher level of inequality makes nascent democracies more likely to collapse. Meanwhile, Krieckhaus *et al.* (2014) examine how citizens' support

redistributive reward to make revolutionary activity extremely profitable.” Put more simply, a widening gap in wealth increases the poor’s demand for redistribution, and this pressure for redistribution, if not properly addressed, can quickly turn into a regime-destabilizing force. Cederman *et al.* (2013) echo our proposition and find that economic inequality results in more civil wars. Houle (2016) also agrees that class inequality poses a serious threat to political stability. Specifically, he shows that class inequality fuels distributional conflicts, which in turn increases the frequencies of military coups in developing countries. Finally, Alesina and Perotti (1996) show that higher inequality leads to more frequent political assassinations, higher casualties in domestic mass violence, and more coups.

2.2. Human Capital Formation As A Solution

We extend the theoretical insights of redistributive preferences and regime transitions to examine the effects of human capital formation on authoritarian consolidation. We suggest that dictators invest in human capital as a way to alleviate pressure for redistribution and thus sustain their authoritarian regimes. In other words, human capital formation can boost citizens’ perceived level of social mobility and thus ease their demand for redistribution in authoritarian countries. Ultimately, human capital formation helps consolidate authoritarian regimes.

2.2.1. Social Mobility and Preference for Redistribution

The first part of our theory on human capital formation and authoritarian stability focuses on the effect of social mobility. According to Lipset and Bendix (1959, 6), social mobility is defined “as the process by which individuals move from one stratum of society to another.”⁴ Essentially, social mobility can be seen as an indicator of equality of opportunity while income inequality can be thought of as an indicator of equality of outcome (Merelman 1973). More generally, the concept of social mobility is multi-dimensional. First, we consider social mobility within or across generations. Here, one can distinguish between inter-generational mobility, which refers to the extent to which social-economic levels are able to change across generations within the family, and intra-generational mobility, which captures the change in social-economic status over the course of a person’s life. We consider both perspectives here, though the theoretical foundation on which we build our paper and the empirical measurement we use rely more on the inter-generational mobility perspective.⁵ Second, we differentiate between actual social mobility

for democracy is conditioned on their prospective and retrospective evaluations on the government’s performance on income inequality. They also investigate how citizens evaluate democracy based on their personal experience with inequality and their assessment of overall national inequality. They find that higher levels of economic inequality reduce citizens’ democratic support.

⁴ In a similar fashion, a recent study by Houle (2017, 3) conceptualizes social mobility as “the degree to which an individual’s status (e.g., income or profession) at one point in time (e.g., childhood) can predict his or her status at a later point in time (e.g., adulthood).”

⁵ Both inter- and intra-generational mobility can be understood in either absolute or in relative terms. Absolute social mobility refers to the change in the social-economic outcome of the whole society, whereas the relative social mobility refers to the movement of an individual’s position within the social-economic ladder. In other words, relative mobility refers to the internal re-structure within a social-economic hierarchy, while absolute mobility refers to the change in absolute income. Our study considers both absolute and relative mobility, with an emphasis on the latter. We thank Christian Houle for this insightful suggestion.

and perceived social mobility. The former is commonly measured objectively by the elasticity of intergenerational earnings, where a higher value of elasticity means more difficulty for a child to move outside her parents' social-income class,⁶ while the latter is operationalized subjectively by asking survey respondents about their belief in the ability to move up in social and income status. According to a recent study by OECD (2018), these two forms of social mobility correlate closely with each other: people tend to perceive greater continuity in social-economic status across generations in countries with greater intergenerational income elasticity.⁷ Our paper focuses on perceived intergenerational social mobility.

We argue that citizens who perceive higher levels of social mobility will prefer less redistribution and support the current authoritarian regime. We build our theory on the well-known "prospect of upward mobility" (POUM) hypothesis formulated by Benabou and Ok (2001). Looking to explain the Robin Hood Paradox, Benabou and Ok propose a dynamic, inter-temporal framework where citizens derive their preferences for redistribution from both their current income and their rational expectation of future income. The upshot of the POUM hypothesis is that the poor do not necessarily support redistribution when they expect they or their children will rise up in the income ladder in the future. In other words, poor individuals who expect to be rich in the future will rationally choose to oppose redistribution policies in order to protect the wealth they believe they will hold in the future. Importantly, we focus on the implication of the POUM hypothesis that citizens who perceive social upward mobility are less likely to demand redistribution and challenge their current authoritarian regimes.

The POUM hypothesis has been empirically supported and theoretically refined by several subsequent studies. On the empirical side, Alesina and La Ferrara (2005) report that social mobility, either defined objectively with one's history of income or subjectively with one's beliefs about future mobility, makes U.S. citizens less supportive of redistribution compared to their European counterparts. In a recent study, Alesina *et al.* (2018) reexamine the redistributive consequences of social mobility, using a randomized information experiment to show that voters who perceive low social upward mobility have higher support for redistribution and prefer a more progressive income tax system. Other cross-national studies also find a negative relationship between social mobility and demand for redistribution (Guillaud 2013; Steele 2015). On the theoretical side, Mérola and Helgason (2016) clarify how the difference between relative and absolute income shifts matter for individual redistribution preferences. Specifically, if citizens perceive that income shifts vary across individuals in a society, this relative change will reduce their support of redistribution. By contrast, citizens will support redistribution if they perceive that income shift is the same across the society.

⁶ In a society with complete intergenerational mobility (an intergenerational income elasticity of 0), a parent's income would have no bearing to that of her child. In other words, a child who grows up poor would have exactly the same chance of becoming rich in adulthood as a child born into a rich family. Alternatively, a country would have an elasticity of 1 if the family income passes completely from the parent to the child. In other words, all poor (rich) children would become poor (rich) adults.

⁷ Meanwhile, it is interesting to note that while the actual social mobility is about the same between the U.S. and the Europe, Americans are much more optimistic than Europeans in their perception of social mobility (Alesina and Glaeser 2004). Even more paradoxically, Alesina *et al.* (2018) report that the optimism in social mobility is particularly high in U.S. states where the actual mobility is low.

In addition to the POUM mechanism, social mobility also shapes citizens' preferences for redistribution by affecting their attitudes toward the existing levels of income inequality. Alesina and Angeletos (2005), for example, argue that the difference in support for redistribution between the U.S. and the Europe results from their different perceptions regarding the fairness of income distribution and the sources of income inequality. Specifically, they argue that the long-term class division from medieval times has created a sense of social immobility and limited career opportunities in Europe. Under such circumstances, Europeans tend to attribute wealth to luck and connections rather than ability and hard work, and they thus tend to perceive income distribution as unfair. Consequently, Europeans favor redistributive policies and government intervention. In contrast, Americans tend to perceive higher levels of social mobility and are more likely to attribute poverty to lack of effort instead of luck. As a result, Americans tend to justify the existing income inequality as fair and prefer low redistribution and limited government regulation. Bénabou and Tirole (2006) echo Alesina and Angeletos' finding, and they propose a theoretical model to examine the relationship between citizens' beliefs in economic fairness and redistributive politics. They identify two unique equilibria: the "American equilibrium" is characterized by a common belief in economic justness and limited redistribution, whereas the "European equilibrium" is characterized by social unfairness and more redistribution. Essentially, this line of research argues that the poor might not consider income inequality unfair (and eventually demand redistribution) if they believe everyone has the same opportunity to move up the social-economic ladder.

Finally, social mobility can directly contribute to regime stability in authoritarian regimes through a parallel mechanism of prospective economic voting. Specifically, while the POUM mechanism focuses on how social mobility shapes citizens' beliefs regarding their future income, the prospective voting mechanism treats citizens' perceptions of social mobility as an important evaluative base for the current authoritarian regime. Commonly known as the reward-punishment model (Lewis-Beck and Stegmaier 2000), theories of economic voting suggest that voters are pragmatically-minded and economically-driven actors who are more likely to reward (punish) the incumbent at the ballot box when they perceive good (bad) economic conditions (Kiewiet 2000; Wilkin *et al.* 1997).⁸

Specifically, the theory of prospective economic voting argues that citizens' expectations for the future economy is more important than their evaluation of the economic past, or retrospective economic voting. MacKuen, Erikson, and Stimson (1992, 605) argue the electorate "develops sophisticated expectations based on economic forecasts rather than current economic conditions." They further show that economic forecasts reported by the mass media have stronger effects on citizens' support for the incumbent than the objective economic indicators or personal retrospective evaluations. Other studies also find that prospective voting occurs beyond the U.S. political context (Hsieh, Lacy, and Niou 1998; Lewis-Beck 1990).⁹

⁸ Importantly, many studies argue that citizens' behavior of economic voting plays a crucial role in shaping democratic accountability. As Fiorina (1978, 429) explained, economic voting not only "offers the voter a way of saying 'change!'" but also "encourages representation by providing an incentive for politicians to anticipate constituents' reactions when they make public policy."

