

Essays on Economic Theory of Underdevelopment Traps

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Essays on Economic Theory of Underdevelopment Traps

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by

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ABSTRACT

While many countries have been developing at an astonishing speed, a group of countries at the bottom are falling behind and falling apart, getting stuck in underdevelopment traps. Designing effective development policies that can save these countries from underdevelopment traps requires critical understanding of their roots. This dissertation provides theoretical economic analysis on several issues related to economic development and underdevelopment traps.

Chapter 1 is an overview of the dissertation, which includes the discussion on the significance of the main issues analyzed in the subsequent chapters.

Chapter 2 is a survey of theoretical literature on political economy of development. It discusses theories that explain the political and institutional foundations of economic performance and public accountability. This review aims at obtaining some insights into two fundamental issues in political economy of development: (1) identifying appropriate political institutions conducive to economic development; and (2) holding a government accountable and virtuous.

Chapter 3 develops a static economic model of the resource curse, one of the causes of underdevelopment traps, by incorporating the role of institutions and foreign investment. Recent literature has emphasized that poor institutions, such as rent seeking and patronage, are the causes of the curse. Recent

trend also shows an increasing role of new source of foreign investment from the South, especially, in the resource sector of developing countries. Motivated by this trend, this chapter proposes an economic model to analyze whether the institutions of the source countries of foreign investment matter for development when the resource curse is considered. The prevalence of South investors may compliment domestic rent-seekers, by raising the profitability of rent-seeking activities vis-à-vis production activities. This may crowd out entrepreneurs from production sectors and result in the country get stuck in the higher rent-seeking activities and lower development equilibrium.

Chapter 4 develops a dynamic model of intergenerational cultural transmission of underdevelopment traps. This model provides the analysis on the interaction between the development of social capital and the development of traditional production (natural resource-based and agricultural production) from the perspective of cultural economics. Some reforms or policies that may leads to the development of traditional production vis-à-vis that of the modern production may ruin the development of social capital, which eventually cause the economy to be caught in the underdevelopment traps.

Chapter 5 constructs a principal-agent model that gives insights into the understanding of the persistence of corruption from the perspective of political economics. Political expectation or beliefs of the voters about corruption can be self-fulfilling, which eventually creates vicious cycle of persistent high corruption and low development traps. In democratic regime, election and voting mechanisms created by the voters are vital tools that hold the politicians accountable and refraining from corrupted behaviors. That is, to vote for the good politician, but against the bad one. However, the voters who are

skeptical about corruption, holding the beliefs that all politicians are similarly corrupted, tends to be more tolerant of corrupted behaviors. Such skepticism and tolerance will generate a voting mechanism that is less effective in holding the politician accountable.

Chapter 6 provides the summary of main results in the dissertation, with suggestion on policy implications and direction for future research.

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Chapter 1

Introduction

1.1 Underdevelopment Traps

The ultimate and foremost objective of economic science perhaps is to seek ways to improve the economic well-being and overall quality of life of human beings. Insights from economics have contributed significantly to the development of the world economy. Many countries have been developing at an astonishing speed, allowing their people to enjoy high standards of living that their ancestors could never have imagined. Unfortunately, at the same time, around 1 billion people around the world live in desperate poverty and have very poor quality of life. In the famous book “The Bottom Billion,” Collier (2008) emphasized that as of 2006, the reality of life for 980 million people in at least 58 countries matches that of the fourteenth century, and they coexist with others who lead typical twenty-first century lives.

What is worse, the cycle of extreme poverty has continued to persist in those countries from one generation to another over many decades. In the field of development economics, such vicious cycles are usually known as “underdevelopment traps.” Following a recent study by Matsuyama (2008), un-

derdevelopment traps are defined as self-fulfilling economic conditions through which countries become stuck in a vicious cycle of persistent underdevelopment. They are sometimes also known as “development traps,” “low development traps,” or “poverty traps.” These four terms may have slightly different meanings depending on individual interpretation. However, at least in theoretical economic models, these terms are always treated the same.

Researchers, policymakers, and international development agencies, such as the World Bank and International Monetary Fund, have widely recognized that the issues of underdevelopment traps are not limited to people in least developed countries only, but are global problems. Globalization and economic interdependence implies that the whole world is vulnerable to these problems. Indeed, rescuing least developed countries and anti-poverty policies has always been among the top priorities of the United Nations Development Program (UNDP). Although these issues may be considered the most challenging to solve, it is now widely recognized that underdevelopment traps can be broken if appropriate development policies are implemented effectively.

However, designing effective development policies that can save countries from these traps requires critical understanding of their roots by considering different angles. Why have these countries not developed like others? How can we explain these differences of development? How can we save these countries from underdevelopment traps? Why do these vicious cycles of underdevelopment traps persist despite many policies and efforts to counter them? Even though considerable research effort, both theoretical and empirical, has been devoted to understanding these questions, the fact that the problems remain and are severe implies that more research, especially theoretical analysis, could

provide more insights and understanding about the causes and mechanisms that generate these traps.

1.2 Significance of the Dissertation

In order to shed some new light on the issues of development traps as described above, this dissertation provides theoretical economic analysis on several topics related to economic development and microfoundational roots of low development traps. The subsequent chapters of the dissertation are organized as follows.

Chapter 2 is a literature review of theories on political economy of development. Well-functioning market and economic systems need well-designed political institutions. A significant factor for economic development is critical understanding of the microfoundations and mechanisms through which politics can influence the economic system. Political and development economists have for a long time studied the two fundamental roles of politics in the economic system, as follows. (1) What are the most appropriate political institutions conducive to economic development? (2) How is a government held accountable to act in the interests of society? Chapter 2 contributes to the literature by discussing well-known economic theories that have shed light on these two puzzles. First, the literature survey focuses on theories that analyze the relationship between democracy, a form of political institution adopted by most countries in the world, and development. Four main channels through which democracy influences the market system and economic development are discussed, namely, innovation, inequality, protection of property rights, and natural resource endowment. Second, insights into how to achieve high levels

of government accountability that enhance the social welfare can be obtained from the principal–agent models of political economy. The discussion on this issue centers around the roles of information, elections, and news media in promoting public accountability. In addition, recent theories that incorporate concepts from behavioral political economics are presented to obtain new insights in this area of research.

Chapter 3, 4, and 5 propose new theoretical models for the analysis of the causes of underdevelopment traps, considering institutional, cultural, and political perspectives, respectively.

Chapter 3 studies the roles of institutions that may lead to different levels of development equilibria in a static model of the resource curse. Chapter 3 proposes a new economic model of the resource curse, by incorporating the roles of foreign investment and institutions. The resource curse, which refers to the tendency that countries abundant in natural resources perform worse economically than those with scarce natural resources, is a surprising paradox in the economic development literature. It has been pointed out that corrupt institutions, for example, via rent seeking and patronage, are the causes of the curse (e.g., Torvik, 2002; Mehlum, Moene, & Torvik, 2006; Robinson, Torvik, & Verdier, 2006). Moreover, it can be observed that resource-rich countries with poor institutions that suffer from the resource curse tend to lack capital and advanced technology. They depend heavily on foreign investment firms that possess higher technology for extraction of some kind of natural resource, such as mineral ores and oils. This indicates that foreign investment has to be considered in the resource curse analysis. In addition, there is a recent trend for an increasingly significant role of foreign investment from some develop-

ing countries, known as the South, with corrupt institutions, as a substitute for foreign investment from developed countries, called the North, with non-corrupt institutions. These two sources of foreign investment are particularly different from each other when investing in a corrupt environment. While foreign investors from the North are usually discouraged by corruption, foreign investors from the South tend to be less deterred by corrupt institutions in host countries. Foreign investors from the South are more efficient at investing in corrupt host countries than their counterpart foreign investors from the North because the former have more experience doing business in and dealing with corrupt environments at home. This chapter proposes a simple model in which the role of North and South foreign investment and institutions can be examined in the resource curse literature. The main focus of our model is to investigate the effect of institutional quality of the source countries of foreign investors on development via the lens of the rent-seeking channel of the resource curse. The model predicts that the prevalence of foreign investors from the South may complement rent-seeking activities in the host countries, which eventually leads to lower total income of the economy and magnifies resource curse impacts.

Chapter 4 studies the causes of underdevelopment traps from the perspectives of cultural economics. The choices and interactions of individual agents in the market can be considered the direct causes of different development paths, and institutions can be perceived as the factors that determine the rules of a game and affect the incentives of those agents. However, there is one more factor to consider: culture. Cultural factors, such as norms, beliefs, and preferences, are the fundamental factors that not only support the exis-

tence of different institutions, but also have direct influences on the incentives and choices of individual economic agents. Cultural factors have both direct and indirect effects on the economic development process. Moreover, the fact that cultural factors usually have deep roots and long history in a society, and thus, are hard to change, implies that these factors may be the roots of the persistence of different development paths in different economies. Taking into account the significance of cultural factors on economic development, Chapter 4 proposes a dynamic model of intergenerational cultural transmission to investigate the roles of cultural factors, particularly social capital, on the development paths of different economies. Under a setting in which different cultural norms may support different production types, this model predicts that countries with initially different accumulation of social capital may end up on different development paths. Countries with sufficient social capital to support more efficient modern production will converge to high development equilibrium, while those with cultural norms that are favorable only for less efficient traditional production will end up in low development equilibrium. Moreover, the complementarity between different types of production and the cultural norms that support them implies that the development of traditional production will in turn strengthen the cultural norms that support it. This creates a vicious cycle of underdevelopment traps. Furthermore, our model in Chapter 4 provides an explanation of the resource curse phenomena that may occur in some countries, but not others, from the perspective of cultural economics.

It cannot be denied that a main obstacle to development, especially in least developed countries, is corruption. It is commonly perceived as hav-

ing detrimental impacts on economic development because it causes inefficient allocation of resources, hinders investment, and exacerbates poverty. More seriously, corruption is always viewed as a widespread and persistent phenomenon in these countries. Despite many endeavors to fight corruption, it still feeds on itself and continues to exist over time, causing a vicious cycle that leads these countries to become stuck in underdevelopment traps. Therefore, an analysis of the roots of persistent corruption is significantly important for the study of underdevelopment traps. In contributing to understanding this issue, Chapter 5 constructs a principal-agent model to provide a rationale for this persistence of corruption from the perspective of political economy. The model argues that political expectations or beliefs of voters about corruption may be self-fulfilling. In other words, public skepticism about corruption may lead to the vicious cycle of persistent corruption. In democratic countries, the election and voting mechanism for voters is an important tool that determines the accountability level of politicians to the public. Politicians who desire to hold public office are regulated by the motivation for re-election. If properly used, the election and voting mechanism can become an effective reward for good behavior and a punishment for corruption. That is, citizens vote for non-corrupt incumbents and vote against corrupt ones. However, voters' skepticism about corruption can cause these important tools to deteriorate. When voters hold firm beliefs that all politicians are similarly corrupt, they create a voting mechanism in which there is more tolerance of corruption and less reward for non-corrupt behavior. Taking into account voters' expectations about corruption and the corresponding chance of re-election, the more skeptical voters are, the more likely are incumbent politicians to behave corruptly.

Lastly, Chapter 6, summarizes the results of the dissertation, with suggestions on policy implications and directions for future research in related fields.

Chapter 2

Political Economy of Development and Accountability: A Survey of Theories

2.1 Introduction

Economics cannot be separated from politics. Both economic historians and modern economists have acknowledged the inseparable interrelation between politics and economics. Thriving markets require well-designed systems of both economics and politics. Fundamental economic factors, such as externalities, imperfect competition, monopoly, and public goods provision, create market failure and the need for government intervention. The question is: how do we design an appropriate public intervention to ensure proper functioning of the market and optimal social welfare?

Political economists have emphasized at least two fundamental political roles in the economic system. First, the economy needs well-designed political institutions that provide political leaders or the government with enough authority to govern the state effectively, and intervene in markets using the right policies at the right time. The government must be sufficiently strong to

ensure stability and security of the country, protect property rights, enforce contract law, implement regulations on industrial competition, efficiently redistribute resources in the society, and provide public goods.

However, a government run by politicians who, like economic agents, act in their self-interest may become the focus of corruption. The negative side of a strong and unconstrained government is that such government may confiscates the wealth of its citizens at large to reward a small group of the powerful. Politicians who maximize self-interest choose public policies that contradict socially optimal ones in favor of their group. Moreover, the motivation and competition for power to capture the state always induce wasteful efforts and misallocation of resource and talents. Hence, another challenging task for political economists is to identify conditions under which the government can be held accountable and act in the interests of its citizens. This requires tools for constraining the government's ability to confiscate public wealth and/or aligning its interest with social welfare. The solution to these problems lies in the two basic elements of political agency theories: incentives and selection (Besley, 2006). Political economists need to understand key factors that affect the incentives of policymakers so as to identify political foundations that ensure accountable government. Moreover, since the government is run by political leaders, having a virtuous leader whose interest is aligned with social welfare or who is inherently benevolent can result in a good government.

This implies that economists must also strive to understand the mechanisms of political selection. In a democratic society, citizens vote to elect the government. The voting mechanism, information structure, and strategic interaction between voters and politicians are key factors that determine

whether right incentives are provided to politicians, and whether the right candidates are selected for public office.

In order to obtain insights into these two fundamental roles of politics in the economic system, this chapter discusses contemporary political economic theories that seek to understand the political foundations of economic performance and public accountability. The chapter focuses on analytical approaches that are built on the foundations of microeconomics and game theory. The structure of this theoretical review is organized as follows. Section 2.2 discusses theoretical literature that provides insights into the influence of political institutions on economic performance. Section 2.3 focuses on the literature of political agency theories that shed light on the link between politics and public accountability. Theoretical approaches that incorporate insights from behavioral economics into the study of political economy are presented in Section 2.4. Lastly, Section 2.5 concludes the literature survey.

2.2 Political Institutions and Development

In their famous book, “Why Nations Fail,” Acemoglu and Robinson (2012) provide a compelling explanation that it is man-made political institutions that determine the prosperity of nations. Although the roles of political institutions are significant, it is not easy to understand what forms of political institutions are growth enhancing. Similar political institutions in two different nations may lead to different economic performances in each country. Meanwhile, two countries that differ politically can enjoy similar economic prosperity. Understanding these issues requires detailed and critical analysis at the micro level of the economy. For instance, the simple question, yet diffi-

cult to answer, is whether and when democracy is good for economic growth. Empirical studies always provide mixed and ambiguous results. Indeed, to answer this question, one must analyze the micromechanisms through which democracy may promote or hamper growth. There are at least four main channels through which political institutions, particularly democratic institutions, affect economic performance, that is, innovation, inequality, property rights protection, and natural resource abundance.

2.2.1 Democracy, Innovation and Growth

In support of democracy, economists have argued that democratic institutions reduce corruption and facilitate industrial competition. Generally, thanks to higher political accountability, democratic regimes are associated with lower protection of vested interests and lower entry barrier in markets than authoritarian regimes. In turn, free entry and exit by competitive firms promote innovation and technological advancement in the industry. If democracy promotes growth through the channel of innovation, how can one explain differences in economic performance in two similarly democratic nations?

Aghion, Alesina, and Trebbi (2007) develop a formal theory that provides a unified and plausible explanation for this puzzle. The basic argument of their study is that political institutions may have different impacts on different sectors of the economy. Depending on initial industrial and technological characteristics of a market, democracy may enhance or hamper productivity growth.

In their setting, there is one incumbent monopoly firm in each sector for each period. Each incumbent may be an advanced firm with frontier produc-

tivity or a backward firm with below-frontier productivity. Each incumbent monopoly faces the threat of entry by new firms that, if they possess higher productivity, may replace the monopoly in the next period. The probability of entry is directly determined by a politician. His payoff increases with the average productivity growth in the economy and his aggregate welfare concerns, but he may also accept bribes offered by the incumbent firm to limit entry. The parameters of the politician's aggregate welfare concerns reflect the quality of democracy, which imposes constraints on his corrupt behavior.