⁹ It is important to note that the debate between retrospective and prospective voting is anything but settled. Consider, for example, work by Clark and Steward (1994) compared to other work by MacKuen, Erikson, and Stimson (2000). We do not intend to engage or solve this debate in this paper.

Another line of research argues that economic conditions influence citizens' voting behaviors as well as their political support for the current regime. Chang and Chu (2006), for instance, show that citizens who evaluate the economy favorably place higher trust in political institutions in East Asian democracies. In the context of established democracies, Clark *et al.* (1993) show that citizens in Western Europe are more likely to be dissatisfied with the way democracy works when the inflation or unemployment rate is high. Finally, Rose *et al.* (2011) demonstrate that citizens' assessment of their own well-being is an important attitudinal foundation for popular support for authoritarian regimes. Following the insights from these economic voting studies, we argue that social mobility should boost citizens' regime support in autocracies. Specifically, we suggest that social mobility helps citizens, especially those suffering from economic hardship, stay optimistic about their future. And citizens with high perceptions of social mobility are more likely to have rosy evaluations of their prospective economic situations. Accordingly, they have no reason to "rock the boat" that sails to the land flowing with milk and honey. Instead, they would support the status quo with the expectation they will move upward to enjoy more economic benefits in the future.

Social immobility, on the other hand, could be a major cause of regime instability. The 2018 OECD report shows that citizens' prospects of social immobility have strong influences in their political attitudes, including life satisfaction, political efficacy, and social as well as institutional trust. Importantly, the lack of social mobility and perception of unequal opportunities can create economic pessimism among disadvantaged groups and further magnify their socio-economic discontent. Social immobility can also fuel class division and political polarization between the haves and the have nots. Houle (2017) suggests the lack of social mobility creates a sense of being trapped and hopeless, which can quickly build to a strong anti-regime sentiment. Houle further argues that social immobility lowers the opportunity costs for a young, poor generation to challenge the regime through violent or even revolutionary means. With nothing to lose, the young lower class is more likely to settle their economic grievances with political violence. Indeed, many scholars and policy experts agree that the Arab Spring movement was triggered by the younger generation's frustration and anger over perceived lack of social mobility and economic opportunities in the foreseeable future (Kienle and Louër 2013; Majbouri 2017).

2.2.2. Human Capital Formation and Social Mobility

Taking the chain of logic one step further, the second part of our theory of human capital formation and authoritarian stability focuses on the effect of citizens' human capital formation on their perception of social mobility.

Human capital is commonly measured by education, and scholars have argued that education is a key facilitator of social mobility. According to Breen and Jonsson (2007), there are two channels through which education can increase social mobility. At the micro-level, the "equalization effect" suggests that while an individual's class destination largely depends on her parents' social-economic status, she can nevertheless improve her final position on the economic ladder by investing in education. In other words, education investment not only makes one's class destination less dependent on her class origin but also helps enhance upward social

mobility. At the macro-level, the second channel, known as the “compositional effect,” considers the expansion of education throughout the population. The basic idea is that when a larger share of people receives educational services, more people from low class move up to a higher class. Meanwhile, people from high class would benefit less than those from low class because education weakens the association between class origin and class destination. As a result, educational attainment can reshuffle people among different classes.

Many studies offer empirical evidence demonstrating a causal link between education and upward mobility (Breen 2010; Lipset and Bendix 1991). For example, the OECD report (2018) shows that countries with higher education spending tend to have higher social/educational mobility. Hence, as a policy recommendation to facilitate social mobility and equal opportunities, the OECD report highlights the importance of providing high quality education, especially good early education programs for children from disadvantaged groups, along with fair and inclusive secondary school systems. Meanwhile, Jerrim and Macmillan (2015) show that educational attainment mediates the relationship between intergenerational immobility and income inequality. They show that investment in a younger generation’s education makes it less dependent on the income of the parent generation. Additionally, educational attainment not only increases the child generation’s competitiveness in the labor market but also facilitates returns to education. Finally, it is noteworthy that education can facilitate intergenerational mobility but cannot eliminate income inequality entirely. Crawford (2016), for example, finds that children from affluent families still have better chances of receiving higher education and earning higher pay in the labor market.

In summary, Figure 2 presents the logical chain underlying our theory. First, we argue authoritarian survival, to a large extent, depends on how well dictators deal with citizens’ redistributive demands and pressures. Second, we argue that social mobility indirectly contributes to authoritarian consolidation by reducing citizens’ demand for redistribution through the POUM mechanism and their attitudes toward the fairness of income distribution. Simultaneously, social mobility also directly sustains authoritarian rule through the mechanism of prospective economic voting. Finally, we argue that human capital formation leads to greater social mobility through both equalization and composition effects. Taken together, our central argument is that dictators invest in human capital as a way to consolidate their authoritarian regimes. Specifically, we hypothesize that human capital formation reduces the odds of authoritarian breakdown.

[Figure 2 about here]

To be sure, when inequality rises, autocratic governments can respond to the poor’s demands for greater wealth redistribution and economic equality in several ways other than human capital formation. However, we argue that human capital formation is the most cost-effective tool available to authoritarian regimes. Specifically, human capital formation is less costly than an authoritarian regime’s first alternative, repression. As Wintrobe (1998) argues, repression leads to the dependence on a coercive apparatus, which inevitably invites the bigger potential threat of a military coup. A second alternative is to give in to the poor’s demand for retribution by providing material benefits. As we earlier articulated, however, such efforts may be seen as only temporary and thus lack credibility in the long run. Finally, dictators can also

respond to the poor's demands for redistribution by taxing the rich. However, doing so can further escalate conflict between the dictator and the ruling elites and exacerbate the problem of power-sharing highlighted by Svoboda (2012). By contrast, investment in human capital does not increase the risk of military coup and allows authoritarian regimes to address citizens' demands for redistribution without taxing the rich. It is particularly appealing to those authoritarian regimes that lack necessary natural resources to dole out material benefits to citizens (e.g., authoritarian regimes in East Asia).

It is useful to emphasize at this point that our analytical interest is in authoritarian breakdowns, not democratic transitions. These are two distinct concepts that are not necessarily two sides of the same coin. A democratic transition occurs when a democratic regime follows an authoritarian one, while an authoritarian breakdown is a broader concept that can involve either a democratic transition or the replacement of one authoritarian regime with another. As Wright and Escrivà-Folch (2012) explain, an authoritarian breakdown does not guarantee a transition to democracy. In our theoretical perspective, citizens' demands for redistribution in the face of high inequality may increase pressure to overthrow an authoritarian government, but overthrowing that authoritarian government does not ensure a democratic regime replaces it. Our paper focuses on how human capital formation sustains an authoritarian regime's survival rather than how it facilitates a democratic transition.

3. Empirical Analysis

To test our hypothesis on the effects of human capital accumulation on authoritarian survival, we compile a cross-sectional time-series dataset of 88 authoritarian regimes from 1970 to 2009. We base our sample of autocracies on the dataset by Geddes *et al.* (2014), and we include a list of the authoritarian regimes as well as summary statistics for the variables used in our empirical analysis in the Appendix.

3.1. Variable Operationalization

The key analytical focus in our paper is on human capital formation, and we follow the conventional wisdom and measure human capital formation by **education spending** (Barro 1990; López-Cariboni and Cao 2018). We operationalize this variable by using the government expenditure on education as a percentage of GDP. We draw this information from the United Nations Educational, Scientific, and Cultural Organization (UNESCO). We expect that higher levels of government expenditure on education are associated with a lower probability of authoritarian breakdown.

We control for several factors that are known to be correlated with regime breakdown. First, we incorporate the log of GDP per capita to control for the effects of **economic growth**. Modernization theory posits that economic development facilitates democratization (Boix and Stokes 2003; Lipset 1959). While recent studies challenge the modernization theory with rebuttal evidence (Acemoglu *et al.* 2008; Przeworski and Limongi 1997), we remain theoretically agnostic and treat the effects of economic development on regime breakdown as an empirical question. Second, in light of the recent debates over the effects of **trade openness** on regime transition (Eichengreen and Leblang 2008; Teorell 2010; Wu 2015), we account for the effects of

trade openness on authoritarian breakdown, measured by a country's trade volume divided by its GDP. Third, natural resource curse scholars suggest that **natural resources** help dictators consolidate their regimes through non-tax revenues. Specifically, natural resources provide dictators with monopolized revenues to strengthen dictators' co-optation and repressive capacity and thus deter pressure for democratization (Caselli and Tesei 2015; Ross 2001). We consequently control for the effects of resource abundance on authoritarian survival by including a variable of resource rents as a percentage of GDP. The data on these variables are taken from the World Development Indicators.

In addition to the above economic variables, we include several political variables that are associated with regime breakdown. In particular, Geddes (1999) finds that **single-party dictatorships** survive longer than other authoritarian regimes such as military, monarchic, and personal dictatorships. Thus, we use a dichotomous variable for single-party authoritarian regimes to control for type of authoritarian regimes.

Similarly, an autocracy with stronger **coercive capacity** is more resistant to regime transition (Albertus and Menaldo 2012), so we include a country's military spending as a proxy of state coercive capacity. Also, we include a variable that measures the number of **regime breakdowns** in other countries within an autocracy's geographic region because the effects of regime breakdown may be contagious (Leeson and Dean 2009). Finally, we include a dummy variable for the period of the Cold War, because democratic transition becomes more frequently due to the collapse of the Soviet Union (Geddes *et al.* 2014).

3.2. Model Specification

The dependent variable in our model is a dichotomous variable of authoritarian breakdown. It takes a value of 1 if an autocracy collapses in the observed year and 0 otherwise. Accordingly, we follow the suggestion of Beck, Katz, and Tucker (1998) and employ binary time-series cross-sectional (BTSCS) models to conduct our empirical tests. We also include three time polynomials in our empirical models to address the issue of time dependence (Carter and Signorino 2010). We include country fixed-effects to address the unobserved heterogeneity among countries. Finally, we lag all independent variables by one year to avoid reverse causality.

3.3. Empirical Results

Table 1 reports our estimation results. Notice immediately from Model 1 that our key explanatory variable of human capital formation is negative and significant, as expected. The empirical finding suggests that more government spending on education makes an autocracy less likely to experience regime breakdown. Specifically, holding other variables at their mean, a 1% increase in education spending reduces the probability of authoritarian breakdown by 0.85%. The effects of human capital formation on authoritarian survival become even stronger after we include country fixed effects in Model 2.

[Table 1 about here]

It is worth noting that controlling for country fixed effects resulted in several dropped observations in Model 2, as only a few autocracies experience authoritarian breakdowns during the observation period. We would argue, however, that a regime breakdown or transition to democracy is usually a latent process. Consider the Kuomintang's (KMT) authoritarian rule in Taiwan, which began loosening in the late 1980s. In the 1990s, the KMT gradually implemented a series of political reforms that continued loosening its authoritarian hold. Yet no one regarded Taiwan as a democracy until 2000, when the KMT lost a presidential election (Geddes *et al.* 2014). To better capture the gradual process of regime transition, we replace the dependent variable of regime breakdown with the change of an autocracy's polity score (Marshall and Jaggers 2002). By taking the first-difference of a country's polity score, we are able to capture the latent process of regime change and mitigate the issues of time-invariant dependent variables when estimating fixed-effects models.

With the first-differenced polity score as the dependent variable, we estimate an OLS model with panel-corrected standard errors (PCSEs). We include country dummies to control for the unobserved country-level heterogeneity. We also control for a country's level of autocracy in the previous year. Based on our theory, we expect that the coefficient of government spending on education would be negative because more education spending makes an autocracy less likely to democratize. The result in Model 3 is consistent with this expectation. As the inclusion of the lagged dependent variable with fixed effects incurs the Nickell bias, in Model 4 we estimate an OLS-PCSEs model without country dummies. The results are similar to those in Model 3.

There are several other interesting results in our findings. Consistent with the recent finding by Wu (2015), Model 1 shows that increases in trade openness consolidates authoritarian regimes. However, the results suggest that trade openness facilitates regime breakdown once we control for country fixed effects in Model 2. Additionally, we find that single-party authoritarian regimes are more resistant to breakdown.¹⁰ We also find that a regional trend of authoritarian breakdown is contagious and may lead to increases in an autocracy's level of democracy.

3.4. Testing the Mechanisms

Our cross-national analysis shows that government expenditure on education has a significant and substantive effect on sustaining authoritarian survival. The finding supports our theory that investment in human capital stabilizes authoritarian regimes because it facilitates social mobility that eases the demand of redistribution. In this section, we use individual-level survey data to examine the relationship between education, social mobility, and regime stability under dictatorships in order to further substantiate our findings. To reiterate, we hypothesize the effect of human capital on citizens' preferences for redistribution will drive regime consolidation in authoritarian countries. Specifically, we expect that citizens in autocracies with more formal education will perceive higher possibility of social mobility and, in turn, will be less likely to demand redistribution and more likely to support authoritarian regimes. Hence, we first test (1)

¹⁰ As a robustness check, we also replace the variable single-party dictatorship with a military dictatorship variable. Our results suggest that military dictatorships are shorter than other type of authoritarian regimes. More importantly, our substantive result that education prolongs authoritarian survival remains unchanged in this analysis.

the effects of perceived social mobility on regime support and then test (2) the effects of human capital formation on perceived mobility.

We use the fourth wave Asian Barometer Survey (ABS4 thereafter) to illustrate the micro-foundation that links human capital formation to social mobility and authoritarian stability. The ABS4 conducted surveys in 14 East Asian countries and territories in 2013 and 2015. As our theory mainly focuses on autocracies, we only include countries that Freedom House rates as “Not Free” or “Partly Free” in the survey year. Our sample consequently covers nine countries: Cambodia, China, Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. Importantly, our sample covers a variety of authoritarian regime types, including the military regime (Myanmar) and the single party regime (China). Our substantive results also hold if we exclude two partly free countries, the Philippines and Indonesia, and focus on the sub-sample of countries that Freedom House considered “not free.”

We use the ABS4 survey data to test our theory for two reasons. First, it offers useful micro-level empirical leverage to further scrutinize our macro-level empirical findings on education expenditure and authoritarian stability. Many recent studies have employed this strategy to revisit theories on the nexus of inequality, redistribution, and social mobility. For instance, Haggard *et al.* (2013) use the World Values Survey to gauge the relationship between income inequality and support for redistribution. Similarly, Houle (2017) investigates the effects of social mobility on political instability by combining data from Afrobarometer, Latinobarómetro, and the International Social Survey Programme (ISSP). We follow this mixed methods approach to explore the effects of human capital on regime stability.

Second, to our best knowledge, there is no time-series cross-national data available to measure actual social mobility in authoritarian regimes. Ideally, a valid measure of country-level social mobility requires income or wealth data of at least two generations. However, such data are usually not available in democratic countries, let alone in authoritarian regimes. As a result, we rely on survey data to construct alternative indicators of social mobility at the individual level. Our approach echoes the recent development in the literature (e.g., Houle 2017).

3.4.1. Testing the Effects of Social Mobility on Support for Authoritarian Regimes

Regime Support: Our dependent variable is individuals’ political support for authoritarian regimes. As Easton (1975: 437) insightfully explained decades ago, there are two types of political support. Specific support refers to “the satisfactions that members of a system feel they obtain from the perceived outputs and performance of the political authorities”, while diffuse support -- the fundamentally more important one -- consists of a “reservoir of favorable attitudes or good will” that makes members to accept their political system.

This paper focuses on tapping into citizens’ diffuse support for their current authoritarian system. To examine diffuse support, we use the ABS4 question that measures people's support for their authoritarian systems, which reads: “A system like ours, even if it runs into problems, deserves the people's support.” Respondents are asked to strongly agree, agree, disagree, or strongly disagree with the statement. As Figure 3 shows, there exists a substantial variation in citizens’ regime support across these nine authoritarian countries in East Asia. Specifically, more

than 90% of citizens in Vietnam give their ringing endorsement for their authoritarian system, whereas only slightly more than 70% of respondents in Cambodia and China offer their regime unambiguous support. To ease the interpretation of estimation results, we collapse the four-category measure into a dummy variable, with 0 indicating disagreement (respondent answered strongly disagree or disagree) and 1 indicating agreement (respondent answered strongly agree or agree).¹¹

[Figure 3 about here]

Social Mobility: The ABS4 uses the following statement to probe individual perception of social mobility: “As compared to my parent's generation, my generation has more or fewer opportunities to improve one's standard of living or social status.” Respondents are asked to choose one of the following items: (1) Substantively more opportunities, (2) More opportunities, (3) About the same, (4) Fewer opportunities, and (5) Substantively fewer opportunities. To a great extent, this question captures citizens’ perceptions of inter-generational social mobility. More specifically, this variable captures respondents’ perception of opportunities to move up in a society relative to their parents, and it directly reflects the mechanisms underlying the POUM hypothesis. Based on respondents’ answers to this question, we create an ordinal variable, *Perceived Mobility*, to measure how citizens perceive the intergenerational social mobility. We reverse the order so that a higher value indicates higher perception of mobility.

Figure 4 illustrates the relationship between citizens’ perceived mobility and their support for the authoritarian regime across the nine East Asian countries we use for our analysis. We calculate the mean value of perceived mobility for each country and plot it against the percentage of citizens who offer clear support to the current regime. Figure 4 clearly shows that countries in which citizens perceive higher mobility also enjoy more popular regime support and thus offers preliminary support to our hypothesis.