The model predicts three important results. First, democracy promotes innovation in more advanced sectors. Second, the mechanism through which democracy promotes innovation is the freedom of entry in the market. Third, combining the first and second implications, the model concludes that an economy with more advanced sectors benefits more from democracy in terms of growth.

To understand the intuition behind these results, first consider the incumbent advanced firm in the last period that faces the threat of a potential entrant with cutting-edge technology. The incumbent has two choices: (1) to bribe the politician to prevent entry, or (2) to use its first-mover advantage and innovation to block entry.¹

Higher (lower) quality of democracy increases (decreases) the cost of bribing the politician relative to innovation cost, and thereby, induces advanced firms to choose innovation (bribes) to deter the entry of new firms. On the other hand, incumbent backward firms in the last period will always be re-

¹Note that the potential entrant will not enter the market if it realizes that the incumbent possesses the same productivity, which is true in the case in which the advanced incumbent firm succeeds in innovation, as the model assumes a homogeneous productivity growth rate.

placed and earn zero profits if entry occurs regardless of its innovation decision, because the incumbent can never catch up to the frontier technology. Since the incumbent's profit decreases with the probability of entry, a more democratic system, and thereby, a higher threat of entry, discourage innovation by incumbent backward firms at a given innovation cost.

When considering the effect of democracy on economic growth through the mechanism of freedom of entry and innovation, it should be expected that democracy fosters growth in an economy with more advanced sectors, where growth relies on frontier innovation, but may hinder growth in an economy with backward sectors, where growth is induced by imitation of existing technology.

2.2.2 Democracy, Inequality, and Growth

Another mechanism through which democracy may enhance or hinder growth lies in the argument of inequality, redistribution policies, and investment. Persson and Tabellini (1994) is among the earliest studies to develop a formal model to examine this issue.² This study predicts a negative impact of democratic voting on growth when inequality is considered because the redistribution of resources from the rich to the poor reduces investment. To understand this argument, consider an economy that is populated by a continuum of overlapping individual citizens who live for two periods, young and old. They differ in their initial capital and skill endowment, which they use for consumption and investment. All young individuals have to vote on redistribution level, which will be applied to them when they are old. The utility maximization of

²A similar model and argument is also discussed in Alesina and Rodrik (1994).

each individual produces two immediate predictions: (1) lower initial income and a higher redistribution level reduce investment capital; and (2) poorer citizen demands higher levels of redistribution. In a majority voting game, the equilibrium level of redistribution is decided by the median voter. More inequality means that the median voter becomes poorer and demands a higher redistribution level, which in turn reduces capital investment and growth in the economy.

In line with this finding, Cervellati, Fortunato, and Sunde (2006) develop a model in which different types of political institutions, which arise under different levels of economic development and income inequality, determine the performance of the economy. Based on the argument of social conflict and resource redistribution, they argue that democracy is better for economic performance only in an economy with sufficiently small inequality, but oligarchy is better in the case of high inequality.

2.2.3 Democracy and Property Rights

Secure property rights are critical and conducive to growth (North, 1990). However, it remains controversial whether democracy is better for safeguarding property rights. An argument against democracy is made by conservatives and socialists, who argue that majority rule provides the larger group of the poor with authority to use democracy to confiscate the private property of the rich minority. This group of researchers predicts that the combination of democracy and capitalism is inherently unstable because the rich, who are usually threatened by expropriation by the poor, will respond by using their available resources and power to subvert democracy (Przeworski & Limongi,

1994).

On the other hand, proponents of democracy treat this conclusion as too extreme and point to the evidence that at least 14 developed nations have been both democratic and capitalist for more than half a century (Przeworski & Limongi, 1994). They argue that effective enforcement of regulation and the rule of law in a democracy at least could provide more credible commitment to property rights protection compared to an authoritarian regime whose survival usually depends on plundering the society. However, proponents of democracy never provide a formal model of the democratic process that ensures credible commitment to property rights protection.

Unlike the innovation and inequality channel, the property rights channel of democratic influence on economic development remains a controversial argument.

2.2.4 Political Institutions and the Resource Curse

One of the most surprising paradoxes in the economic development literature is the paradox of plenty, or the resource curse.³ The basic notion is that most resource-rich countries tend to have worse economic performance than those with scarce natural resources. Acknowledging the existence of the resource curse, economists have devoted great efforts to explain the roots of this curse. Efforts to understand this phenomenon can be divided into two strands of literature: economic and political foundations of the resource curse.

The literature on the economic foundations of the resource curse lies at the

³These two terms are used interchangeably in the literature and are sometimes known as “reversal of fortune.”

heart of the Dutch disease theory, in which the mechanism of poor economic outcomes results from productivity loss, decline in national competitiveness, and contraction of modern production sectors due to such arguments as currency appreciation, decline in terms of trade, revenue volatility, and lack of economic diversification.⁴ The political foundations of the resource curse are based mainly on two types of theories: rent seeking and patronage. This study skips the first strand of literature on the economic foundations and devotes the following two subsections to discussing the two types of models in the political economy of the resource curse.⁵

Rent-Seeking Models

The concept of rent seeking was pioneered by Tullock (1967) and then labeled by Krueger (1974). In political economics, rent seeking generally refers to the use of resources to increase one's share of existing rents without creating more wealth through the political arena. Insights from rent seeking have been used widely to explain the economic welfare loss resulting from political lobbying for monopoly privilege, subsidies, and taxation. In the resource curse literature, the underlying argument is that political institutions favorable for rent-seeking activities result in the failure of the state to realize the blessing from natural resources.

In general, resource abundance generates two competing effects. It di-

⁴For details, refer to Van Wijnbergen (1984), Krugman (1987), Sachs and Warner (1999a), Torvik (2001), and Van der Ploeg (2011).

⁵The motivation behind the discussion of the political foundations of the resource curse, rather than the economic ones, is that they not only are relevant to this survey, but also tend to provide better explanations and are more consistent with empirical evidence (Kolstad & Wigg, 2009).

rectly increases income (income effect), and it causes a displacement in productive sectors by inducing wasteful allocation of entrepreneurial talents and resources in unproductive rent-seeking activities, which eventually decreases income (displacement effect). The resource curse occurs when the latter effect dominates the former effect.

There are numerous studies on rent-seeking models in the resource curse literature, which differ in the mechanisms through which the displacement effect dominates the income effect. These studies include, among others, Tornell and Lane (1999) on voracity; Hodler (2006) on fractionalization; Torvik (2002) and Mehlum, Moene, and Torvik (2006) on misallocation of entrepreneurs; and Van der Ploeg and Rohner (2012) on violent conflict.⁶

In order to gain insights into the relationship between political institutions, rent seeking, and the resource curse, the well-known model of Mehlum et al. (2006) is worth discussing. In their model, there is a continuum of entrepreneurs who can choose to be manufacturing producers or rent seekers (grabbers). If they choose to be producers, they will earn profits from modern production in which positive demand externalities exist between producers. If they become rent seekers (grabbers), they can gain political power to capture public rents from natural resources. The size of the rents that grabbers can capture depends on the country's exogenous institutions, which can be interpreted generally as regulatory and democratic institutions, or the rule of law. When an institution is perfectly good, there is no gain in grabbing and resource rents are shared equally among all entrepreneurs. The poorer the institution, the more share of resource rents the grabbers can capture at the

⁶For recent surveys on the political economy of the resource curse, refer to Rosser (2006) and Deacon (2011).

expense of producers. In equilibrium, the allocation of entrepreneurs depends on the relative profitability from the two activities, which are influenced by the institutions..

The model derives two types of equilibria conditional on institutions: (1) production equilibrium in which all entrepreneurs are producers when institutional quality is high; and (2) grabber equilibrium in which some entrepreneurs are producers and some are rent grabbers when institutional quality is low. Moreover, the model shows that resource abundance is a pure blessing for the nation in production equilibrium, but becomes a curse in grabber equilibrium. The former result is straightforward. In the absence of grabbing activities, an increase in resources directly adds to the income of all producers. The latter result is derived from the fact that the displacement effect of an increase in the resources magnified by the positive demand externality between producers dominates its immediate income effect. The opportunity cost of an entrepreneur who becomes a grabber is the forgone profit from production. Additional rents from an increase in natural resources add to the profits of grabbers, resulting in more entrepreneurs moving out of the production sector until a new equilibrium is reached. In the case of fixed opportunity cost of grabbing, the marginal increase in income from a rise in natural resources is fully dissipated by a decline in income from increasing grabbing activities, implying that the two opposing effects are balanced. However, in this model, a positive demand externality between producers implies that more entrepreneurs leave the production sector, thereby reducing the profits of the remaining producers since the demand for their products decreases. As a result, the opportunity cost of grabbing for the remaining producers also decreases, and they follow suit. The

declining opportunity cost is the reason why the displacement effect eventually dominates the income effect and gives rise to the resource curse.

Patronage Models

The patronage models of the resource curse center on the political decision governing the extraction and allocation of state resources. The increase in resource rents makes political power more valuable, but also attracts more challengers for power. In a democratic society, incumbent politicians respond to these effects by using increasing resources to raise their popularity in order to secure power. They can increase their chances of re-election through patronage (i.e., redistribution of state resources to their clients through public employment and investment). Politically motivated public investment creates inefficient allocation of resources, which is harmful to the economy. In addition, incumbents can use additional resources to increase their popularity in efficient ways, such as reducing taxes or making productive investments. Whether natural resources are a curse or blessing depends on the optimal policy choices of the incumbent.

Robinson, Torvik, and Verdier (2006) is one of the well-known studies that provide insightful understanding of this issue. In their model, there is a potential stock of natural resources whose price is determined exogenously by the world market. It can be extracted before and after the election. The output of extraction after election declines by the amount of prior extraction. An incumbent politician initially decides on the amount of extraction and public employment. Since the probability of re-election is less than one, without a permanent resource boom (the increase in resource price), the incumbent

always inefficiently over-extracts the natural resources. In addition, the incumbent can use the natural resources to buy votes from his clients through public job provision. Citizens who are not hired in the public sector will work in the more productive private sector.

A permanent resource boom has three different effects on economic incomes. First, it directly increases incomes. Second, it reduces resource extraction before an election and thereby increases the efficiency of the extraction path (closer to the optimal path) because it is more valuable to be in power in the future. This also raises incomes. Third, more value in future political office induces the incumbent to expand the public sector inefficiently by offering more jobs to his clients to raise his chance of re-election. This has negative impacts on income owing to the transfer of labor from the private sector to less productive public sector. Whether the two positive effects dominate the third effect depends on the quality of political institutions. For example, well-functioning political institutions that hold the incumbent accountable and constrain them from gaining power through clientelism will reduce the third, negative impacts of the resource boom on total income.

These two models of rent seeking and patronage clearly show that better institutions, especially political institutions, are conducive to economic development by preventing the resource curse and allowing the nation to realize the economic blessing of its natural resource endowment.

2.3 Election, Information, and Public Accountability

The study of public accountability centers on the political agency models in which citizens are principals and politicians or government are agents. Besley

(2006) emphasizes that this kind of modelling usually covers four key issues: (1) the nature of the uncertainty (unobservable types of politicians and policy quality); (2) politicians' motives for office (material gain or policy concerns); (3) the nature of accountability (responsibilities and discretion of political leaders); and (4) retrospective voting (the use of past records of policy outcome for future voting decisions).

Political agency models may be categorized into three types depending on the nature of asymmetric information in the delegation relationship between voters and politicians (Besley, 2006). The first type is based on pure moral hazard (hidden actions) in which all political leaders are assumed alike in their desire to shirk, and care only about their agenda. In this framework, voters must choose a re-election mechanism that can discipline the politician by providing them with correct incentives, particularly, re-election chance and future rents. Another type of model focuses on pure adverse selection (unknown competence or honesty of politicians) in which the voters' key issue is to recruit the right politicians for public office. The third type of model combines the problems of moral hazard and adverse selection in one framework. This kind of approach is more challenging, but more effective in the sense that it reflects reality better. In such models, both competence and actions of politicians are unknown to voters. The key analyses center on the use of public policy choices by politicians as a signal device to differentiate themselves from each other. This creates two possible distortions. Good incumbents may exaggerate their actions to prevent imitation by bad ones, while the latter may try to pool with the former to increase their probability of re-election.

These two distortions give rise to two fundamental issues in the politi-

cal accountability literature: populism (pandering), and discipline–selection trade-off. A politician is said to pander to the electorate or is considered a populist politician when he adopts a policy that is *ex ante* popular with the majority of voters, even though he receives information revealing that the popular policy contradicts the voters’ interests (Ashworth, 2012). This behavior results from the fact that a politician who cares more about re-election always wants to maximize voters’ expectations of his type. If voters’ beliefs about an incumbent’s type are conditional on his policy choices and choosing a popular policy induces voters to believe that he is of good type, pandering would be his optimal strategy. Pandering is always detrimental to voters’ welfare. In order to hold a politician accountable and act in voters’ interests, one must understand the voting mechanism and information structure that eliminates his incentive to pander to the electorate. The concept of the discipline–selection trade-off refers to the fact that the voting mechanism and information structure that disciplines a bad politician to act in voters’ interests would also reduce the voters’ ability to screen good politicians from bad ones, making it less likely to elect the former for the next period. How to achieve the highest possible public accountability in the presence of this trade-off is another challenging question in the study of public accountability.

The next two subsections discuss recent theories that apply the concepts of populism and discipline–selection trade-off in the study of public accountability. Moreover, as mentioned above, information asymmetry is the root of these political distortions. Therefore, the study of the sources that provide information to voters, particularly news media, is indispensable in understanding how to achieve accountability. Indeed, researchers have devoted great efforts

in the last decade to the study of the behavior and political outcomes of news media. Previous literature that provides extensive surveys (both theoretical and empirical) of the political economy of mass media includes, among others, Prat and Strömberg (2011) and Sobbrío (2013). The third subsection provides a brief discussion of theories that explore the link between news media and electoral accountability.

2.3.1 Populism: Pandering Models

Canes-Wrone, Herron, and Shotts (2001) provide a good baseline model for the study of pandering theory. They develop a model that identifies conditions under which elections may or may not give policymakers incentives to pander to the electorate.

In the model, there are two periods and an election held at the end of period 1 in which a representative voter elects an executive policymaker for period 2, who may be an incumbent executive or a challenger. Both of them may be either high or low quality. The probability that an incumbent and a challenger are high quality is their private information and is denoted by $\kappa \in (0, 1)$ and $\gamma \in (0, 1)$, respectively. The incumbent in period 1 is exogenously given. An incumbent has to make a policy choice $x \in \{A, B\}$ in each period. The policy outcome depends on the uncertain state of the world, $\omega \in \{A, B\}$. The politician in office and the voter each have a utility of 1 if $x = \omega$, and 0 otherwise. Since ω is uncertain, the voter can observe only the policy choice and not its outcome before the election. However, the uncertainty about the state may be resolved after policy adoption with probability $\rho \in (0, 1)$. If uncertainty is resolved, denoted as $\omega = A$ and $\omega = B$ for each state, the voter

learns the true state before election. If uncertainty is not resolved, denoted as $\omega = \phi$, the voter is uncertain about the state, but has prior beliefs that A is more likely to be a true state, that is, $\Pr(\omega = A) \equiv \pi > 0.5$.