[Figure 4 about here]

To guard against spuriousness in this analysis, we include several variables that may affect people’s support for the regime. First, we include respondents’ evaluations of their family's **current economic situation**, as many studies find that people are more supportive of the regime if they perceive better economic performance under the regime (Chu *et al.* 2008; Finkel *et al.* 1989). Second, we include respondents’ **subjective familial social status**. A respondent from a family with a higher level of social status may be more supportive of the regime. We argue the variable of respondents' subjective social status is more ideal than the variable of income for two reasons. First, these two variables are highly correlated: as Appendix A.4 illustrates, people with higher income tend to have higher subjective social status. Second, respondents are more willing to identify their subjective social status than they are to reveal their income. Respondents'

¹¹ The substantive results remain the same if we take the original ordinal four-category response as the dependent variable.

reluctance to disclose their income creates a serious missing data issue here.¹² Accordingly, we use subjective familial social status to measure one's socioeconomic status.¹³

Third, we include a variable that measures people's perception of **regime responsiveness**. We do so based on Easton's (1975) work, which suggests that a more responsive political system should garner more support among its members. Finally, we include respondents' **demographic traits**, such as gender, age, and education. Because each country's education system is substantially different from the others, we use a dichotomous variable to indicate whether a respondent's education level (as measured in years of formal education received) is below or above the median respondent in her own country. Using this operationalization enables us to compare level of education for the different countries in our sample.

We present the operationalization and summary statistics for the variables used in this section in the Appendix.

Model Specification: For our analysis here, we employ a multilevel random intercept logit model. Rather than follow the conventional country-dummy fixed effects approach -- a commonly used modeling choice -- we use multilevel analysis because it enables us to estimate both the fixed and random components of the model simultaneously, which allows us to more effectively model the unobserved heterogeneity among countries. Multilevel analysis also enhances the generalizability of a study by giving researchers more leverage to explore contextual variations even when there are only a limited number of countries (Steenbergen and Jones 2002). Additionally, by incorporating contextual-level variables into the analysis, multilevel analysis enables us to model the casual complexity more closely than we could using the conventional fixed effects approach (Western 1998). As a result, the model becomes more theoretically encompassing and more empirically robust against possible model misspecification.

We report our estimation results in Table 2. Consistent with our theory, the results in Model 5 show that respondents perceiving a higher level of social mobility are more supportive of their authoritarian regime ($p < 0.001$). Specifically, holding other variables at their means, an increase from the lowest perceived mobility (1) to the highest one (5) increases the probability of supporting the regime by 7.88%. Additionally, citizens who perceive a higher level of social status or a better evaluation of their countries' economic situation also exhibit higher levels of regime support. Together, these findings suggest that citizens who enjoy more economic fruits are more likely to be supporters of the regime.

[Table 2 about here]

¹² 16.30% of the respondents did not report their income in our sample, while only 7 % of the respondents did so for the question on familial social status.

¹³ In our preliminary analysis, we also explored the possibility of an interactive effect between respondents' social-economic status and their perceived social mobility. The interactive effect was insignificant. More interestingly, as Appendix A.4 indicates, we found that the variable of perceived social mobility is almost equally distributed among respondents with different income levels and social status.

We conduct additional robustness checks of our findings by using an alternative dependent variable. Specifically, we utilize a measure of respondents' willingness to change their current authoritarian regime as an alternative. We rely on respondents' answer to the following question: "Compared with other systems in the world, would you say our system of government works fine as it is, needs minor change, needs major change, or should be replaced?" The responses are on a 1-4 scale, with a higher value indicating greater desire for regime change. With this new dependent variable, we estimate a multilevel random intercept ordered logit model. The results of Model 6 clearly show that people who perceive a higher level of social mobility are less willing to replace the current authoritarian regimes. This result corroborates our previous findings and shows the importance of social mobility in sustaining authoritarian rule.

Because the dependent variables in Models 5 and 6 measure respondents' political support, one may be concerned with the issue of response bias, as those surveys are conducted in authoritarian regimes. Simply put, respondents in authoritarian regimes may be afraid of revealing their true answers to politically sensitive questions such as regime support. Under such circumstances, response bias can create systematic measurement error and biased statistical inferences. Ideally, we can use randomized response techniques or survey experiments to alleviate the response bias. However, these methodological solutions are not available in the ABS4. As a second-best solution for our empirical analysis, we control for the extent to which respondents are politically alert. Specifically, we select five questions with serious political sensitivity, including those on political activism and perception of corruption.¹⁴ Our intuition is that, if a respondent is truly concerned with revealing her true preferences, she is more likely to give a non-response than a concrete answer to those politically sensitive questions. Based on this reasoning, we create five binary variables to indicate when respondents gave non-responses to those sensitive questions. We code these variables as 1 if the respondents' answer is "Don't know" or "Declined to answer," and 0 if she gives a concrete answer. We further calculate the mean value of each respondent's answers to those five questions and create a new variable, **political alertness**. We expect respondents with a higher value of **political alertness** are more guarded and less willing to reveal their true preferences. Importantly, as a partial solution to respondent bias, we include the variable of **political alertness** in both Model 5 and Model 6, and as the results in Model 7 and 8 suggest,¹⁵ our key finding that respondents with a higher level of perceived mobility are more likely to support the current regime and less willing to replace it remain unchanged.

3.4.2 Testing the Effects of Human Capital Formation on Perceived Social Mobility

As we have shown that people perceiving higher social mobility are more supportive of their regimes in East Asian autocracies, our next step is to investigate the relationship between human capital and perceived mobility. Based on our theory, we expect that respondents with a higher

¹⁴ For the measure of political activism, we include questions on attending a demonstration or protest march, and the use of force or violence for a political cause. For the measure of perception of corruption, we include questions on respondents' evaluation on the scope of corruption in local and national levels of government. We also include the question on whether the respondents (or their friends/family members) have witnessed an act of corruption or bribe-taking in the past year.

¹⁵ Vietnam is not included in Model 7 and Model 8 because the questions on political activism and perception of corruption are not available.

level of education should perceive higher social mobility. We estimate additional multilevel random intercept ordered logit models to test this mechanism.

Specifically, we use the variable of 5-category perceived mobility discussed in the previous section as the dependent variable. We operationalize respondents' levels of education in different ways, as it is the key explanatory variable in our empirical models. We also control for other variables' confounding effects on perceived mobility, including respondents' residence (urban vs. rural), gender, age, evaluation of the condition of present economic conditions, perceived social status, and perceived responsiveness of their government.

[Table 3 about here]

Table 3 presents the empirical results estimated with different operationalizations of respondents' education. In Model 9, we compare respondents with secondary and tertiary education with those with primary education (the omitted category). While neither coefficients are statistically significant, both coefficients are positive.

We suspect that the insignificant results in Model 9 are driven by different education systems in countries of our sample. In other words, one's level of education cannot be cross-nationally comparable if it is operationalized by a tertiary variable or the duration of educational pursuits. As a result, we use dummy variables with different cutting points to indicate whether a respondent has a higher level of education than others in her own country. For instance, Model 10 uses the 50th percentile as the cutting point to differentiate citizens with higher or lower level education. The result indicated that more educated respondent (those who receive more education years) perceive more social mobility. To avoid the arbitrariness, we test the robustness of our results with different cut-off points (the 40th and the 30th percentiles in Model 11 and Model 12, respectively), and the result remains unchanged.

3.4.3 Mediation Analysis

The results in Table 2 and Table 3 suggest that education, through perceived mobility, indirectly effects regime support while also directly affecting it. Thus, we conduct causal mediation analysis to better capture the relationship between education, perceived mobility, and regime support. Following the methodological advice of Imai *et al.* (2011), we regard education as the treatment variable and regime support as the outcome variable, respectively. We also treat perceived mobility as the mediating variable that mediates the direct effect of education on regime support. With the statistical package, *medeff*, developed by Hicks and Tingley (2011), we conduct mediation analysis and estimate the average causal mediation effect (ACME), average direct effect (ADE), and average total effect (ATE).

We report the results of the mediation analysis in Table 4. Models 13(a) and 13(b) estimate an OLS model for the observed mediator, *perceived mobility*, and a logit model for the outcome variable, *political support*, respectively. The results suggest that *education* increases perceived mobility but decreases regime support. Meanwhile, a higher level of perceived mobility boosts one's regime support. Thus, we find a mediating effect of perceived mobility between education and regime support. More specifically, the values of ACME, ADE, and ATE

on the bottom of Table 4 are all statistically significant at the $p < 0.05$ level, offering further support to our argument that perceived mobility increases regime support in authoritarian regimes.

[Table 4 about here]

In Model 14(a) and Model 14(b), we replace regime support with the support for changing the current regime as the outcome variable in the mediation analysis. The results also indicate that a higher level of perceived mobility leads to low support for regime change among respondents in non-democracies surveyed by the ABS4.

To summarize, an analysis of the data collected by the ABS4 in nine authoritarian regimes in East Asia suggest that people with a higher level of education perceive more social mobility, which further contribute to more regime supports. These results offer clear and strong micro-level evidence to substantiate our aggregated-level finding that authoritarian regimes with higher level of human capital formation are more likely to consolidate their rule.