The incumbent is better informed than the voter about the state. A high-quality incumbent receives a perfect signal, $s = \omega$, while the signal of the low-quality incumbent is correct with probability $q > \pi$. The voter prefers a high-quality politician who delivers higher utility to him. Let $\bar{\mu}^H$ denote the voter's posterior belief about the probability that the incumbent is high quality. The voter re-elects the incumbent if $\bar{\mu}^H > \gamma$. He updates his belief about the incumbent's quality after observing the policy choice and uncertainty resolution of the state. The perfect Bayesian equilibrium of the posteriors given the policy choice and uncertainty resolution can be ordered as follows:

$$0 = \bar{\mu}_{\omega=B}^H = \bar{\mu}_{\omega=A}^H < \bar{\mu}_{\omega=\phi}^H < \kappa < \bar{\mu}_{\omega=\phi}^H < \bar{\mu}_{\omega=A}^H < \bar{\mu}_{\omega=B}^H < 1$$

When uncertainty is resolved ($\omega = A$ or $\omega = B$), the voter knows that the incumbent is low quality when $x \neq \omega$, and has a very high posterior expectation of his quality when $x = \omega$. The latter case is strictly less than 1 because of the possibility that the low-quality incumbent sometimes chooses $x = \omega$. When uncertainty is not resolved ($x = \phi$), the posteriors are higher (lower) than the ex ante probability that the incumbent is high quality (κ) if he adopts policy $A(B)$. This is because the voter believes that A is more likely than B to be a true state and that a high-quality incumbent obtains a better signal that matches the state than the low-quality incumbent.

Next, consider the incumbent's strategy using backward induction. Since the election is held only at the end of period one, the incumbent always follow his signal to adopt a policy in period two. However, he has two objectives

when choosing a policy in period one: maximize his current payoff by adopting a correct policy (i.e., following his signal, $x = s$), or maximize $\bar{\mu}^H$ to increase his re-election chance to enjoy payoffs from holding future office. Given the above voter's posteriors, the incumbent policy choice may fall into two types of equilibria, conditional on γ and ρ : true equilibrium, in which all incumbents choose the policy by following their signal (true leadership or perfect accountability), and pandering equilibrium, in which a low-quality incumbent sometimes adopts a popular policy ($x = A$) even though his signal suggests that it is incorrect ($s = B$). True equilibrium can only arise under three cases: (1) when the incumbent's quality is far better than the challenger $\gamma < \bar{\mu}^H$; (2) when the incumbent's quality is much worse than that of the challenger $\gamma > \bar{\mu}^H$; and (3) when the uncertainty resolution probability is sufficiently high. Otherwise, pandering equilibrium arises. Cases 1 and 2 are straightforward. Since pandering cannot increase re-election chance in these two cases, following his signal is optimal for the incumbent. The intuition behind Case 3 is derived from the voter's posterior that $\bar{\mu}_{\omega=\phi}^H_{x=B} < \bar{\mu}_{\omega=\phi}^H_{x=A}$, which creates incentives for pandering. In particular, the voter increases his posterior belief about the incumbent when observing policy A , and decreases it when observing policy B . This matters a lot for the incumbent when the ex ante reputation of the challenger is similar to his, $\gamma \in (\bar{\mu}_{\omega=\phi}^H_{x=B}, \bar{\mu}_{\omega=\phi}^H_{x=A})$. The voter requires a higher burden of proof from the incumbent who adopts unpopular policy. He always re-elects the incumbent who adopts a populist policy unless he is proved wrong, but only re-elects the incumbent who adopts unpopular policy if he is proved right. Such an asymmetric burden induces the incumbent who seeks re-election to adopt a populist policy even though it disagrees with his signal.

However, if the uncertainty is resolved, the incumbent will win the election if and only if he adopts the correct policy, and so, he will follow his signal if the uncertainty resolution chance is high enough, $\rho > \bar{\rho}$. The cutoff $\bar{\rho}$ depends on the low-quality incumbent's future discount factor, the accuracy of his signal, and his belief about the probability that popular policy is correct when $s = B$.

The result from Canes-Wrone et al. (2001) clearly indicates that information asymmetry induces pandering behavior. One may expect that better informed voters about the correct policy choice would improve a policymaker's accountability. Motivated by this argument, Ashworth (2010) extends the baseline model of Canes-Wrone et al. (2001) by adding media commentary about the merits of the incumbent's policy choice to investigate its influence on his incentives to pander. However, the analysis of Ashworth (2010) suggests that reports of independent media reduce the pandering incentives of the incumbent who faces a challenger with a low reputation, but may induce more pandering incentives when the challenger has a high reputation. This is because the informative commentary of the media about the state decreases the asymmetric burden of proof between the adoption of popular and unpopular policy in the former case, but increases it in the latter case. Moreover, the most interesting result of Ashworth (2010) is that in some circumstances, a "yes man" media may improve the policymaker's accountability. The argument is that independent media do not always receive a perfect signal. When the media's signal is less precise than that of the incumbent, truthful reports based on this signal may add more misleading critique on an already unpopular policy. The "yes man" behavior of the media in this case reduces the incumbent's fear of dismissal from adopting the right, but unpopular, policy.

Maskin and Tirole (2004) use the concept of populism to compare the merits of three different types of constitutions—a specification of who gets to decide what—in improving public officials’ accountability and public welfare. They show that representative democracy (public policy is decided by politicians subject to re-election) is inferior to direct democracy (referendum decides the policy), and judicial power (a non-accountable official, a judge, decides the policy) when the office-holding motives of politicians are relatively stronger than his policy concerns. This is because representative democracy under such conditions is associated with pandering behavior.

Frisell (2009) constructs a theory of self-fulfilling prophecy of populism. His work is motivated by the fact that some nations keep repeating the same mistake of adopting incorrect policy and never learn. The model explains that this repeated mistake is a perfectly rational response to distorted political incentives induced by voters. In particular, his model predicts that the incumbent’s incentive to pander increases when voters expect him to be populist. This is because voters’ beliefs about the probability that the incumbent is corrupt when he fails to conform to public opinion is higher under populist expectations than under candid expectations. This model provides further insight into populism by emphasizing the effect of public trust in politicians on pandering incentives.

2.3.2 Discipline–Selection Trade-off

The baseline model developed by Besley (2006) is a good starting point for gaining insights into the discipline–selection trade-off.

In this model, there are two periods $t \in \{1, 2\}$, and in each period, the

elected politician makes a political decision $e_t \in \{0, 1\}$, which yields payoffs to himself and voters depending on the state of the world $s_t \in \{0, 1\}$. Voters can observe their payoffs, but not the incumbent's political action. The politicians may be one of two types: congruent and dissonant. The probability that a politician randomly selected from the pool is congruent is $\pi \in (0, 1)$. A congruent politician has payoffs aligned with voters. He receives payoffs Δ when $e_t = s_t$. Otherwise, he receives zero payoff. The dissonant politician obtains private rents, denoted as $r \in [0, R]$ when choosing $e_t \neq s_t$, where r is independently drawn from a cumulative distribution function $G(r)$ with mean of μ , and 0 otherwise. Besides payoffs from political actions, all politicians earn payoffs E from holding office regardless of their type and political action. All voters and politicians have a common future discount rate $\beta < 1$. The model assumes $R > \beta(\mu + E)$ to ensure that dissonant politicians sometimes make political decisions that contradict voters' interests.

The timing of the game is as follows. Nature determines s_t , π and draws r_t from $G(r)$. A period-1 incumbent is randomly elected, who then makes a political decision. Voters observe their period-1 payoffs and decide whether to re-elect the incumbent. The elected politician makes a political decision in period 2 and all players obtain the payoffs.

Now, consider the voters' strategies. They always prefer a congruent politician and will re-elect the incumbent if their posterior belief about the probability that he is congruent upon observing their period-1 payoffs, denoted as Π , is larger than π . The voters use Bayes' rule to update their beliefs. If the voters observe 0 payoffs, they know the incumbent must be dissonant and thus, will vote against him. On the other hand, the voters' beliefs that the

incumbent is congruent upon receiving the payoffs Δ is $\Pi = \frac{\pi}{\pi + (1-\pi)\lambda}$, where λ denotes the probability that the dissonant incumbent may choose $e_t = s_t$ to mimic the congruent politician. λ reflects the political discipline on dissonant politicians. Note that $\Pi \geq \pi$, implying that voters will re-elect the incumbent who produces payoffs Δ .

This posterior gives rise to the following result of the incumbent's strategies. The congruent incumbent always chooses $e_t = s_t$ in both periods, while the dissonant incumbent always chooses $e_t \neq s_t$ in period 2. However, the dissonant politician chooses $e_t = s_t$ in period 1 if he earns sufficiently small rents from being dissonant. This clearly shows that sufficiently small dissonant rents in period 1 relative to the payoffs from holding office in period 2 induce the probability that a dissonant politician pools with the congruent one, particularly, $\lambda = G(\beta(\mu + E))$.

Finally, the voter's total welfare for both periods is given as $W(\lambda) = [\pi + (1 - \pi)\lambda]\Delta + \pi[1 + (1 - \pi)(1 - \lambda)]\Delta$. The first and second terms on the right-hand side are voters' payoffs in periods 1 and 2, respectively. An increase in λ raises voters' period-1 payoffs, but decreases the period-2 payoffs. The former shows the positive welfare effects of improvement in political discipline by the voting rule imposed on dissonant politicians, while the latter shows the negative welfare effects of the disciplinary improvement that decreases the voters' ability to screen the dissonant incumbent. In this model, the former effect dominates the latter effect, implying that an increase in λ raises the total welfare. This is because voters' payoffs always increase with the improved discipline whenever there is a dissonant incumbent in period 1, but voters only gain more payoffs from improvement in screening when the dissonant

incumbent is replaced by the congruent one in period 2. However, this is not always the case. In other settings, the relative significance of the two effects on voters' welfare may be reversed or ambiguous.

Since political distortions are the result of asymmetric information in which voters cannot know the true type of the politicians, one should expect that providing better information to voters always improves political accountability. However, the existence of the discipline–selection trade-off shows that this is not necessarily true. Besley (2006) extends this baseline model by adding two more assumptions on the voters' information structure. First, voters cannot perfectly observe the outcome of political actions before the election. Some political policies (e.g., fighting a war) may take a long time before its outcome is revealed. In particular, voters observe Δ after the incumbent picks e with probability $\chi \in (0, 1)$. Second, with probability $\tau \in (0, 1)$ voters may receive some information about the true type of the incumbent from some sources other than his political actions. For instance, voters may obtain information from the media, academics, or think-tanks. The model predicts that improvement in χ always increases voters' welfare for the same reason as in the baseline model. However, the increase in τ need not always improve voters' welfare, and may reduce it if there are sufficiently few congruent politicians in the pool (small π). This is because a positive selection effect of better information about the incumbent's type is insignificant when π is very small, as the dissonant incumbent is more likely to be replaced by another. However, higher τ reduces the dissonant incumbent's incentive to mimic the congruent incumbent and thus, reduce voters' welfare (negative discipline effect). Besley (2006) concludes that the effects of improvement in voters' information

on electoral accountability must be treated carefully to balance the discipline and selection effects.

Prat (2005) develops a model that differentiates the effects of information on actions and information on outcomes by applying the concepts of both discipline–selection trade-off and pandering. He emphasizes that better information about the outcome of political actions improves accountability as it allows voters to screen and discipline the incumbent based on the signals related to their ex post utility. However, the improvement in information about incumbents’ actions induces politicians to disregard his better signal and to pander to voters’ prior beliefs about able-agent behavior. Since the incumbent makes a poor decision and all politicians act in the same way, accountability is damaged in terms of both discipline and selection.

Ashworth and Bueno de Mesquita (2014) develop two canonical models (ideological policy choice and effort choice models), which take into account the strategic interaction between politicians and voters. Both models predict that voters’ welfare is sometimes higher when voters are imperfectly informed. They argue that under this case, the bad politician⁷ must balance the desire to choose his preferred policy or effort level and the desire to improve his re-election chance, which provide higher welfare to voters. In this case, the effects on voters’ welfare are similar to the discipline–selection trade-off. However, under perfect information about policy choice or effort level, bad incumbents only have two extreme choices: (1) to fully imitate the good incumbents when re-election is stronger, or (2) to completely choose their preferred policy or

⁷To distinguish politicians’ types, in the original study, the authors use the terms “extreme” and “moderate” politicians in the ideological policy model, and “low-ability” and “high-ability” politicians in the effort choice model. Here, for simplicity, the terms “bad” and “good” politicians are used for both types of models.

effort level and forgo re-election. The strength of re-election motivations depends on the relative weight of current and future payoffs, which is the same for voters and politicians. Thus, it is obvious that when future payoffs are more important, informed voters obtain higher payoffs in the current period, but lower payoffs in the future, than uninformed voters. However, when the present is more valuable, informed voters obtain lower current payoffs, but higher future payoffs, than uninformed voters.

2.3.3 News Media

Research on the role of news media in public accountability mainly focuses on three aspects of media: coverage, capture, and bias. The literature that focuses on the first aspect is particularly interested in the study of endogeneity and accountability effects of media coverage, which concern the amount of news that the media covers about different political issues, how it is delivered to various groups of voters, and how politicians respond to the coverage. Studies of media capture consider the conditions under which media can be free from capture by politicians or collusion with interest groups, and how free media can improve accountability.

On the other hand, researchers who study media bias are concerned with the reliability and truthfulness of information or news reported by the media, which itself is subject to bias for various reasons. These researchers seek to understand the news market and political environments that may lead to the systematic bias of the media, and the effects of these distortions on public accountability.

Media Coverage

To investigate the effect of media coverage on public policy, Strömberg (2004) constructs a model that combines the model of media competition with political competition.

In this model, politicians deliver their binding campaign promises of public expense allocations to voters through mass media. Voters consume news because they need information about future public policies so that they can take proper private action to maximize benefits from those policies, but at the same time, they also consume political news on which they base their voting decisions. Mass media earn revenue from consumers and advertisers, and operate under increasing return-to-scale technology. For example, the cost of producing a first TV program or a first newspaper is high, but the extra cost of obtaining an additional TV viewer or printing another copy of the newspaper is very small. Under these assumptions, the model predicts that increasing return to scale and advertising finance induce mass media to provide more news to large groups and groups that are more valuable to advertisers, and that government spending increases with news coverage. The reason for the latter result is because media coverage affects the efficiency of political campaign promises to the electorate, and an increase in spending in the area that receives more news increases votes for politicians. Moreover, Strömberg (2004) emphasizes that the rise of broadcast media (TV and radio) as a substitute for newspapers in providing political news could induce favorable public policy to poor people in rural areas. This is because news transmission via radio has an extremely low marginal cost of delivering news to those areas, relative to the physical distribution of newspapers.

In line with these results, Prat and Strömberg (2011) build an endogenous model of news coverage and predict that the media covers more issues that concern the larger group, the group that has larger advertising potential, and the group to which it is cheaper to deliver news. Moreover, they predict that voters with media access are more able to have accountable representatives and favorable policies, and that politicians are more accountable on issues covered in the media.

Media Capture

Besley and Prat (2006) develop a two-period retrospective voting model of pure moral hazard in which government may capture the media. In their model, voters cannot directly observe true types of politicians (good or bad) and the outcomes of policy choices, which solely depend on the politicians' type. To discover the true type of the incumbent, they rely on better informed media. However, the incumbent may capture and silence the media by offering bribes. They predict that media pluralism (number of media outlets) and independent ownership reduce media capture by the government, and that media capture reduces political turnover and voters' welfare. A larger number of media outlets makes it more costly for the government to silence all of them. The cost of capture becomes extremely large when only one media outlet is enough to reveal true information to all voters, and publishing true news, instead of remaining silent, provides the media with commercial revenue. The government has to pay each media outlet as if it were a monopoly provider of the information. This is because each time the government pays an outlet to silence it, the commercial profits of the remaining outlets increase due to less

commercial competition. Similarly, independent ownership (i.e., media owned by private firms instead of the state) makes it more difficult for the government to transfer bribes to the media industry, and thus, there is a higher transaction cost of capture. The reason that media capture reduces political turnover is because voters, without information from the media, cannot observe the incumbents' type and fail to vote against the bad incumbent. Lower political turnover in turn reduces the average quality of government and thereby voters' welfare. In addition, Besley and Prat (2006) stress that the more likely are media to be captured, the larger are the political rents. Large office rents increase incentives and ability of the incumbent to capture the media.

The effect of office rents on media is examined in detail by Egorov, Guriev, and Sonin (2009). They explore the link between natural resource abundance and media freedom in a dictatorial regime. In the model, dictators are of two types: competent and incompetent leaders. These leaders have to hire bureaucrats to implement a public project. The success rate of the project depends on the dictators' competency and the bureaucrats' effort. Whether the project is successful affects how people support the dictator. Free media allow the dictator to monitor and induce high-power effort of the bureaucrats; however, media freedom also discloses information about the dictator's type to the citizens, who may revolt to overthrow him if he is found to be incompetent. A dictator faces a trade-off between allowing free media to induce high bureaucrats' effort and media censorship with low efforts of the bureaucrats. Egorov et al. (2009) show that in a dictatorial regime, the media are more likely to be censored in an economy with abundant resources. Resource abundance allows the dictator to use resource rents to compensate their citizens for

ineffective project implementation. Monitoring bureaucrats is less important in resource-rich nations and media censorship is a better choice for politicians.

Corneo (2006) studies the link between wealth concentration (ownership distribution of a production firm) and media capture in a model with heterogeneous voters. Voters are uncertain about the welfare effects of alternative policy choices and rely on information from a monopolist media, which may collude with different interest groups. He shows that the media is more likely to be captured under a higher level of wealth concentration. This is because the payoffs of the largest shareholders increase disproportionately from a rise in profitability induced by the public project, and the conflict of interest between them and a median voter provides them with strong incentive to collude with the media to manipulate public opinion on the public project. Regarding welfare analysis, the model predicts that media capture often reduces welfare, as valuable information is not transmitted to the electorate. However, media capture may occasionally raise welfare because full information may sometimes cause political distortions in which a median voter makes a poor decision for the society. However, such a case is very restrictive, as it occurs only when the wealth of median voters does not coincide with that of average voters, and wages comprise less than 50% of national income (the latter is a rare case in reality).

Similarly, Petrova (2008) examines the relationship between inequality and media capture. She develops a model in which rich and poor agents have a conflict of interest regarding taxation and the choices of public projects, whose usefulness is uncertain. She shows that the rich can capture the media and manipulate public opinion, although the electorate can understand that the

media might be captured. Her model predicts that the media is more likely to be captured when the inequality gap is larger. Moreover, this negative effect of inequality is stronger in democratic regimes because democracy increases the incentive for the rich to capture the media.

Media Bias

Prat and Strömberg (2011) emphasize that media bias may take different forms. Media may create bias by selecting which issues to report (issue bias), what aspects of an issue to include or exclude (fact bias), how the facts are reported (framing bias), and how the news is commented on (ideological stand bias). However, each form of bias is not mutually exclusive and news bias tends to be a mix of this mechanism (Sobbrio, 2013).

Regarding the roots of media bias, theoretical approaches can be categorized into two strands of literature: supply-driven and demand-driven explanations. Models of supply-driven media bias argue that the bias stems directly from the idiosyncratic preferences of the owners and employees who works in news organizations (journalists, reporters, and media owners), and from external pressure on news content from politicians who or interest groups that may benefit from biased news. The model of media capture discussed above can be considered as an example of supply-driven bias induced by external pressure. Hence, only models of supply-driven bias induced by the preference of media owners and journalists will be presented.

Baron (2006) is a good example of supply-driven bias model in which journalists' preferences for news create media bias. The underlying argument is that some kinds of news stories can increase journalists' fame and induce them

to publish such news more than other kinds. Audiences are skeptical of potentially biased news and demand less of it, which means that a news organization has to set a lower price for more biased news. Although a news organization could control bias and increase the price of its publication by limiting journalists' discretion, granting some degree of discretion to them and tolerating bias could allow it to hire journalists at lower wages. Maximization of this trade-off may result in a news organization that tolerates bias in their journalists' reports. Baron (2006) claims that highly biased news organizations can be more profitable than those with low bias. Moreover, greater competition may increase the average bias of news reports in the media industry because it increases news organizations' incentives to save labor wages.

Anderson and McLaren (2012) develop a model in which media owners may withhold information in opposition to their political agenda. In this model, a media owner maximizes his utility, which includes profits and his desire to influence the political opinion of news consumers. Anderson and McLaren (2012) show that media bias can arise in equilibrium even with rational consumers who know that the media owner is biased, because they do not know how much news the media has, and thus, do not know when it is withheld. Unlike Baron (2006), this model indicates that media competition could reduce media bias. However, the authors claim that competition may be defeated in equilibrium by a media merger that increases the media's profits at the cost of the social interest.

Models of demand-driven bias, on the other hand, claim that media bias exists because media outlets maximize its economic payoffs. One of the rationales for news bias is that media outlets may find it more profitable to distort

news provision when news consumers are not rational.

Mullainathan and Shleifer (2005) study the cognitive-bias rationale of media bias. A feature of their model is that people consume news not only because they want accurate information, but also because they would like to hear stories that confirm their prior beliefs. Under the assumption that readers have disutility from receiving news in opposition to their prior views, the model predicts that media competition may increase media bias in the presence of heterogeneous audiences. This is because the media may choose extremely biased news to differentiate and avoid price competition. However, Mullainathan and Shleifer (2005) also show that readers who crosscheck multiple news stories from media outlets with different ideological slants tend to form more accurate beliefs. Therefore, media competition may lead to greater accuracy of readers' posterior beliefs if they crosscheck news from different sources.

Gentzkow and Shapiro (2006) develop a demand-driven model of media bias, which occurs even when voters are rational. The premise of their model is that media outlets have a desire to enhance their reputation for being perfectly informative, which create incentives to misreport the news. The mechanism is similar to pandering behavior by a low-quality incumbent to increase voters' expectations of his type. When consumers have the same prior beliefs about the state of the world, a low-quality media outlet that receives an informative but imperfect signal about the state may disregard this signal that opposes the common prior belief in order to increase consumers' expectations about its quality. Competition in this setting reduces media bias because an increase in the news reported by high-quality media outlet would expose the bias in

the news reported by low-quality media outlet, which reduces readers' beliefs about their quality and thereby the media outlet's incentive to present biased news.

A study of the effects of demand-driven media bias is conducted by Bernhardt, Krasa, and Polborn (2008). In their model, left-wing audiences receive more utility from hearing good news about left-wing politicians and hearing bad news about right-wing ones. The reverse is true for right-wing audiences. Media firms earn profits from audiences and may cater to partisan audiences by suppressing information that partisan audiences dislike. Although audiences understand that media are biased, the loss of information through news suppression can lead to electoral mistakes in which inferior candidates are elected. Electoral inefficiency is more likely to occur when voter ideologies are asymmetrically distributed. Intuitively, if most voters are left-wing, media find it more profitable to offer left-biased news, and the decisive median voter is also a left-wing voter who prefers to hear left-biased news even if unbiased news is available for him.

2.4 Insights from Behavioral Politics

Except for Mullainathan and Shleifer (2005) and Bernhardt et al. (2008), who include voters' cognitive bias in their studies of media bias, all models in the previous sections assume that politicians and voters have rational expectations. These models predict that poor political institutions lead to poor economic outcomes and that low public accountability is the result of voters' ignorance (lack of information). However, one crucial debate within political economics is the extent to which we can rely on the full rational-

ity postulate. Some political economists argue that voters are not perfectly rational—they are subject to bias and various cognitive problems, especially when they enter the political arena (Schnellenbach & Schubert, 2014).⁸ This group of researchers emphasizes that irrationality on the part of voters must be considered if we want to understand their political decisions and behavior. In addition, this group points out that models of rational ignorance cannot explain the persistence of voters’ systematic bias. For example, Caplan (2001a) argues that the lack of information may induce voters to make significant mistakes, but there are no reasons for a rationally ignorant voter to be dogmatic and to make mistakes systematically. Rationally ignorant voters can understand that their opinions may be wrong due to information shortage.

2.4.1 Democratic Inefficiency: Rational Irrationality Model

To resolve this puzzle, Caplan (2001a) suggests an alternative model of rational irrationality to explain why people hold systematically biased, low-information, high-certitude beliefs. Insights from this model provide another way of considering the possible failures of democracy in achieving optimal economic performance and public accountability, which persist even under full information. In his model, irrationality, the deviation from rational expectations, is treated as a standard good. Agents have a specific bliss belief (the tendency to believe what is pleasant) from which they derive utility. They want to move closer to bliss beliefs, and so, they are willing to deviate from rational expectations. They make a trade-off between holding irrational beliefs and

⁸Schnellenbach and Schubert (2014) provide a critical survey on the key insights of behavioral economics, which are applicable to understanding public policy choice.

wealth. Their wealth-irrationality indifference curves are C-shaped and the preference for irrationality yields a downward-sloping demand curve in which the price of irrational beliefs is the loss of private wealth at a given degree of bias under given circumstances. Moreover, the model assumes that agents have rational expectations about the price of irrationality, which differentiate rational irrationality from complete irrationality. Caplan (2001a) differentiates agents in his model from the standard neoclassical agents, who always have no demand for irrational beliefs, by terming them “near-neoclassical agents” who consume zero irrationality when its price is significant, but whose demand for irrationality increases sharply when the price approaches zero. Hence, the model concludes that when irrational belief is cheap, near-neoclassical agents exhibit large systematic bias, while neoclassical agents do not. This distinction is particularly important in the political arena, because the private cost of systematic error in political belief is very low. Practically, the probability that one vote would change the electoral outcome is extremely low, and so is the probability that a single agent’s systematic bias in his political beliefs would have a negative impact on his private wealth. Although the private cost of irrationality is insignificant, the social cost can be enormous. The divergence between these two costs could lead a group of identically irrational agents to a suboptimal, high-irrationality outcome. What is worse, while rationally ignorant voters may admit their ignorance and try to take action to compensate for it, systematically irrational voters are over-confident that they have the correct beliefs and have no incentive to correct them, even when faced with contradictory evidence.

Caplan (2001b) applies the rational irrationality model to provide an alter-

native microfoundational explanation for the persistence of four well-known political failures: rent seeking, pork-barrel politics,⁹, bureaucracy, and economic reform. He argues that by incorporating privately costless irrationality, a plausible explanation can be provided for the persistence of these failures. He emphasizes that rational ignorance about the inefficiency of rent seeking does not mean that voters underestimate the optimal level of effort to prevent it, and passively accept it. He explains that voters select the suboptimal level of rent-seeking prevention because they systematically underestimate the link between rent seeking and redistribution politics, that is, they irrationally deny the existence of the problem. In pork-barrel politics, it is difficult to explain why rational voters expect to benefit more from each inefficient project than from a simple, but more efficient, cash transfer. Caplan's (2001b) explanation is that irrational voters would not be willing to accept a blatant transfer. While voters pay no attention to pork-barrel politics, direct cash transfers to political supporters would lead to hostile public attention. The insignificant private cost of holding this biased belief implies that each voter has no incentive to be more rational, which creates incentives for politicians to support this inefficient status quo to secure their positions. Similarly, the survival of inefficient and excessively large bureaucracies could be clearly understood if one considers that voters frequently fail to evaluate politicians' connections to political outcomes. For instance, although voters prefer drug-quality regulations, they may not be happy with the specific actions of regulators. Politicians attempt to avoid this populist backlash by delegating the job to an independent

⁹Pork-barrel politics generally refers to inefficient government spending for localized projects that bring benefits primarily to the representative's constituents in return for their political support. This type of politics leads to wasteful use of public resource and is even less efficient than simple cash transfers are.

agency and distance themselves from daily tasks. Irrational voters give credit to politicians who create such agencies and enact laws with obvious good objectives, but vague specifics, but they fail to punish them when the policies eventually become unpopular. Lastly, economic reform, which takes time to come to realize fruitful outcomes, is often subject to stalling due to political resistance. Although in the initial stage, it is widely agreed that reforms bring improvement over the status quo, the pain of structural readjustment at the center stage often erodes this consensus. However, why would a majority resist a socially beneficial reform? Caplan (2001b) again points to the fact that the majority of voters are irrational, and particularly myopic. They systematically underestimate the benefits of reform simply because they do not understand how it works.

In addition, Caplan (2011) identifies four fundamental types of bias that explain the ongoing failures and mistaken policies in a democratic society, and provides an empirical survey to support this bias. While rational choice models emphasize the influence of special interests and voters' ignorance as the causes of these failures, he argues that voters are worse than ignorant. They are systematically irrational and continue to confidently embrace a long list of wrong beliefs despite limited information, and they vote accordingly. First, he argues that voters possess "anti-market bias," a tendency to underestimate the economic benefits of the market mechanism. In particular, they are always skeptical about how a greedy profit-seeking business could produce a socially optimal outcome, and underestimate the disciplinary role of competition. Hence, they continue to support inefficient and excessive public intervention in the market. Second, they have "anti-foreign bias" in the

sense that they tend to underestimate the economic benefits of interaction with foreigners. For instance, they are doubtful about the mutual benefits of international trade and thereby support inefficient protectionist policies. Third, voters tend to underestimate the economic benefits of conserving labor, which is termed “make-work bias.” People believe that increasing jobs is always good and misunderstand that employment, not production, is an indicator of prosperity. This explains why inefficient public expense solely to maintain unproductive jobs remains a popular policy. Lastly, voters suffer from “pessimistic bias.” They tend to overestimate the severity of economic problems and consider that the economy is getting worse. Pessimistic beliefs about economic performance imply that they cannot evaluate the efficiency of public policies perfectly.

2.4.2 Expressive Voting and Accountability

As discussed in Section 2.4.1, the probability that one vote would be decisive in a mass election is extremely low, and thus, there would have no point in voting for instrumental reasons. Then, why would each voter bother to vote at all? Political economists have devoted much effort to provide rationales for this puzzle (Schnellenbach & Schubert, 2014). Among the earliest efforts to explain it is Downs (1957), who emphasizes that each individual has a sense of social responsibility and votes to sustain a well-functioning democracy.

Riker and Ordeshook (1968) develop a voter’s cost–benefit calculus with an additional argument D by incorporating the voter’s concerns for the functioning of his polity and intrinsic benefits of voting, for example, concerns about informal punishment through pressure from peers who demand partic-

ipation. The rationale for voting participation that seems to have attracted most attention from researchers in recent years is the idea of “expressive voting.” Based on this concept, individuals gain direct intrinsic benefits or utility from expressing their opinions, which is called expressive utility.

More specifically, Hamlin and Jennings (2011) distinguish expressive voting from instrumental voting by describing the latter as voting behavior that aims to obtain utility from the outcome of actions, but define the former as voting behavior that aims to achieve direct utility from the meaning or symbolic significance of actions.

Schnellenbach and Schubert (2014) point out several arguments from the literature that provide a rationale for why it is worthwhile for individuals to vote expressively rather than instrumentally, and they categorize these arguments into three subsets. First, expressive voting is induced by a voter’s desire to express his personal identity to himself or to the specific group he identifies with. For instance, he may vote expressively because he wants to identify with political parties, a political candidate, and his perceived characteristics. The individual is more likely to vote for candidates that appear similar to how he perceives himself. Second, the voter may be induced by the benefits of moral actions to vote expressively, for example, voters tend to prefer politicians who exhibit desirable morality. Third, the individual may vote to express his gratitude to a politician who is perceived as supporting voters.