4. Discussion and Conclusion

From Aristotle to Rawls to Huntington, the relationship between inequality and political order in changing society has always been a major concern for social scientists. Our paper contributes to this perspective of scholarship by examining the effects of human capital formation on authoritarian regimes' survival and consolidation. By weaving together insights from the well-known POUM model as well as theories of inequality and regime transition, we argue here that dictators invest in human capital -- education specifically -- in order to fortify their power over citizens. Education is the key, as it helps the poor accumulate human capital, which in turn provides them with social mobility, which then increases their support for the regime that offered them this opportunity for upward advancement. Accordingly, the poor have less incentive to challenge authoritarian regimes. In other words, investing in human capital helps dictators neutralize threats of revolution. They can effectively boost citizens' perceived level of social mobility and preemptively ameliorate the pressure for redistribution from the poor.

Using data from 88 dictatorships between 1970 and 2009, we demonstrate that autocracies' decision to spend money on education reduces the likelihood of regime breakdown. We further demonstrate the micro-foundation of our aggregated-level finding with individual-level survey data from the Asian Barometer Survey. We find that citizens with a higher level of education perceive more social mobility, which further contribute to greater regime support.

Our argument parallels to recent work by Houle (2017). Specifically, Houle finds that countries with low social mobility are more likely to witness different kinds of political instability, including riots, revolutions, and civil wars. We move beyond Houle's study in two key ways. First, we explicitly highlight the role of human capital, which is absent in Houle's study. By doing so, we are able to examine the sources of social mobility and consequently portray a fuller picture of the relationship between social mobility and regime stability. Second, Houle usefully examines political instability by focusing on a variety of important phenomena, like civil war onset and antigovernment demonstrations. Yet, an authoritarian regime can still

survive the occurrence of these events. Our paper focuses more directly on authoritarian regime breakdown, the most significant type of political instability facing citizens, and speaks more directly to the literature of regime transition.

Our paper is also related to the works of Leventoğlu (2005, 2014). While both our work and Leventoğlu's (2005, 2014) are similar in their belief that social mobility reconciles the tension between the rich and the poor on the issue of redistribution, we disagree with Leventoğlu's conclusion that social mobility facilitates democratization. In particular, Leventoğlu (2005, 2014) argues that when social mobility is high, democratic transition is more likely, because the rich are more willing to accept it. However, we argue that social mobility lowers the poor's demand of redistribution, and we empirically demonstrate that citizens in autocracies have higher regime support when they perceive more social mobility.

Several interesting issues await for future research. First, while we build our theory based on the POUM model and regime evaluation mechanism, citizens' belief system of fairness might represent another potential mechanism linking social mobility and regime support. Houle (2017), for instance, suggests that citizens who have moved up the ladder in the society tend to embrace conservative ideologies and support the existing political and economic orders. More specifically, Alesina and Angeletos (2005) suggest that citizens who perceive higher levels of social mobility might demand less redistribution since they are more likely view the (unequal) distribution of income as fair and blame the poor for their laziness. Extending these insights, it is possible that citizens with higher levels of social mobility might attribute their economic success to effort and thus view the authoritarian regimes as justifiable/tolerable.

Second, it would be interesting to extend this project to examine the types of human capital in which authoritarian regimes prefer to invest. For example, Hayhoe (1995) finds that many former authoritarian regimes in East Asia and Eastern Europe have placed an emphasis on education in engineering and natural sciences. Following this insight, we expect that authoritarian regimes are more likely to emphasize the engineering and natural sciences over the humanities and the social sciences. Specifically, the pursuit for economic growth is critical for the legitimacy of authoritarian regimes, such as China, South Korea, and Taiwan. Thus, investment in engineering and natural sciences helps those countries to develop their manufacturing and industry sectors and pay the economic dividend. Meanwhile, investment in the humanities and social sciences is likely to threaten the authoritarian control of dictatorships because students in these disciplines are more likely to develop independent and divergent thinking and could eventually challenge the authority.

Second, while our paper shows that human capital formation reduces the pressure society puts on dictators to redistribute assets, one could extend this project to explore how human capital formation affects the power dynamics between dictators and ruling elites in dictatorship. On the one hand, elites may support the dictator's investment in education, because the enhancement of human capital reduces the pressure of redistribution as well as the tax burden on the rich. On the other hand, however, it may increase the elites' incentives to challenge the dictator because their privileged status would be shaken due to increased social mobility. Future studies can endeavor to explore this issue.

Another possible extension of our paper is to investigate the conditions under which dictators are more likely to invest in human capital. Indeed, our findings that human capital investment boosts authoritarian survival naturally leads to a new question: why would authoritarian regimes choose not to invest in human capital? A recent study by López-Cariboni and Cao (2018) show that dictators educate their people when they depend more on a productive work force and when they have longer regime horizons. In other words, there may be a virtuous cycle between human capital investment and regime survival. Investment in education facilitates social mobility and strengthens ordinary citizens' political support. Authoritarian leaders facing fewer threats are more willing to make long-term investment in human capital.

One may further extend this line of inquiry by looking at different authoritarian institutions and their influences on the formation of human capital. As different authoritarian regimes include different groups in their winning coalition to broaden their ruling legitimacy (Geddes 1999), the societal pressure to redistribute, as well as dictators' decisions to invest in human capital, may vary by the type of authoritarian regimes in place. Specifically, because single-party dictatorships are more institutionalized and engage with more societal actors (Geddes 1999; Magaloni and Kricheli 2010), we expect that single-party dictatorships might invest more in human capital than their authoritarian counterparts, which Geddes *et al.* (2014) separate into military, monarchic, personalist, and single-party. We can also extend the selectorate theory (Bueno de Mesquita *et al.* 2003) to the authoritarian context and examine whether authoritarian systems with weak loyalty norms (higher value of W/S) are more likely to invest in public education. A recent study by Wong (2018) shows this is indeed the case. Using the return of Hong Kong to China in 1997 as an exogenous treatment, Wong shows that Hong Kong experienced an increase in spending on education, social welfare, and public health after 1997.¹⁶

In addition, it would be useful to connect this paper to the natural resource curse literature and examine whether the optimal level of human capital investment in authoritarian regimes depends on the levels of natural resource endowment. On the one hand, we might expect resource abundant authoritarian regimes are less likely to invest in human capital since they can simply distribute the rents to ease the demand of redistribution. On the other hand, we can also expect that the availability of natural resource will ease authoritarian leaders' budgetary constraints, making them more likely to spend on education and other public goods.

Last but not least, it would be useful to conduct case studies to further validate our theory. For instance, many East Asian dictatorships, especially China and Singapore currently, put a significant amount of investment in human capital to consolidate their authoritarian rules. Meanwhile, many African dictatorships not only have limited investment in education but also suffer from domestic political instability like revolution and civil wars. Future studies should explore this contrast via comparative case studies.

¹⁶ It is noteworthy that Gallagher and Hanson (2015) challenge the validity of the selectorate theory in the context of authoritarian regimes.

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Tables and Figures

Table I: Estimated Effect of Government Spending on Education

	Model 1	Model 2	Model 3	Model 4
	DV: Breakdown		DV: Δ Polity	
Gov. Expenditure of Education	-0.238*	-1.012*	-0.031+	-0.044+
	[0.117]	[0.466]	[0.018]	[0.023]
Logged GDP Per Capita	0.195	2.129	-0.055	0.114
	[0.163]	[1.926]	[0.165]	[0.101]
Resource Rents	-0.071	0.197	0.008	-0.018**
	[0.043]	[0.146]	[0.007]	[0.006]
Trade Openness	-0.010*	0.072**	0.002	-0.002
	[0.005]	[0.023]	[0.002]	[0.001]
Single Party	-0.961+	-0.664	-0.016	-0.033
	[0.555]	[2.973]	[0.266]	[0.111]
Military Spending	-0.019	-0.161	0.110**	0.014
	[0.078]	[0.701]	[0.041]	[0.026]
Regional Trend of Authoritarian Breakdown	0.259+	0.060	0.059	0.112+
	[0.148]	[0.311]	[0.067]	[0.066]
Cold War	-0.406	0.363	-0.602***	-0.578***
	[0.355]	[0.943]	[0.173]	[0.123]
Polity Score			-0.158***	-0.079***
			[0.037]	[0.012]
Constant	-1.758	-18.880	-1.883	-0.353
	[1.151]	[15.009]	[1.206]	[0.489]
No. of Observations	877	262	904	904
No. of Countries	88	28	87	87
R2			0.216	0.028
Log pseudolikelihood	-132.567	-72.217		

Note: The dependent variable in Model 1 and Model 2 is regime breakdown. The dependent variable in Model 3 and Model 4 is the first difference of the policy score. Robust standard errors clustered at country level are reported in brackets. Three time polynomials are not shown in Models 1 and 2.

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 2: Estimated Effect of Perceived Mobility

	Model 5	Model 6	Model 7	Model 8
Perceived Mobility	0.146*** [0.038]	-0.174*** [0.040]	0.139*** [0.038]	-0.180*** [0.045]
Male	-0.055 [0.066]	0.224** [0.083]	-0.038 [0.069]	0.242** [0.089]
Age	0.005+ [0.003]	-0.007** [0.002]	0.004 [0.003]	-0.005** [0.002]
Education	-0.340* [0.150]	0.235** [0.080]	-0.373* [0.154]	0.248** [0.084]
Subjective Status	0.046* [0.022]	-0.032* [0.015]	0.056** [0.019]	-0.037* [0.016]
Present Economic Evaluation	0.083+ [0.044]	-0.144*** [0.036]	0.108** [0.041]	-0.161*** [0.036]
Perceived Gov. Responsiveness	0.726*** [0.127]	-0.770*** [0.085]	0.699*** [0.128]	-0.768*** [0.091]
Political Alert			0.853** [0.312]	-1.032*** [0.167]
Constant	-1.120*** [0.336]	2.551*** [0.394]	-1.240*** [0.341]	2.651*** [0.420]
Variance Component				
Country Level	0.321** [0.109]	0.267+ [0.162]	0.286* [0.114]	0.275 [0.197]
No. of Observations	11524	11167	10382	10041
No. of Countries	9	9	8	8
Log pseudolikelihood	-4807	-6457	-4440	-5760

Note: The dependent variable is support for the current regime in Model 5 and Model 7. The dependent variable in Model 6 and Model 8 is support for regime change. Robust standard errors clustered at country level are reported in brackets.

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3: Estimated Effects of Education

	Model 9	Model 10	Model 11	Model 12
Secondary Education	0.147 [0.096]			
Tertiary Education	0.115 [0.135]			
Education (50 th percentile)		0.171* [0.080]		
Education (40 th percentile)			0.275*** [0.062]	
Education (30 th percentile)				0.247** [0.075]
Urban	-0.167* [0.074]	-0.182* [0.079]	-0.189* [0.087]	-0.176* [0.085]
Male	0.016 [0.045]	0.018 [0.047]	0.011 [0.048]	0.015 [0.051]
Age	0.002 [0.004]	0.003 [0.004]	0.003 [0.004]	0.003 [0.004]
Present Economic Evaluation	0.275*** [0.067]	0.272*** [0.065]	0.273*** [0.064]	0.275*** [0.065]
Subjective Status	0.066*** [0.016]	0.063*** [0.015]	0.060*** [0.013]	0.061*** [0.013]
Perceived Government Responsiveness	0.329*** [0.032]	0.330*** [0.034]	0.333*** [0.036]	0.330*** [0.037]
Variance Component				
Country-level	0.340 [0.208]	0.336+ [0.201]	0.325 [0.200]	0.331 [0.203]
No. of Observations	11987	11895	11895	11895
Log pseudolikelihood	-14020	-13907	-13878	-13892

Note: The dependent variable is perceived mobility. Four cut points estimated by multilevel ordered logit models are not shown. Robust standard errors clustered at country level are reported in brackets.

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4: Mediation Analysis

	Model 13		Model 14	
	(a) Mobility	(b) Support	(a) Mobility	(b) Change
Education	0.063** [0.022]	-0.288*** [0.069]	0.059** [0.021]	0.194*** [0.056]
Perceived Mobility		0.140*** [0.032]		-0.168*** [0.028]
Urban	-0.095*** [0.023]	-0.278*** [0.066]	-0.097*** [0.023]	0.223*** [0.056]
Male	0.009 [0.020]	-0.060 [0.060]	0.008 [0.020]	0.226*** [0.049]
Age	0.001 [0.001]	0.005* [0.002]	0.001 [0.001]	-0.008*** [0.002]
Present Economic Evaluation	0.128*** [0.016]	0.081+ [0.042]	0.120*** [0.015]	-0.143*** [0.035]
Perceived Gov. Responsiveness	0.155*** [0.014]	0.720*** [0.047]	0.152*** [0.014]	-0.762*** [0.037]
Subjective Status	0.025*** [0.006]	0.047** [0.016]	0.026* [0.006]	-0.033* [0.014]
Constant	2.636*** [0.078]	-0.178 [0.248]	2.647*** [0.079]	2.431*** [0.195]
R2	0.096		0.091	
Log pseudolikelihood	-4720.513		-6316.745	
No. of Observations	11488		11134	
Effect	Mean		95% CI	
Average Mediation Effect (ACME)	-0.002		[-0.004, -0.001]	
Average Direct Effect (ADE)	0.037		[0.017, 0.058]	
Average Total Effect (ATE)	0.035		[0.015, 0.056]	

Note: Mediation analysis of the effect of education on regime support. The mediating variable is perceived mobility. Model 8(a) runs an OLS regression predicting perceived mobility and Model 8(b) a logit regression predicting regime support. Model 9(a) runs an OLS regression predicting perceived mobility and Model 9(b) a logit regression predicting support for regime change. All regressions include country dummies (not shown). Robust standard errors clustered at country level are reported in brackets.

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure I: Human Capital in Democracy and Dictatorships as 2009

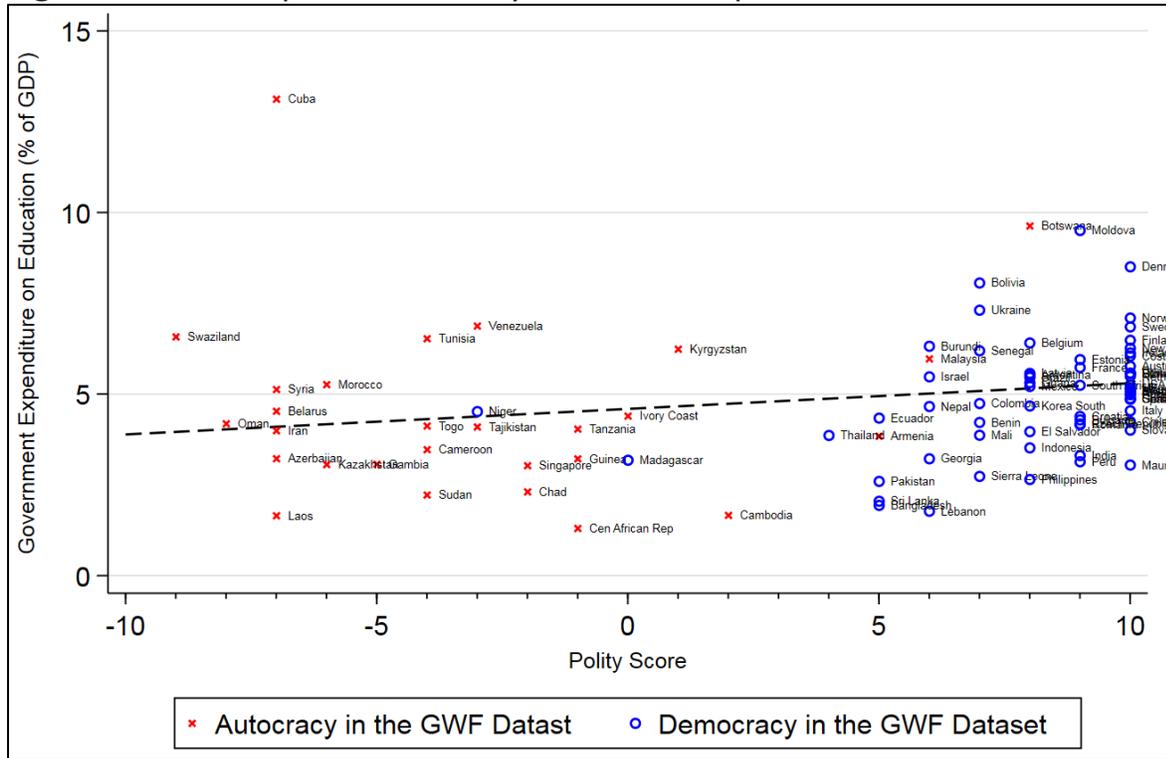


Figure 2: The Logical Chain of the Theory on Human Capital and Authoritarian Stability