Recognizing the existence of expressive voting implies that new approaches are needed for the analysis of political accountability. Indeed, Hamlin and Jennings (2011) emphasize that political outcome should be treated as the consequence of the interplay between expressive and instrumental voting. The

effects of the presence of expressive voting on accountability cannot be simply concluded. For example, if voters' perceived morality of a politician is more important than his political competency, they may elect the politician who appears morally sound, but embrace mistaken views on public policy. However, in other cases, the existence of expressive voting motivated by voters' preferences for moral politicians may induce a good incumbent to refrain from populist behavior that he might choose otherwise.

Jennings (2011) constructs a formal model that incorporates the concept of expressive voting into a political agency model. The premise of the model is that some voters have some level of emotional, expressive attachment to some inefficient policies, which he terms "emotional voters." In particular, the model assumes three types of voters, informed and instrumental voters, informed and expressive voters (emotional voters), and uninformed voters (rationally irrational voters). He concludes that inefficient populism may be driven by the existence of both uninformed bias, and informed bias with hard expressive preferences. First, voters may prefer inefficient policies because they hold biased beliefs, as emphasized by Caplan. Second, voters might opt for inefficient policies because they are emotionally drawn toward them, and the extremely low probability of being decisive in a mass election causes emotional appeal to dominate in electoral settings. Both of these types of voting behavior provide the incumbent with incentives to implement a popular but inefficient policy. Moreover, Jennings (2011) indicates that in the case with potential corruption (a world with some bad or corrupt politicians), the existence of expressive voting that focuses on the integrity of candidates may improve welfare. This is because the fact that voters consider the revealed integrity of politicians

when casting their vote provides a good incumbent with incentives to adopt efficient policy, although this good policy might not be expressively appealing to voters.

2.5 Concluding Remarks

In this review, a number of well-known theoretical models in the field of political economy and economic development were presented in order to shed light on the understanding of the political foundations of economic performance and public accountability.

First, it can be understood from the theoretical literature that political institutions, especially the quality of democratic institutions and the level of corruption, matter in economic development. The conclusion regarding the influence of democracy on economic growth is ambiguous. A higher level of democracy may enhance or impede growth through different mechanisms. Analysis on the microfoundational mechanism could help us understand more about democratic effects on economic development. Although the growth effect of democracy is unclear, good quality of political institutions, particularly low levels of corruption or rent-seeking activities, could prevent the resource curse and enable the nation to realize the blessing of its natural resource endowment.

Second, insights from political agency models help us to identify different conditions of voting mechanisms, information structure, and strategic interaction between voters and politicians under which public accountability could be enhanced. It is obvious that better information and media independence play significant roles in achieving high electoral accountability. However, the

presence of populism and the discipline–selection trade-off implies that information improvement must be treated carefully.

Finally, the implication from theories of behavioral political economy offer more insights into the rationale of political outcomes that may not be obtained from the standard models of rational expectations. The introduction of the concepts of irrationality and expressive voting provides complementary and alternative ways of thinking about the political effects on the economy and public accountability.

Chapter 3

Institutions, Foreign Investment and the Resource Curse

3.1 Introduction

While natural resource abundance traditionally has been emphasized by economic historians as a blessing for nations, recent evidence has shown that countries with abundant natural resources tend to have poorer economic performance. For example, while such resource-rich nations as Angola, Indonesia, Nigeria, Saudi Arabia, Sierra Leone, Venezuela, and Zambia are stuck in poverty traps, East Asian countries with scarce natural resources, such as, Hong Kong, Singapore, South Korea, and Taiwan have recently enjoyed much faster development. This negative relationship between natural resources and economic performance is justified by a body of well-known empirical research, including but not limited to Auty (1995, 1997), Sachs and Warner (1995, 1999a, 1999b, 2001), and Gylfason (2001).

Gylfason (2001) explains that the adverse impacts of natural resource abundance on economic development can be understood through four main chan-

nels of transmission: (1) Dutch disease, (2) rent seeking, (3) overconfidence, and (4) neglect of education. The Dutch disease hypothesis emphasizes that resource booms, for example a boom in the price of raw materials or primary products, such as oils, minerals, agricultural products, fish products, and timber, causes real wages to rise. High demand for primary products in turn hurts other sectors, such as the trade sector and manufacturing, due to higher input costs. Resource abundance shifts production factors from more productive manufacturing industries into backward industries with lower productivity, and thereby decreases the total productivity of an economy.

Sachs and Warner (1999a) study such an adverse effect of resource booms on productivity through the change in the production composition it generates in the big push model. In an economy with two types of sectors: an increasing return-to-scale sector and a constant return-to-scale sector, a resource boom reduces total output if the increasing return-to-scale sector is the trade sector.

Second, the rents created by natural resource endowment provide incentives for the interest group to divert its time and efforts to capture these rents. This results in misallocation of time and talent. Torvik (2002) develops a model to explain how rent seeking that is generated by resource abundance may lead to lower welfare. A larger amount of resource endowment or a resource boom raises profits of rent seekers and thus, crowds out entrepreneurs from productive sectors into rent-seeking activities. The effect of demand externality causes a lower total income for an economy as a whole, since a fall in income from production is higher than an increase in income from natural resources.

Third, governments of resource-rich countries tend to have a false sense of

security and lose sight of the need for good and effective policy to promote economic growth (Sachs & Warner, 1999b). Efforts and incentives to formulate appropriate policy for economic growth tend to be discouraged by the ability and ease of creating wealth from natural resources.

Lastly, resource-rich nations, mostly those with overconfidence and reliability in their natural resource endowment, tend to ignore the development of their human resources. Aldave and Garcia-Penalosa (2009) construct a model to study how natural resources can reduce human capital investment. They explain that the resource boom increases the relative return to political investment over human resource investment. Through this mechanism, resource endowment reduces total income and growth. In addition, empirical evidence supports the negative relationship between natural resource endowment and human capital accumulation (Gylfason, 2001).

Are natural resources always a curse? While it is obvious that many resource-rich countries, especially some of the Organization of the Petroleum Exporting Countries (OPEC), tend to have lower income, it seems impossible to claim that rich nations, such as the United States, Australia, Norway, and Sweden, have developed their human capital and economy without the aid of their natural resources. In some cases, resource abundance stimulates growth and enhances welfare. In contrast to the claims of Sachs and Warner (1999a, 1999b), some researchers emphasize the role of institutional arrangement in determining whether natural resources are a curse or blessing. As also emphasized by Gylfason (2001), who finds evidence of negative impacts of natural resources on economic growth, it seems that natural resource abundance by itself does not directly deter economic growth; rather, what matters the most

is how countries manage and use those resources.

Recent literature focuses on the interaction between institutions and resource abundance. A resource boom results in more corruption and poor institutions, while poor institutions determine whether natural resources are a blessing that stimulates growth or a curse that induces a poverty trap.

Aldave and Garcia-Penalosa (2009) study how the institution plays a role in the education investment channel through which resource endowment affects total output and growth. In their study, corruption and education are interrelated and both are strongly influenced by natural resource abundance. A poor institution that is favorable for rent capture encourages more political investment relative to human capital investment.

Similarly, Wadho (2014) emphasizes that resource abundance affects growth through its influence on the incentives to invest in education and rent capture. Wadho (2014) claims that resource endowment may stimulate growth or induce a poverty trap depending on the institutional quality of the country, particularly inequality in access to education and political participation, and the cost of political participation. Moreover, in general, it is the state that owns natural resources and poor institutions make it easy for the politicians in office to capture its rents.

Robinson, Torvik, and Verdier (2006) argue that resource abundance increases the payoff of holding political power, providing the incumbent politician with incentives to choose inefficient public resource allocation and investment policies that may impede productive activities, but increasing their chances of winning elections. On the other hand, in a non-democratic country where elections play no role in the competition for power, the abundance of

natural resources may cause fighting among political rivals to extract rents.

Mehlum, Moene, and Torvik (2006) study the role of institutional quality in the resource curse literature using a model in which entrepreneurs can choose to be producers or rent grabbers. The profits and equilibrium allocation of entrepreneurs between the two sectors are determined by the institutional arrangement, which reflects the extent to which institutions favor rent seeking (grabbing) versus production activities. It may be a producer-friendly institution in which production and rent appropriation are complementary, or a grabber-friendly institution in which production and rent appropriation are competing activities. Mehlum, Moene, and Torvik (2006) show that resource abundance is a curse for countries with grabber-friendly institutions, and a blessing for countries with producer-friendly institutions.

Mehlum et al. (2006) provide a good framework to understand how institutions play a role in the rent-seeking channel of the resource abundance effect on income. Based on Mehlum et al. (2006), resource abundance is a blessing if an economy has better institutions. Strong legal and democratic institutions ensure that the economy is free from corruption and rent-grabbing activities, and that natural resources are optimally extracted and used for the development of the economy.

In addition to shortages of strong institutions, it is widely known that most countries that suffer from the resource curse are poor and lack technology and capital. Extraction of some natural resources, particularly, oil and minerals, requires advanced technology and capital. Most resource-rich countries cannot afford to undertake such activities alone and rely on foreign investment firms for extraction. Foreign investors obtain some share of rents as a return on their

investment. Most investment is made by large multinational corporations (MNCs) from developed countries, known as the North, which have good institutional infrastructure. Such investment is commonly known as North–South foreign direct investment (FDI). However, as discussed earlier, resource-rich nations tend to have weak legal and democratic institutions, poor property rights protection, less political stability, high corruption, and abundant rent-seeking activities. Such an institutional environment discourages investment by North MNCs. Investment in such an environment involves higher risks and uncertainty. Moreover, engagement in corruption may cause the image and goodwill of North MNCs to deteriorate. However, investment from the North is not the only source of foreign investment. Recent trends show an increase in foreign investment outflow by large MNCs from developing and transition economies, known as the South, whose institutional quality is as weak as the host countries. Such investment is known as South–South FDI. For example, in 2010, 29% of global FDI outflows and six of the top-20 investors of global FDI were from the South (UNCTAD, 2011). Unlike North MNCs that find it unprofitable to invest in countries with poor institutions, South MNCs may be able to capture profits from investment in such countries.

The familiarity and experience of operating with similarly corrupt and weak legal institutions in their home countries provide South MNCs with more competitive advantages over North MNCs when investing in countries with poor institutions. Cuervo-Cazurra (2006) and Cuervo-Cazurra and Genc (2008) provide empirical evidence that weak and corrupt institutions of host countries lower FDI from countries with good and strong institutions, but results in more FDI inflow from countries with poor and corrupt institutions.

They emphasize that investors from corrupt home countries may not be discouraged by corruption abroad, but even seek to invest in corrupt countries where they have competitive advantages over their competing North investors.

It can be obviously understood that the roles and behavior of North and South MNCs in resource investment are crucial for understanding the resource curse phenomena in corrupt, resource-rich countries that rely on foreign investment for resource extraction. However, analysis of the roles of foreign investment in the resource curse literature has not yet been undertaken. In this study, we incorporate foreign investment and institutional quality of the original countries of foreign investors into the resource curse literature. This enables us to investigate the effect of foreign investment and institutional motivation of foreign investment on the total income of an economy through the rent-seeking channel of the resource curse literature.

We proceed in the rest of this chapter as follows. Section 3.2 presents the setting of the model. The equilibrium solutions and the results are provided in Section 3.3. Section 3.4 concludes.

3.2 Model

We consider an economy that consists of four sectors: (1) a resource extraction sector; (2) a backward production sector with constant return-to-scale (CRS) technology; (3) a modern manufacturing sector with increasing return-to-scale (IRS) technology; and (4) a public sector that is simply a redistribution sector in which no output is produced. The economy consists of L workers, and the same number of goods and entrepreneurs, both of which are normalized to one. Moreover, there are foreign investors who seek to invest in the resource

extraction sector of the economy. Workers are employed either in the backward production sector or the modern manufacturing sector.

Entrepreneurs may choose either to become producers in the modern production sector, or to become rent seekers in the public sector who seek to redistribute public income for their own benefit by engaging in political competition, corruption, and rent-seeking activities. Modern producers earn profits from production, while rent seekers obtain rents from the country's resource extraction. We assume that the country lacks strong democratic and legal institutions, which allows rent seekers to capture all the domestic share of resource extraction output, excluding the profit share of foreign investors. Entrepreneurs choose one of the two options so as to maximize their payoffs. We denote the number of entrepreneurs involved in rent-seeking activities by N_R and those engaging in modern production by $(1 - N_R)$.

Next, we discuss the resource extraction sector and foreign investment. The economy is assumed to be endowed with a stock of natural resources that can be extracted only by foreign investment firms. The number of foreign investment firms is denoted by N_I . The output of resource extraction is denoted by R and is a linear function of the number of foreign investment firms: $R = \mu N_I$, where $\mu > 0$ can be considered a parameter of resource endowment of the economy. Output from resource extraction is shared between domestic rent seekers and foreign investors.¹⁰ Foreign investors need to be involved with corruption and bribery to obtain licenses for resource extraction. Foreign investors can be either large MNCs from developed countries with strong institutional infrastructure (North investors) or large MNCs from developing

¹⁰Hereafter, we treat the terms "foreign investment firms" and "foreign investors" as the same and use them interchangeably.

countries with corrupt and weak institutions (South investors). All investors have the same productivity for resource extraction, but differ in their ability to capture output share from investment. The allocation share of profits from extraction is determined by the ability of foreign firms to deal with corrupt institutions. Foreign firms that have been exposed to corruption and rent-seeking activities at home are more effective in dealing with rent seekers in the host country. For example, they know better about the ranking structure of corrupt officials in the host country and can efficiently target key persons to pay bribes. Hence, they can manage to obtain more share from resource extraction. Foreign investors from countries with good institutions have relatively less knowledge about the structure and behavior of corrupt officials in the host country, and find it more difficult to engage in corruption due to legal constraints in their home countries and fear of eroding the goodwill and image of their firms. Hence, they are able to capture a relatively lower share of profits from resource investment.

We denote $\lambda > 0$, which is exogenous in this model, to reflect the difference in institutional quality of foreign investors' home country. λ can also be considered as foreign investors' familiarity and ability to deal with corrupt institutions and rent-seeking activities. A higher value of λ implies that foreign investors know more about corruption and can obtain a higher share from resource extraction.

We apply the contest success function, which is commonly used in rent seeking and the resource curse literature, for the sharing of profits between domestic rent seekers and foreign investors. The profit of each rent seeker is

given by a factor s times $\frac{\mu N_I}{(N_R + N_I)}$

$$\Pi_R = s \frac{\mu N_I}{(N_R + N_I)} \quad (3.1)$$

On the other hand, the profit for each foreign investment firm is defined as

$$\Pi_I = s\lambda \frac{\mu N_I}{(N_R + N_I)} - cN_I \quad (3.2)$$

where cN_I is extraction cost and $0 < c < \mu$. The extraction cost is increasing with the number of foreign investment firms. More competition in the natural resource extraction sector mean that each firm has to increase inputs to be able to compete for extraction of the limited stock of potential natural resources.

The sum of the shares of both groups must equal one. Therefore, the following equality constraint must hold

$$\frac{sN_R}{(N_R + N_I)} + \frac{s\lambda N_I}{(N_R + N_I)} = 1 \quad (3.3)$$

From equation 3.3, we can derive the function of s with respect to λ

$$s = \frac{(N_R + N_I)}{(N_R + \lambda N_I)} \quad (3.4)$$

The factor s is decreasing in λ because the rent seekers are able to capture less when foreign investors manage to obtain more share of investment. On the other hand, $s\lambda$ is increasing in λ as foreign investors obtain more share with higher λ .

The production side of the economy follows Murphy and Shleifer (1989).