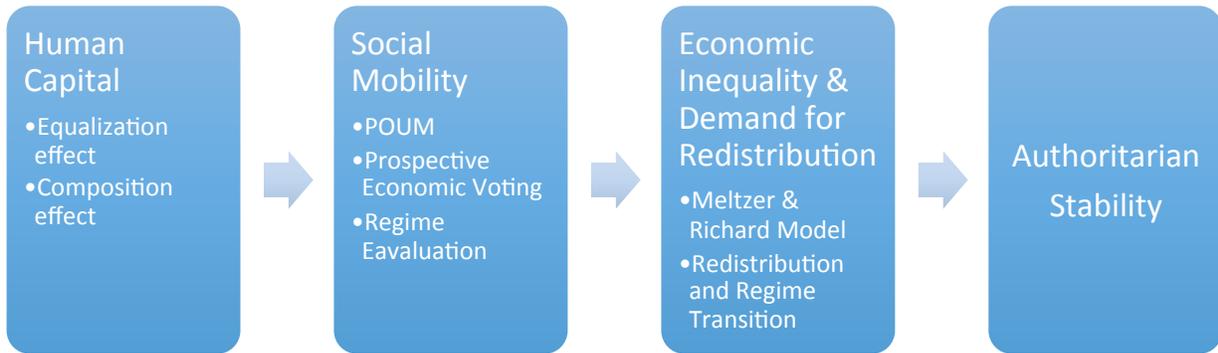


Figure 3: Regime Support in East Asian Autocracies

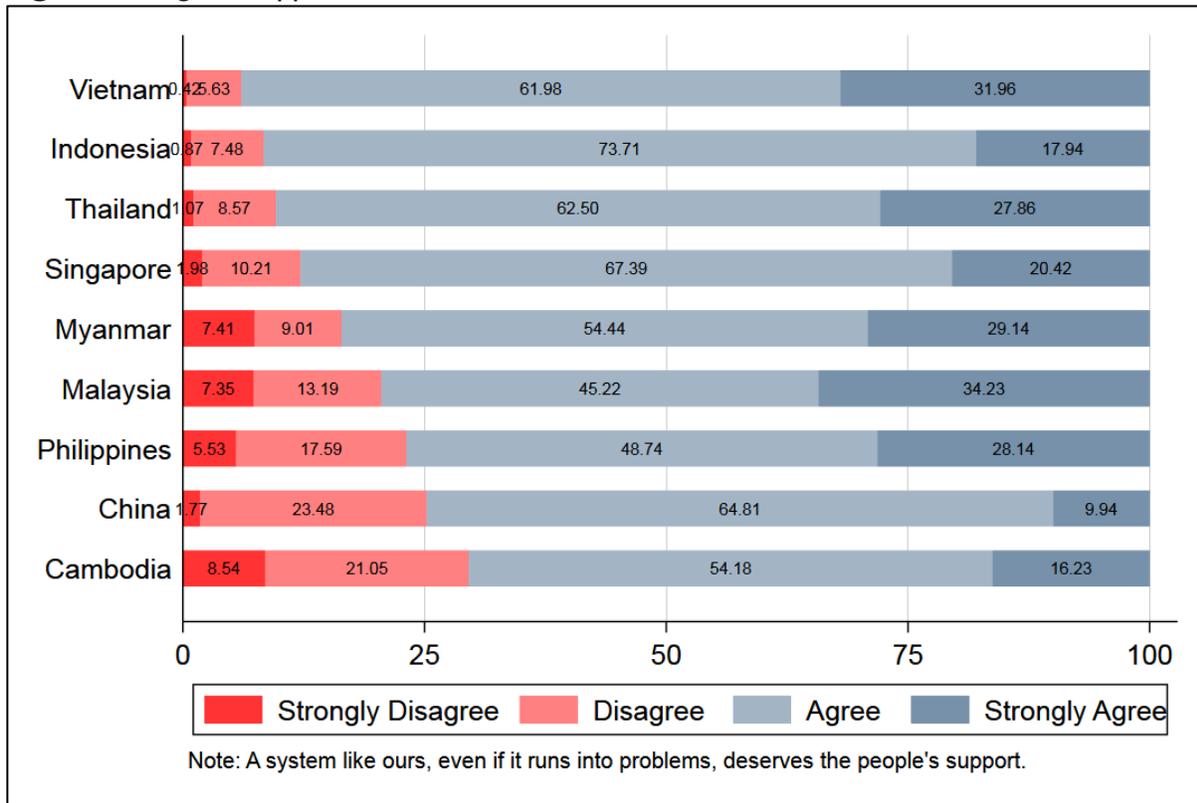
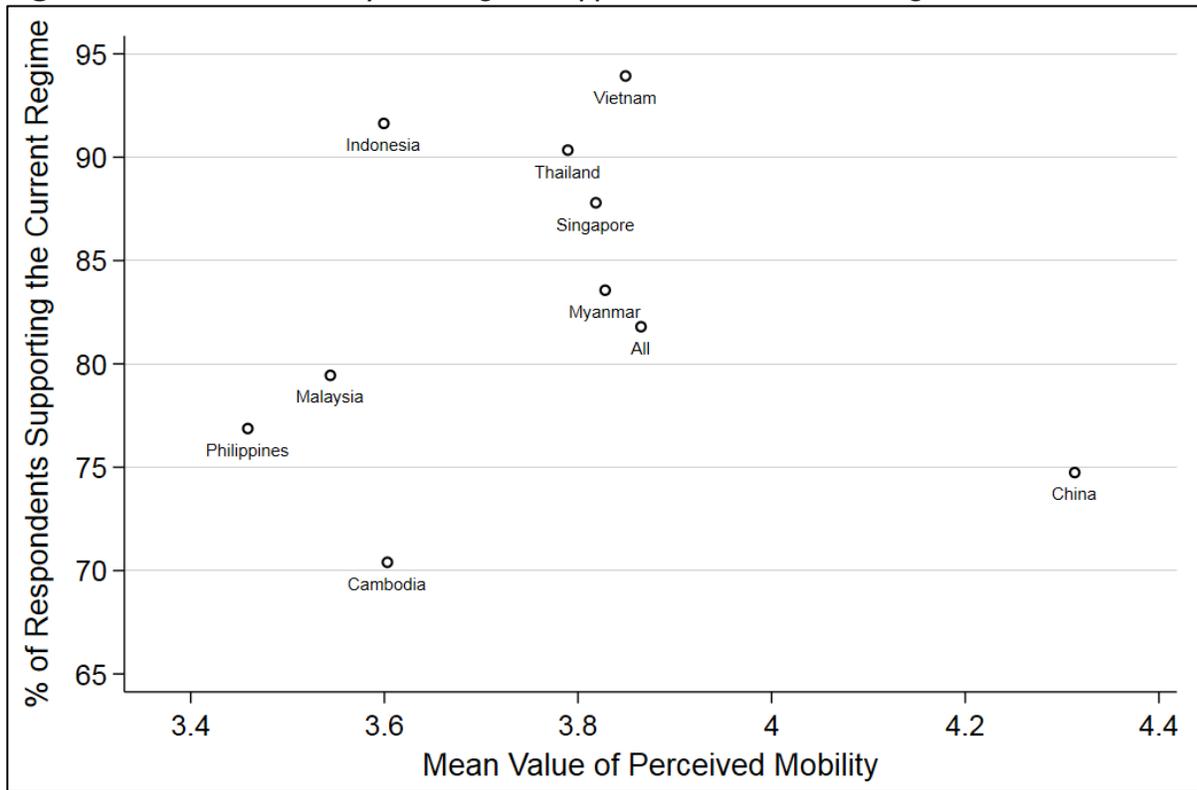


Figure 4: Perceived Mobility and Regime Support in Authoritarian Regimes in East Asia



Appendix

Appendix A. I: Analyzed Authoritarian Regimes

Algeria	Egypt	Lesotho	Russia
Angola	El Salvador	Liberia	Rwanda
Argentina	Eritrea	Libya	Saudi Arabia
Armenia	Gabon	Madagascar	Senegal
Azerbaijan	Gambia	Malawi	Singapore
Bangladesh	Georgia	Malaysia	South Africa
Belarus	Ghana	Mali	Spain
Botswana	Greece	Mauritania	Sri Lanka
Bulgaria	Guatemala	Mexico	Sudan
Burkina Faso	Guinea	Morocco	Swaziland
Burundi	Honduras	Mozambique	Tajikistan
Cambodia	Indonesia	Namibia	Tanzania
Cameroon	Iran	Nepal	Thailand
Cen African Rep	Iraq	Nicaragua	Togo
Chad	Ivory Coast	Niger	Tunisia
Chile	Jordan	Nigeria	Turkey
China	Kazakhstan	Oman	Uganda
Congo-Brz	Kenya	Pakistan	Uruguay
Congo/Zaire	Korea South	Panama	Venezuela
Cuba	Kuwait	Peru	Zambia
Dominican Rep	Kyrgyzstan	Philippines	Zimbabwe
Ecuador	Laos	Portugal	