Firms in the backward production sector use only workers as production inputs, and one unit of labor produces one unit of any good. In the modern manufacturing sector, a modern firm is established by an entrepreneur with a fixed cost of F units of labor and marginal cost of β , where $\beta > 1$. We assume that $F < L$. Consumers are assumed to have Cobb–Douglas utility with inelastic demand and equal expenditure share in consumption, which means that consumption is allocated equally for each good.

We denote Q as the production quantity of each good. Modern firms compete with exogenous fringe competitors, which are the CRS firms in the backward production sector, using Bertrand price competition. This implies that the modern firms charge the highest possible price, which is equal to 1, the price that is charged by the fringe competitors. In addition, the wage paid to each worker is equal to 1, which is the worker’s outside option in the backward production sector. The assumptions of inelastic demand, equal expenditure share in consumption, and Bertrand price competition imply that each good is produced in equal quantity. Moreover, since the number of entrepreneurs and consumption goods are both normalized to one, each good is produced entirely by either a single modern firm or by the fringe firms.

The profit of each entrepreneur who chooses to become a modern producer is the total output from production minus the total production cost

$$\Pi_P = \left(1 - \frac{1}{\beta}\right) Q - F \tag{3.5}$$

3.3 Equilibrium

There are three necessary conditions needed for the economy to be in equilibrium. First, foreign investors enter the resource extraction sector until investment profits become zero. By using equations 3.2 and 3.4, and the condition that $\Pi_I = 0$, we derive the equilibrium number of foreign investors as a function of N_R

$$N_I(N_R) = \frac{\mu}{c} - \frac{N_R}{\lambda} \quad (3.6)$$

Second, the total supply must be equal the total demand or income. We consider the GNP of an economy and thus, exclude foreign investors' profits. We assume that foreign investors take all their profits back to their home countries. We denote Y as the total supply of the economy, which equals the sum of the total production output and resource extraction output, excluding resource output allocated to foreign investors. The total income is equivalent to the sum of workers' income, producers' profits, and rent seekers' profits. The second equilibrium condition is, therefore,

$$Y = Q + \frac{sRN_R}{(N_R + N_I)} \equiv L + (1 - N_R)\Pi_P + N_R\Pi_R \quad (3.7)$$

By using equations 3.1, 3.2, 3.4, 3.5 and 3.7, we solve for the equilibrium total quantity of production output as a function of N_R

$$Q(N_R) = \frac{\beta [L - (1 - N_R)F]}{1 + N_R(\beta - 1)} \quad (3.8)$$

We assume $Q(0) = \beta(L - F) > Q(1) = L$ to ensure that the production

output in an economy with full modern manufacturing firms is higher than that in an economy with complete backward production firms. This requires the marginal productivity of modern firms to be high enough

$$\beta > \frac{L}{L - F} \quad (3.9)$$

It should be noted that R does not appear in equation 3.8. Natural resources do not directly affect production output. This is because natural resources contribute equally to both demand and supply, but indirectly affect production through their effects on N_R .

Next, we insert equation 3.8 into equation 3.5 to derive the payoff function of each producer

$$\Pi_P(N_R) = \left(1 - \frac{1}{\beta}\right) \frac{\beta [L - (1 - N_R)F]}{1 + N_R(\beta - 1)} - F \quad (3.10)$$

The third equilibrium condition is to ensure that no entrepreneur moves between modern production and rent-seeking activities. This requires that the payoff for each producer is equivalent to the payoff for each rent seeker

$$\Pi_R = \Pi_P \quad (3.11)$$

From equations 3.1, 3.4, 3.10, and 3.11, the equilibrium number of rent seekers can be written as a function of N_I

$$N_R(N_I) = \frac{N_I [\mu - \lambda(\beta(L - F) - L)]}{\beta(L - F) - L - \mu N_I(\beta - 1)} \quad (3.12)$$

By using equation 3.9, it is shown that $N'_R(N_I) > 0$. A higher number of

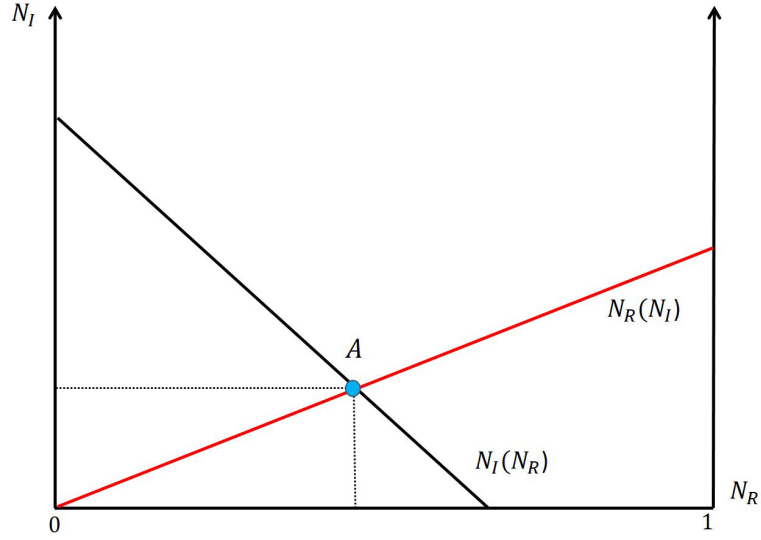


Figure 3.1: Equilibrium N_R and N_I

foreign investors increases profits for each domestic rent seeker, which in turn leads to an increase in N_R . Moreover, from equation 3.6, it can be confirmed that $N'_I(N_R) < 0$. More domestic rent seekers mean that the resource output has to be shared with more people, thereby lowering profit for each foreign firm. This results in a lower number of foreign investment firms. $N_R(N_I)$ -curve and $N_I(N_R)$ -curve cross each other and determine the equilibrium number of rent seekers and foreign investors. This equilibrium point is illustrated by point A in Figure 3.1.

3.3.1 South Foreign Investors and Rent Seeking

Next we investigate the effect of the prevalence of South foreign investors instead of North foreign investors on rent-seeking activities. In this model, this effect can be reflected by an increase in λ . It can be noted from equation

3.6 that $N_I(N_R)$ -curve shifts upward to the right with an increase in λ , and equations 3.12 and 3.9 imply that $N_R(N_I)$ -curve shifts backward to the left when λ is larger. In the new equilibrium, an increase in λ always leads to larger N_I , but the effect of an increase in λ on N_R is ambiguous. The positive relationship of λ and N_I is straightforward: a higher share of resource output allocated to investors encourages more investors. On the other hand, there are two opposing effects of an increase in λ on N_R . The first is the *share effect*. Higher λ means lower share of profits for each rent seeker and thus, lowers N_R . On the one hand, larger λ implies more investment in the resource sector and higher output from resource extraction to be shared to each rent seeker. This is called the *size effect*.

In short, N_R is increasing (decreasing) in λ if the *size effect* is larger (smaller) than the *share effect*. Since λ itself is the parameter of the share of natural resource output allocated to each foreign investor, it can be expected that the *size effect* will be more important than the *share effect* when λ is very small. Indeed, one can show that when λ is insignificantly small or close to zero, N_R is increasing in λ . This result can be shown by inserting equation 3.6 into 3.12 to derive the following result:

$$\lim_{\lambda \rightarrow 0} N'_R(\lambda) = \frac{\mu}{c} > 0 \quad (3.13)$$

Figure 3.2 shows the three possible new equilibrium numbers of N_R and N_I when λ is increasing. New equilibrium point B corresponds to the case in which λ is very small, and the increase in λ leads to higher values of N_R and N_I .

All the results discussed above are formally summed up in the following

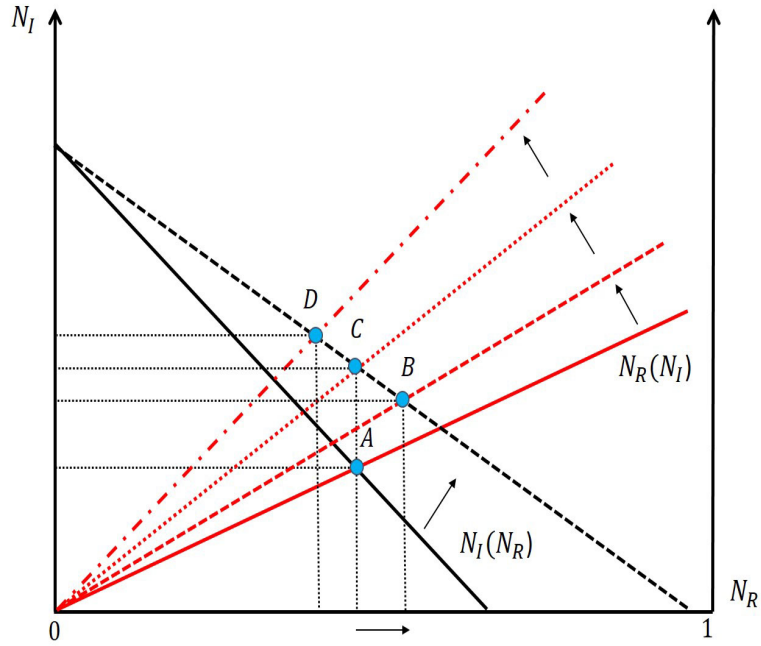


Figure 3.2: The effect of an increase in λ on rent seeking

Proposition.

Proposition 3.1 *An increase in λ always leads to larger N_I . On the other hand, the effect of λ on N_R is ambiguous. However, for some small values of λ , N_R is increasing in λ .*

The economy with corrupt institutions that allow rent seekers to capture much of the output from resource investment may discourage North foreign investors from countries with better institutions who see no hope of earning profits from investment. The existence of South foreign investors who are more familiar with a corrupt environment and thereby can capture more returns from the investment can lead to South investors becoming substitute

sources of foreign investment in the host country. However, the prevalence of South investors may eventually increase rent-seeking activities in the economy. Proposition 1.1 clearly emphasizes that foreign investors who are more familiar with corrupt institutions may complement domestic rent seekers.

3.3.2 Income Effect

To establish if the complementarity of South investors is harmful to a host economy, we turn to investigate the effect of an increase in λ on the total income of the economy. From equations 3.9 and 3.10, it can be confirmed that $\Pi'_P(N_R) < 0$. Moreover, by using equations 3.1, 3.4 and 3.6, the profit of each rent seeker can be written as a function of N_R

$$\Pi_R(N_R) = \frac{\mu\lambda - N_R c}{\lambda^2} \quad (3.14)$$

It can be observed clearly that $\Pi'_R(N_R)$ is also negative. Both $\Pi_R(N_R)$ -*curve* and $\Pi_P(N_R)$ -*curve* are decreasing in N_R . The profits for producers are decreasing in the number of rent seekers due to the *demand externality effect*. More rent seekers lead to a fewer number of modern firms, which in turn results in lower income and demand, and thereby lowers sales and profits for the remaining modern firms. The profits of rent seekers are decreasing in N_R because larger N_R implies a lower share of given rents to each rent seeker.

In the following discussion, we focus on the case in which λ is very small and close to zero. In this case, the equilibrium with complete rent seekers or complete producers never exists, and $\Pi_R(N_R)$ -*curve* crosses $\Pi_P(N_R)$ -*curve* from above, determining the stable equilibrium number of producers and rent seekers and their equilibrium profits. Such an equilibrium is illustrated by

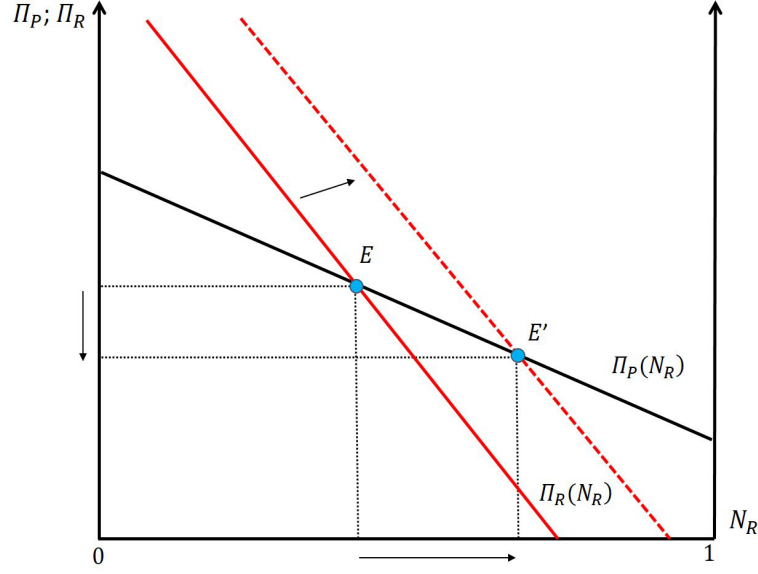


Figure 3.3: Income effect of an increase in λ

point E in Figure 3.3. An increase in λ shifts $\Pi_R(N_R)$ -curve upward to the right, resulting in a new equilibrium point with larger N_R and lower profits for both producers and rent seekers. This also implies that the total incomes of the economy will also decrease. The new equilibrium is shown by point E' in Figure 3.3. We sum up the above result in Proposition 3.2 below.

Proposition 3.2 *Considering a case with some small values of λ , an increase in λ leads to lower profits for both producers and rent seekers and thus, lower total incomes of the economy.*

This proposition clearly shows that the fact that South foreign investors may complement domestic rent seekers can be harmful to the economic development of the host country.

3.3.3 Resource Boom

From equation 3.13, it is straightforward to show that

$$\lim_{\lambda \rightarrow 0} \frac{\partial^2 N_R(\lambda, \mu)}{\partial \lambda \partial \mu} = \frac{1}{c} > 0 \quad (3.15)$$

This implies that a resource boom in an economy and/or an economy with larger natural resources magnify the positive impact of the prevalence of South foreign investors on rent-seeking activities. This is because a rise in μ increase the *size effect* of λ on N_R relative to its *share effect*. A resource boom or larger resource endowment, *ceteris paribus*, means a larger size of resource output to be captured, which directly makes rent seeking more attractive to production. Moreover, larger μ means larger profits from resource investment and thus, larger N_I , which also leads to larger N_R through the *size effect* mechanism.

Although, a rise in μ increases the positive impact of λ on N_R , its effect on the positive impact of λ on N_I is neutral. This is because larger N_R as a result of a rise in μ also has opposing negative impact on N_I . Indeed by inserting equation 3.12 into equation 3.6, one can show that

$$\lim_{\lambda \rightarrow 0} \frac{\partial^2 N_I(\lambda, \mu)}{\partial \lambda \partial \mu} = 0 \quad (3.16)$$

Using similar analysis as in Subsection 3.3.2, it can be concluded that an increase in μ magnifies the negative impacts of an increase in λ on the profits of both producers and rent seekers, and the total income of the economy. We summarize the results in the following Proposition.

Proposition 3.3 *Considering a case with some small values of λ , an increase*

in μ magnifies the positive impacts of λ on N_R and its negative impacts on the profits for both producers and rent seekers, and on the total income of the economy. An increase in μ has neutral impacts on the positive effect of λ on N_I .

When rent seeking exists in an economy, and South foreign investors complement domestic rent seekers, an economy with a larger resource endowment or resource boom suffers more from the negative impacts of the complementarity between South foreign investors and rent-seeking activities. Indeed, Proposition 3.3 clearly predicts the resource curse phenomena that may result in a case in which the existence of South FDI complements domestic rent-seeking activities.