Appendix A.2: Summary Statistics

Models of Regime Breakdown					
Variable	N	Mean	Std. Dev.	Min.	Max.
Regime Breakdown	904	0.02	0.14	0	1
Polity Score	904	-3.92	4.72	-10	8
Logged GDP Per Capita	904	7.51	1.19	5.43	10.81
Resource	904	9.42	11.19	0.00	61.96
Trade Openness	904	77.75	59.92	4.92	441.60
Single Party	904	0.42	0.49	0	1
Human Capital Formation	904	3.97	2.38	0.70	44.33
Military Spending	904	12.55	2.56	0	17.99
Regional Trend of Authoritarian Breakdown	904	0.36	0.72	0	5
Cold War	904	0.48	0.50	0	1
Models of Regime Support					
Variable	N	Mean	Std. Dev.	Min	Max
Regime Support	13,085	0.82	0.39	0	1
Support for Regime Change	12,451	0.34	0.473	0	1
Male	14,280	0.50	0.50	0	1
Age	14,242	43.97	15.06	17	108
Urban	14,218	0.40	0.49	0	1
Subjective Status	13,282	5.46	1.91	1	10
Present Economic Evaluation	14,211	3.15	0.77	1	5
Perceived Gov. Responsiveness	12,907	2.61	0.73	1	4
Perceive Mobility	13,770	3.86	0.92	1	5
Education (50 th percentile)	14,073	0.55	0.50	0	1
Education (40 th percentile)	14,073	0.68	0.47	0	1
Education (30 th percentile)	14,073	0.78	0.41	0	1
Secondary Education	14,236	0.44	0.50	0	1
Tertiary Education	14,236	0.20	0.40	0	1
Political Alert	13083	0.100	0.195	0	1

Appendix A.3: Operationalization of Variables in Table 2 and Table 3

Variables	Operationalization
Support for Current Regime	“A system like ours, even if it runs into problems, deserves the people's support.” 1: strongly agree or agree; and 0 “strongly disagree or disagree.
Support for Regime Change	“Compared with other systems in the world, would you say our system of government works fine as it is, needs minor change, needs major change, or should be replaced? 0: not need to change, needs minor change, or need major change; and 1: should be replaced.
Mobility	"As compared to my parent's generation, my generation has more or fewer opportunities to improve one's standard of living or social status?" 1: Substantially fewer opportunities; 2: Fewer opportunities; 3: About the same; 4: More opportunities; 5: Substantially more opportunities.
Male	Coded as 1 if respondents are male, and 0 if female.
Age	Age in years.
Urban	Coded as 1 if respondents reside in an urban area, and 0 otherwise.
Subjective Status	"Imagine a ladder with 10 steps. At step one stand the lowest status and step 10 stand the highest. Where would you place your family on the following scale?"
Present Economic Evaluation	“How would you compare the current economic condition of your family with what it was a few years ago?” 1: much worse now; 2 a little worse now; 3: about the same; 4: a little better now; 5: much better now.
Perceived Gov. Responsiveness	“How well do you think the government responds to what people want?” 1: not at all responsive; 2: not very responsive; 3: largely responsive; and 4: very responsive.
Education (50th percentile)	Coded as 1 if respondents' duration of education is above the mdian, and 0 otherwise.
Education (40th percentile)	Coded as 1 if respondents' duration of education is above the 40th percentile, and 0 otherwise.
Education (30th percentile)	Coded as 1 if respondents' duration of education is above the 30th percentile, and 0 otherwise.
Secondary Education	Coded as 1 if respondents' highest education is secondary education, and 0 otherwise.
Tertiary Education	Coded as 1 if respondents' highest education is tertiary education, and 0 otherwise.

Appendix A.4: Subjective Social Status across Income Groups

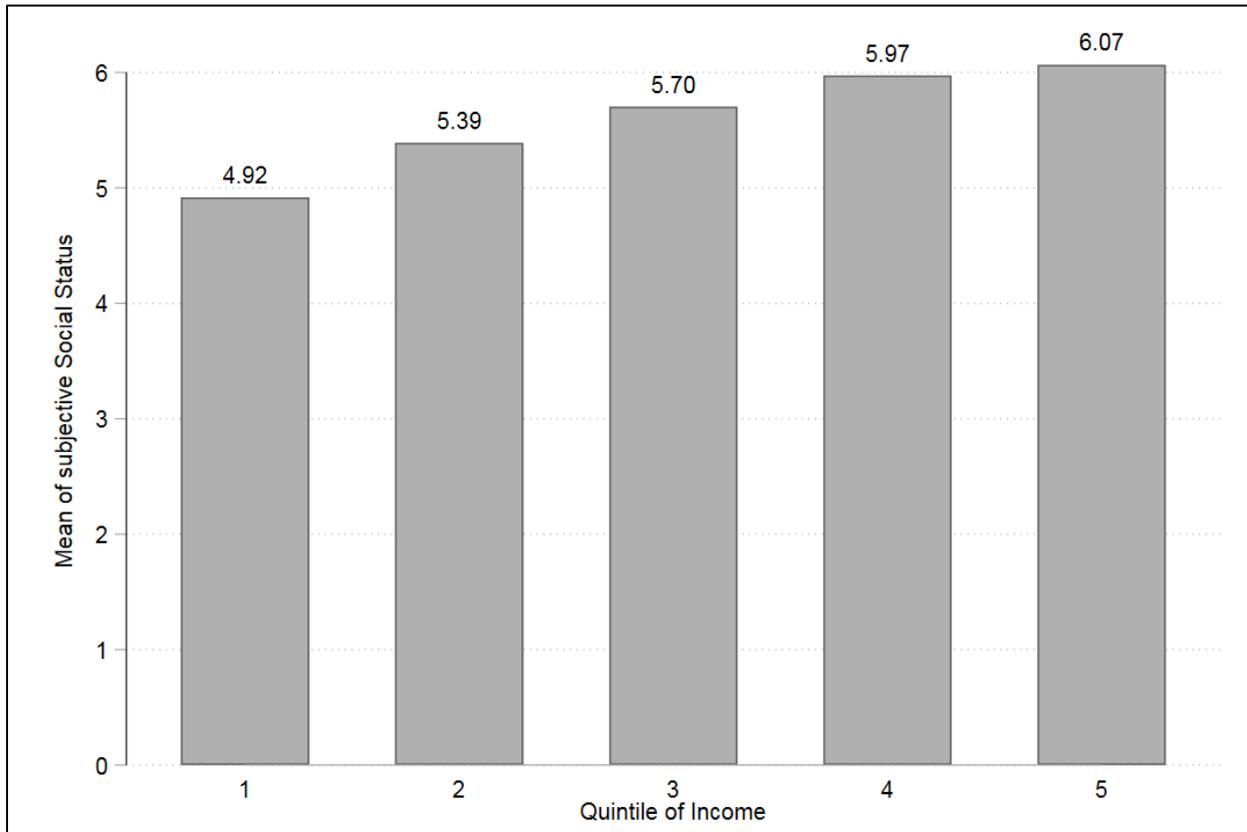


Figure A: Perceived Mobility across Income Groups

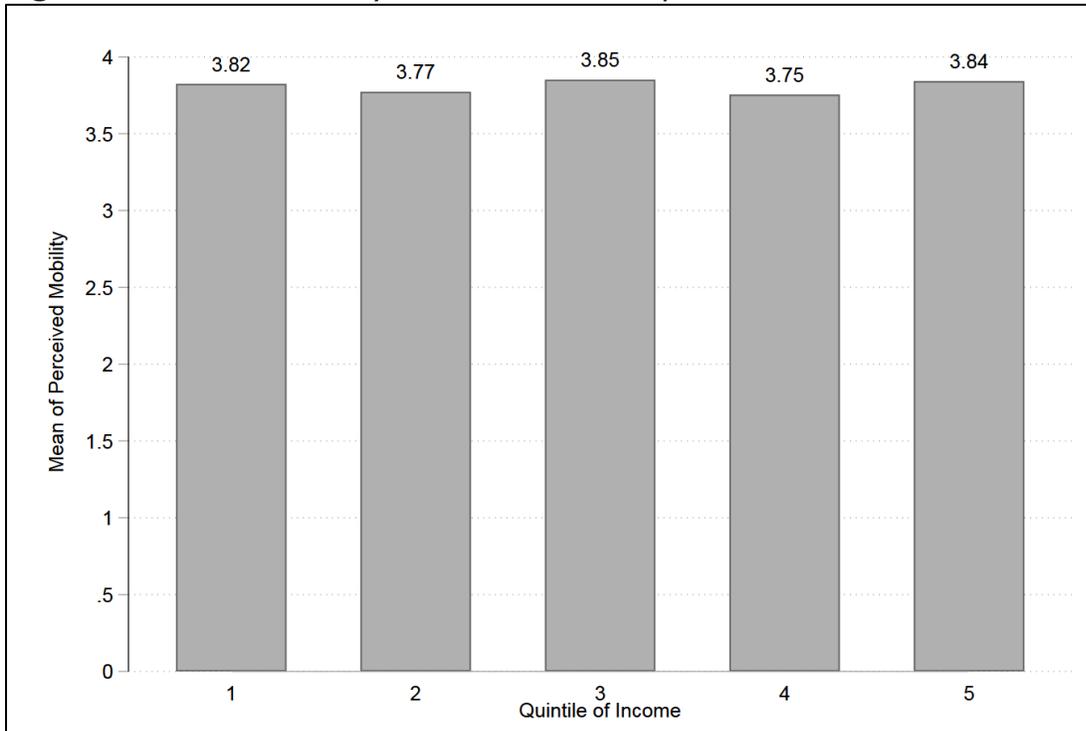


Figure B: Perceived Mobility across Subjective Social Status