3.4 Concluding Remarks

In this chapter, a simple model is developed to investigate the effect of the institutional quality of the home countries of foreign investors on the total income of an economy through the lens of the rent-seeking channel in the resource curse literature. Recent studies argue that natural resources tend to be a curse for countries with poor institutions. Countries that suffer from the natural resource curse are usually poor, lack high technology and capital, and have to rely heavily on foreign investment firms to extract their natural resources. However, such economies are always seen as having weak legal and democratic institutions, and being prone to corruption and rent-seeking activities, which are obstacles for them to attract foreign investment, at least from developed countries. If resource-rich countries must have good institutions to

be able to attract foreign investment, one can expect that the resource curse problem may be reduced in economies that depend on foreign investment for resource extraction. However, the prevalence of foreign investors who are less likely to be deterred by such poor institutions due to their exposure to and familiarity with such environments in their home countries may become substitute sources of foreign investment in those resource-rich economies. We show that the prevalence of such foreign investors may complement domestic rent-seeking activities, and crowd out entrepreneurs from the productive sector, which eventually induces an economy to suffer from the resource curse. Endowment with greater natural resources or a resource boom in an economy magnifies these negative impacts.

Chapter 4

Social Capital, Resource Boom and Underdevelopment Traps

4.1 Introduction

The most serious and challenging issues in the field of economic development have always involved explaining the persistent differences of economic development between different countries, generally known as “underdevelopment traps.” For a long time, economists have devoted considerable effort in explaining the causes and mechanism of these traps. In economic theories, the concept of underdevelopment traps is usually modeled by multiple equilibria. Many models and a rich array of concepts in both static and dynamic settings have been proposed in the literature. However, many questions remain for investigation. In the previous chapter, we proposed a static model of the resource curse and underdevelopment traps, taking into account the roles of institutions and foreign investment. In this chapter, we construct a dynamic model of intergenerational cultural transmission to analyze the cause of underdevelopment traps from the perspectives of cultural economics. The

fundamental mechanism of our model is the interaction between the cultural norms and material incentives of individual agents. The authors of a number of recent studies have argued that cultural factors can provide new insights into understanding economic development (e.g., Tirole, 1996; Francois & Zabojnik, 2005; Sindzingre, 2007; Tebellini, 2008, 2010; and Aghion, Algan, Cahuc & Shleifer, 2009).

To identify the differences of our model from the previous literature, we start by discussing related studies on the rationale of underdevelopment traps from various perspectives and mechanisms. If the process of economic development is viewed as consisting of several layers, as suggested by Aghion and Howitt (2009), the models of underdevelopment traps may be categorized into three groups.

The first group responds to the first layer of economic process, which includes the economic interaction, choices, and incentives of individual agents in the market and industry. This kind of model usually points to the mechanism of coordination failure, increasing returns, and externalities as the foundations of the possible multiple equilibria. Paul Rosenstein-Rodan (1943) is one of the earliest researchers to propose that coordination failures are the causes of underdevelopment traps. These researchers point out that the existence of spillover may lead to increasing returns to an activity proportional to the number of agents implementing the same activity or complementary ones. With strong enough spillover, coordination failure among agents may lead to multiple equilibria and creates underdevelopment traps. Arthur (1989) argues that competition for adoption between different technologies with increasing returns tends to exhibit multiple equilibria, and the occurrence of

insignificant events may accidentally provide one of them with initial benefit in adoption, making it develop more than the others. This technology would then be adopted and developed further. Azariadis and Drazen (1990) emphasize that the existence of threshold externalities, generated by increasing social returns in the accumulation of human capital, may lead countries with initially similar conditions to converge to different multiple and stable equilibria. Diamond (1982) suggests that the difficulty in searching for business partners may discourage many agents from entering the industry, which eventually makes searching for the partners even harder for the other agents.

The second group of models corresponds to the second layer of development process, which involves both the exogenous external environments and institutions (both exogenous and endogenous) that indirectly affect the development process through their effects on the behavior of economic agents.

Exogenous external environments that are commonly proposed include, among others, geographical and demographic differences among nations. The geography hypothesis claims that persistent division between developed and underdeveloped nations is generated by geographical locations. This hypothesis mainly stems from two main arguments (Acemoglu & Robinson 2012). First, infectious diseases in some areas, for example, malaria in tropical countries, have adverse impacts on human health and labor productivity, which may lead the countries in these areas to suffer from poverty traps (Sachs, 2006). Second, some countries are stuck in underdevelopment traps because they are located in areas where agricultural land is intrinsically unproductive (Diamond 1997). Along this line, Bonds, Keenan, Rohani, and Sachs (2010) develop a model in which the poverty trap is generated by the ecology of

infectious diseases. As for the demographic rationale, Nelson (1956) points out that least developed countries are usually stuck in the vicious cycle of persistent high population growth and low income per capita. In line with this, Doepke and Zilibotti (2005) show that underdeveloped countries may be caught in child labor traps.

The institutional hypothesis claims that economic, financial, and political institutions that are established in countries are the key determinants of development traps. For example, Howitt and Mayer-Foulkes (2005) and Acemoglu, Aghion, and Zilibotti (2006) argue that globalization allows technology spillover or transfer between different countries, which may lead to growth convergence. However, economic institutions favorable for technology imitation are growth enhancing only for countries at the early stage of development. Failure to adapt appropriate institutions to technological development may lead to non-convergence traps. Aghion, Howitt, and Mayer-Foulkes (2005) show that financial constraints, particularly credit constraints, may be the causes of underdevelopment traps. As for the political institution hypothesis, many researchers argue that weak democratic and legal institutions, for example, corruption, rent seeking, and clientelism, are the causes of development traps in resource-abundant nations (Torvik, 2002; Mehlum, Moene, & Torvik, 2006; Robinson, Torvik, & Verdier, 2006; Acemoglu & Robinson, 2012).

The third group of approaches corresponds to the third layer of development process, in terms of which cultural factors, such as predominant social norms, beliefs, preferences, and attitudes in countries, are the primary roots of persistent underdevelopment. The notion of cultural effects on economic development can be tracked back at least to the work of Weber ([1902] 1958),

who links the Protestant reformation and ethic to the rise of industrialized society in Western Europe. Formal economic models in this field have become increasingly attractive to development economists in the last 2 decades. Indeed, Aghion and Howitt (2009) point out that cultures and beliefs may be the most fundamental layer of the economic development process. Culture may be considered as the cognitive dimensions of institutions (Sindzingre, 2007). In this sense, cultural factors, such as social norms, which move slowly and are hard to change, may be considered the supporting factors of different institutions (Acemoglu & Robinson, 2012). It can be perceived that the development process works as follows: cultural factors support the existence of different institutions, and different institutions lead individual agents to have different incentives and make different choices in the market, which eventually brings about multiple equilibria. However, some researchers, such as Tabellini (2010), even argue that insights from cultural hypothesis may help us understand why the same institutions function differently in different economies. He raises the example of the Italian judicial system, which works very differently in Northern and Southern Italy, where legal and economic institutions (legal system, judges' career paths, and human capital) are very similar. He concludes that historical differences of the two regions, which shape different cultures and norms, can explain this puzzle.

The concepts that are most commonly used in the modeling of culture and economic development literature are perhaps those of trust and trustworthiness. These two concepts are interrelated and inseparable. Trustworthy behavior among members of society induce higher social trust in the society. Aghion et al. (2009) develop a model to show that distrust among agents pre-

dominating in an economy creates public demand for regulations. Too many regulations in turn discourage social capital accumulation, which eventually leads to multiple equilibria of development. Similarly, Tirole (1996) shows that lack of trust among different economic agents, particularly that generated by existing bad reputations of the group to which the agents belong, induce them to behave dishonestly toward one another, which eventually creates persistent corruption and underdevelopment traps.

Culture or social norms are always viewed as persistent and changing very slowly over time compared to other economic phenomena. Culture and social norms are transferred from one generation to another. The process of intergenerational transmission of culture is formalized by Bisin and Verdier (2001), who conceptualize intergenerational cultural transmission as the results of two interactions between vertical direct socialization and horizontal socialization. The former refers to intentional socialization within the family, in particular, from parents to their offspring, while the latter is imitation and learning from other members in the society, for example, friends, colleagues, and teachers.

Incorporating the ideas of cultural transmission pioneered by Bisin and Verdier (2001), Francois and Zabojnik (2005) develop a model to show the complementarity between social capital, particularly trustworthiness, and more efficient modern production. The basic argument behind this model is that modern production is more vulnerable to expropriation than less efficient traditional production. Firms choose modern production only if they believe their partner contractors are trustworthy. Similarly, parents try to socialize their offspring to be trustworthy if it increases their chances of employment compared to opportunistic characteristics. While the cultural transmission process

moves slowly in response to change, firm decisions are quick to change. Therefore, the model of Francois and Zabojnik (2005) emphasizes that quick reform that increases the profitability of modern production, for example, globalization, trade openness, or access to new technology, may become favorable for more opportunistic behavior, which in turn causes the economy to become caught in underdevelopment traps.

Francois and Zabojnik (2005) provide a good framework for understanding the effects of social capital on development from the cultural transmission perspectives. Their analysis is useful for the explanation of least developed countries that have been trying to adopt more open and globalized policies to gain access to modern production, but have failed to move beyond underdevelopment traps.

However, in some least developed countries, development occurs in traditional production instead of modern production. For example, globalization and free trade agreements may lead to a boom in the price of primary products, such as agricultural products and other natural resources. It would be equally important to investigate the interaction between the development of social capital and traditional production. The model of Francois and Zabojnik (2005) focuses only on analyzing the development of modern production, and treats traditional production as inactive. In their model, contractors are completely unemployed if they are not hired in modern production. This, of course, implies that the effects of development of the traditional production sector are not taken into account by parents when making decisions about socializing their offspring. Further analysis concentrating on the traditional side of production may offer more useful insights.

In this chapter, by following the setting pioneered by Bisin and Verdier (2001) and Francois and Zabojnik (2005), we develop a new cultural transmission model of underdevelopment traps, incorporating the role of the development of an economy's traditional sector. Our model is different from Francois and Zabojnik (2005) in several ways. First, while their focus is on the effects of the modern production development, ours is on the effects of traditional production. Second, unlike their model, the key features of our model are the characteristics of traditional production, in which we assume possible monitoring on contractors, leaving no room for opportunistic behavior. Traditional production usually involves simple and routine jobs that are easier to monitor and control than those in modern production, which usually involve sophisticated jobs, high skills, and more discretionary power of contractors. Therefore, opportunistic contractors may be hired to work in traditional production firms if they are not employed in the modern firms. This, of course, affects the incentives and process of cultural development. Such mechanisms do not exist in the model of Francois and Zabojnik (2005).

By contributing to the theoretical literature, our model sheds new light on the understanding of the causes of underdevelopment traps and resource curse phenomena. It does so from the perspective of cultural transmission through the lens of the interaction between the development of social trust and traditional production. To the best of our knowledge, this is the first such attempt in the literature. The subsequent sections proceed as follows. Section 2 presents the setting of the model. The equilibrium analysis and results are discussed in Section 3. Section 4 concludes.

4.2 Model

In this model, the economy lives infinitely and each period is denoted by a subscript, t . For each period, one unit measure of homogenous potential entrepreneurs are born and one unit measure of their trading partners, called “contractors,” are born. Both entrepreneurs and contractors live for one period only. The entrepreneurs are purely economic agents; they do not have any cultural traits or norms. Each entrepreneur can set up a production firm by hiring a contractor to work for him, and they share the total production output as follows: the entrepreneur obtains a share $\alpha \in (0, 1)$ of the total output, and the remaining proportion $(1 - \alpha)$ of the total output is allocated to the partner contractor. The contractors may have different cultural traits or hold different cultural norms, which is discussed later. They are of overlapping generations, in which a young child is born when his adult parent is still alive. However, only adult contractors are active in economic transactions, and the young child learns and is influenced by the cultural norms of only his parent and the society. The young child becomes an adult when his parent dies and then, starts to become involved in economic transactions, holding the cultural norms he obtained when young. This process is repeated infinitely. Moreover, we assume that the entrepreneur is matched with only one adult contractor once in his life. Since the numbers of entrepreneurs and adult contractors in each period are equal, all entrepreneurs are able to find a partner.

Before providing a detailed discussion on production and profitability, we first illustrate the two different norms of contractors. We assume that the contractors can be of two types: trustworthy and opportunistic. Trustworthy contractors are those who behave in accordance with the promise and contracts

made with the entrepreneurs who hire them. On the other hand, opportunistic contractors are those who break promises or violate the contracts made with their trading partners, particularly the entrepreneurs, if they consider they will be better off doing so. We draw attention to the fact that although we use the terms “trustworthy” and “opportunistic,” they do not generally refer to honest (good) and dishonest (bad) agents, and we do not intend to imply that opportunistic agents are always bad. These two types of agents should be considered as two competing norms or beliefs in the society. For example, following Tabellini (2008), these two competing norms can be thought of as the distinction between norms of limited and generalized morality. In this sense, “trustworthy agents” can be considered as those who hold norms of general morality, in which they always keep their promises and obey the formal contracts made with all partners, for example, outsiders, strangers, or foreign partners, regardless of their familiarity with them. On the other hand, “opportunistic agents” can be interpreted as those who hold norms of limited morality, in which they keep promises only within a narrow circle of people in their individual group, community, village, or family. Outside this circle, cheating is permitted and regularly committed. These agents may not be bad people, taking into account the different values and definition of morality and justice. For example, they may violate formal contracts with outsiders, as long as such behavior is beneficial to their own communities. The points we emphasize here about the difference between the two norms are not about which is morally better than the other. However, we emphasize that these two competing norms are favorable for different kinds of production. For example, while opportunistic (or limited morality) may be favorable for small and

traditional production in a local village, trustworthy (or general morality) is necessary for large-scale and modern production, which usually involves more discretion and larger ranges of cooperation between many unfamiliar partners.

We denote subscript T for the trustworthy type, and subscript O for the opportunistic type, and denote $\beta_t \in [0, 1]$ for the proportion of trustworthy contractors and $(1 - \beta_t)$ for the proportion of the opportunistic ones in period t . If cheating is possible, a contractor of either type can behave opportunistically, particularly by cheating the entrepreneur, and earn a financial benefit $b > 0$, in addition to the total production output share he can obtain. However, while there is no utility loss for the intrinsically opportunistic contractor to cheat, the intrinsically trustworthy contractor has a disutility of γ if he cheats. This can be considered as feelings of guilt for breaking promises, which occurs only for trustworthy contractors. The contractors do not have any other outside options besides working for the entrepreneurs.

These two types of norms or preferences of the contractors are transferred from one generation to another in the way formalized by Bisin and Verdier (2001). The intergenerational transmission is that of asexual one-for-one reproduction with only two possible types, trustworthy and opportunistic. The transmission occurs through two types of transmission process: 1) direct vertical socialization (effort of parents to directly transmit their own preferences to their offspring); and 2) horizontal socialization (social interaction, imitation, and learning from others in the society). We denote q^{ij} as the probability that a child of a type- i parent becomes the contractor of type- j trait through horizontal socialization, with the subscripts i and $j \in \{T; O\}$. As for direct vertical socialization, we assume that the trustworthy parent can make effort

to transfer his preferences to his child. We call such efforts the *education effort*, which refers to education inside the family. We denote the probability that his child becomes trustworthy via this education effort by d_t . However, this direct vertical socialization incurs cost C , where C is an increasing function of d_t and is given as $C(d_t) = \frac{d_t^2}{2\phi}$. This cost function implies that $C(0) = 0$, $C'(d_t) \geq 0$ and $C''(d_t) \geq 0$. Moreover, we assume that the trustworthy parent is altruistic and always tries to choose d_t to maximize the expected utility of his child, by considering the perspective of his own intrinsic type. This means that the trustworthy parent takes into account the utility loss of feeling guilty from cheating, γ , when considering the utility of his potential opportunistic child, even though the potential opportunistic child does not face this loss. This kind of assumption is common in the cultural transmission literature. Since our analysis is on the development of social capital, we focus only on the education effort made by trustworthy parents to educate their offspring, and simply assume that there is no education effort made by the opportunistic parents. Including the education effort of the opportunistic parents does not change our qualitative results, but only adds more complexity to the model.

Next, we discuss the production side of the economy. There are two types of production that the entrepreneur can choose: to enter modern production or stay in traditional production. Modern production is more productive and yields higher output, but is also more sophisticated and difficult to monitor, making it vulnerable to opportunistic behavior on the part of the trading partners, particularly the contractor. This could be industrialized and modern production that involves high skills and technologies. The opportunistic behavior in this kind of production can be considered as a case in which pro-

ducers hire contractors to contribute necessary inputs or parts for the final products, and the contractors do not contribute qualified inputs in accordance with the specification of the contracts. Due to the sophistication of the intermediate goods, which is difficult to verify, and the necessary discretion given to the contractors, such kind of production is very vulnerable to cheating. The contractor gains by providing cheaper and low-quality inputs, but the entrepreneur loses. On the other hand, traditional production is less productive but is engaged only with simple and routine work. Thus, it could be almost perfectly monitored and controlled, and is not vulnerable to any opportunistic behavior on the part of the contracting partners. This may refer to production activities in agriculture and natural resource sectors, which do not involve high skills and technologies. In this kind of production, the work of the contractors can be monitored almost perfectly, leaving it almost no room for any opportunistic behavior, compared to that of modern production. The assumption that opportunistic behavior does not occur in traditional production can be considered a case in which the contractor is simply a normal worker who provides labor to the producer and works in simple routine jobs that are easy to monitor and control.

We denote $p_t \in [0, 1]$ as the proportion of entrepreneurs who enter modern production and $(1 - p_t)$ as the proportion of those who choose traditional production. We call the former “the modern producer” and the latter “the traditional producer.” We denote Π_H and Π_L as the notations for production output from modern and traditional production, respectively, where $\Pi_H > \Pi_L$. In either case, the entrepreneur has to hire a contractor to work for him. The entrepreneur does not know perfectly the types of the contractors, but with

probability $\theta \in (0, 1)$, he can detect the opportunistic type of the contractor before making production choices.

If the entrepreneur wants to enter modern production, the entrepreneur has to first invest in the entry sunk cost $k(p_t)$, which is assumed to be a linear and increasing function of p_t , where $k'(p_t) > 0$, $k(0) = 0$. The assumption that $k'(p_t) > 0$ implies that the cost of entering modern production is increasing in the number of modern producers. For example, when more firms want to hire office space in a capital city, the office rentals in that city become more expensive. In addition to the entry cost, if the entrepreneur is cheated by the contractor in modern production, he will lose a share $\delta \in (0, 1)$ of the total production output. On the other hand, if the entrepreneur chooses traditional production, he does not need to invest any entry cost, and is never subject to any loss of opportunistic behavior. The only disadvantage is lower output compared to that of modern production.

Lastly, for simplicity, we assume that the utility of all agents—both entrepreneurs and contractors—is only linear in consumption or that utility is only equal to income.

4.3 Equilibrium

The equilibrium solution of this model is derived from the strategic interaction between all agents. By using backward induction, each player's strategies can be thought of in the following order. First, the contractor decides whether to cheat the entrepreneur after being hired. Second, the entrepreneur decides on the types of production to choose based on his expectation about the types of contractor he meets, taking into account the contractor's cheating behavior.

Lastly, the parent of the potential contractor decides on the education effort to maximize the expected utility of his offspring, considering the entrepreneur's strategies.

Before we proceed to the solution, in order to simplify the model, we introduce the following two assumptions:

Assumption 4.1 $b - \gamma < 0$

Assumption 4.2 $\alpha - \delta < 0$

Since the opportunistic contractor always gains from cheating, he always cheats, if possible; Assumption 4.1 assures that the trustworthy contractor never cheats at all. In this sense, the strategies of the contractors in the production partnership are straightforward. Considering this behavior of the contractor, Assumption 4.2 implies that the entrepreneur never chooses modern production if he meets an opportunistic contractor and can detect his type, because doing so leads to negative profit.

Considering these two assumptions, the main mechanism of this dynamic model lies only in the strategic interaction between the education effort of the trustworthy parent of the contractor and the entrepreneurs' choices of production in each period. The dynamic interaction of these two strategies derives the steady-state solutions of the two key endogenous variables of this model, β and p , which are denoted as β^* and p^* , respectively.

Moreover, note in advance that we assume the entrepreneur can switch quickly between the two types of production to adapt to any changes. Therefore, the dynamic parameter p^* is a jump variable that moves quickly in response to a change. However, although the trustworthy parent can choose

his optimal education effort levels immediately to adapt to the change, the dynamic parameter β^* evolves slowly in adaptation to the change due to the gradual effect of the cultural socialization process.

4.3.1 Parental Education Effort

Now, we consider the trustworthy parent's decision on his education effort. Denote the probability that a child of a type- i parent becomes the type- j contractor by P_t^{ij} via the two socialization processes, with subscripts i and $j \in \{T; O\}$. Based on our assumptions about the intergenerational cultural transmission process, this probability can be presented as follows:

$$\begin{aligned} P_t^{TT} &= 1 - (q^{TO} - d_t) \\ P_t^{TO} &= q^{TO} - d_t \\ P^{OO} &= 1 - q^{OT} \\ P^{OT} &= q^{OT} \end{aligned} \tag{4.1}$$

Consequently, the proportion of offspring who become the trustworthy type in period $t + 1$ is given by

$$\beta_{t+1} = [1 - (q^{TO} - d_t)]\beta_t + q^{OT}(1 - \beta_t) \tag{4.2}$$

From equation 4.2, a different equation for β can be obtained as follows

$$d\beta = \beta_{t+1} - \beta_t = q^{OT}(1 - \beta_t) - (q^{TO} - d_t)\beta_t \tag{4.3}$$

Next, denote U_t^{TT} and U_t^{TO} as the expected utility of the trustworthy and opportunistic child (contractor), respectively, of the trustworthy parent, from

the perspective of the trustworthy parent. These two utility functions are given as follows:

$$U_t^{TT} = (1 - \alpha)[p_t\Pi_H + (1 - p_t)\Pi_L] \quad (4.4)$$

$$U_t^{TO} = p_t(1 - \theta)[(1 - \alpha)\Pi_H + (b - \gamma)] + (1 - p_t)(1 - \alpha)\Pi_L \quad (4.5)$$

The trustworthy parent chooses the education effort or equivalently, the probability d_t , so as to maximize his child's expected utility. Then, this maximization problem is given by

$$d_t^* = \max_{d_t} 1 - (q^{TO} - d_t)U_t^{TT} + (q^{TO} - d_t)U_t^{TO} - C(d_t) \quad (4.6)$$

Using $C(d_t) = \frac{d_t^2}{2\phi}$, along with equation 4.4, and 4.5, the solution of the maximization problem in equation 4.6 can be derived as the function of p_t

$$d_t^*(p_t) = \phi p_t[\theta(1 - \alpha)\Pi_H + (1 - \theta)(\gamma - b)] \quad (4.7)$$

From, equation 4.7, it is shown easily that $d_t^{*'}(p_t) > 0$, implying that the equilibrium education effort is always increasing in the number of modern producers. The reason for this result is that an increase in p_t raises the chance of employment of the trustworthy child (contractor) in the modern production. Thus, the expected utility of the trustworthy child also increases in p_t , making it better off for the trustworthy parent to put more education effort on his child.

Note from equation 4.1 that the trustworthy parent never makes education

effort such that d_t is larger than q^{TO} . Therefore, d_t^* has an upper-bound value given by $d_t^*(p_t) \leq q^{TO}$.

Subsequently, by using equation 4.7, and $d_t^*(p_t) \leq q^{TO}$, the minimum and maximum equilibrium values of d_t^* evaluated at $p_t = 0$, and $p_t = 1$ are given as follows

$$d_t^*(0) = 0 \tag{4.8}$$

$$d_t^*(1) = \min (\phi[\theta(1 - \alpha)\Pi_H + (1 - \theta)(\gamma - b)]; q^{TO}) \tag{4.9}$$

Figure 4.1 provides an illustration of $d_t^*(p_t)$. There are three cases presented in this figure.

- Case 1 corresponds to the case in which $\phi[\theta(1 - \alpha)\Pi_H + (1 - \theta)(\gamma - b)] < q^{TO}$, implying that the equilibrium d_t^* never reach its upper-bound value even at its maximum optimal point when $p_t = 1$.
- Case 2 represents the case in which $\phi[\theta(1 - \alpha)\Pi_H + (1 - \theta)(\gamma - b)] = q^{TO}$, which implies that the maximum optimal value of d_t^* that the trustworthy parent chooses when $p_t = 1$ is just equal to its upper-bound value q^{TO} .
- Case 3 is the case in which $\phi[\theta(1 - \alpha)\Pi_H + (1 - \theta)(\gamma - b)] > q^{TO}$, indicating that d_t^* reaches its upper-bound value before $p_t = 1$.

Hereafter, we omit Case 3, and focus only on the first two cases. Therefore, we place a restriction on our parameters to assure that $\phi[\theta(1 - \alpha)\Pi_H + (1 - \theta)(\gamma - b)] \leq q^{TO}$. This condition holds as long as ϕ is small enough. Therefore, we introduce another assumption:

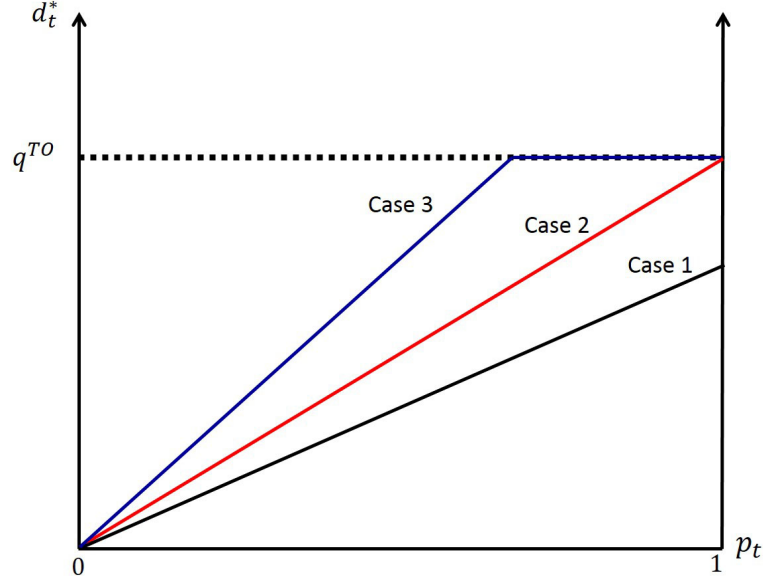


Figure 4.1: Equilibrium d_t^* as a function of p_t

Assumption 4.3 $\phi \leq \frac{q^{TO}}{[\theta(1-\alpha)\Pi_H + (1-\theta)(\gamma-b)]}$

Assumption 4.3 puts a restriction on the maximum values of the parameter ϕ to assure that the education cost is not too low; in other words, the maximum optimal effort that parents are willing to make educating their children never exceeds its upper-bound value. This assumption is both reasonable and useful for our subsequent analyses.

4.3.2 Evolution of Cultural Preferences

In the next step, we derive the motion equation of the endogenous parameter β_t , which is the proportion of trustworthy contractors in the economy in each period. First, note from the different equation 4.3 that the motion of β_t for a given initial value of β_t depends on the sign of $d\beta$. Define β_t^*

$= \frac{q^{OT}}{q^{OT}+q^{TO}-d_t}$ which satisfies $d\beta = 0$ for a given p_t . This threshold value β_t^* determines the direction of the motion of β_t which is given as follows

$$\left. \begin{aligned} d\beta &> 0 && \text{when } \beta_t < \beta_t^* \\ d\beta &< 0 && \text{when } \beta_t > \beta_t^* \\ d\beta &= 0 && \text{when } \beta_t = \beta_t^* \end{aligned} \right\} \quad (4.10)$$

By inserting the equilibrium value of d_t^* from equation 4.7 into $\beta_t^* = \frac{q^{OT}}{q^{OT}+q^{TO}-d_t}$, we obtain the threshold value β_t^* as a function of p_t .

$$\beta_t^*(p_t) = \frac{q^{OT}}{q^{OT} + q^{TO} - \phi p_t [\theta(1 - \alpha)\Pi_H + (1 - \theta)(\gamma - b)]} \quad (4.11)$$

Subsequently, the minimum and maximum values of β_t^* evaluated at $p_t = 0$, and $p_t = 1$ are given as follows

$$\left. \begin{aligned} \beta_t^*(0) &= \frac{q^{OT}}{q^{OT}+q^{TO}} \\ \beta_t^*(1) &= \frac{q^{OT}}{q^{OT}+q^{TO}-\phi[\theta(1-\alpha)\Pi_H+(1-\theta)(\gamma-b)]} \leq 1 \end{aligned} \right\} \quad (4.12)$$

Note that $\beta_t^*(1) \leq 1$ is directly derived from Assumption 4.3.

The sign of the first derivatives of equation 4.11 can be confirmed as follows

$$\frac{\partial \beta_t^*(p_t)}{\partial p_t} = \frac{\phi[\theta(1 - \alpha)\Pi_H + (1 - \theta)(\gamma - b)]q^{OT}}{\{q^{OT} + q^{TO} - \phi p_t [\theta(1 - \alpha)\Pi_H + (1 - \theta)(\gamma - b)]\}^2} > 0 \quad (4.13)$$

Equation 4.13, indicates that $\beta_t^*(p_t)$ is an increasing function, implying that the number of trustworthy contractors is increasing in the the number of modern producers. The reason for this result comes directly from $d_t^{*'}(p_t) > 0$,

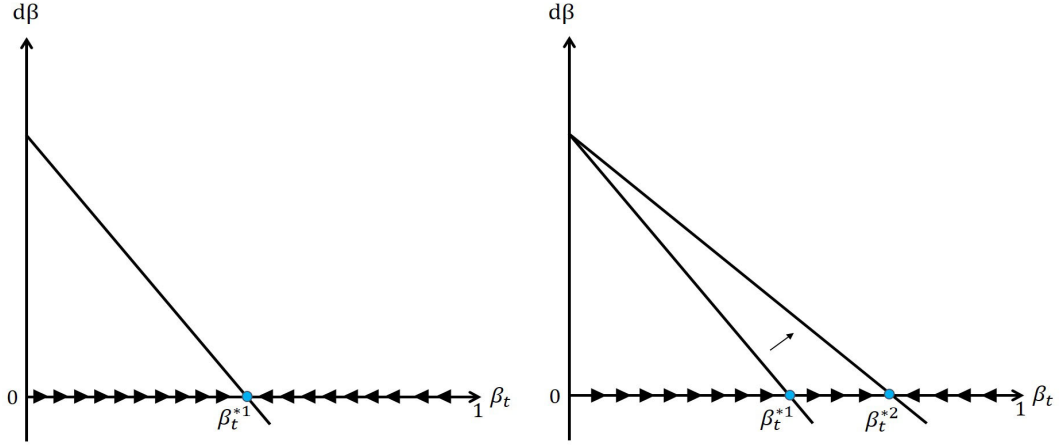


Figure 4.2: The effect of an increase in p_t on β_t^*

which we mentioned earlier. The existence of more modern producers implies that the trustworthy child has more chance of employment in modern production, which yields higher utility for him. For a given education cost, this induces the trustworthy parent to put more education effort into his child, which eventually results in an increase in the number of trustworthy contractors in the new generation.

Figure 4.2 provides a graphical illustration of this result. First, observe the figure on the left-hand side. If the economy starts with $\beta_t < \beta_t^{*1}$, β_t is increasing and moving to the right until it reaches the equilibrium value β_t^* ; the reverse movement occurs when $\beta_t > \beta_t^{*1}$. Now, compare the two figures; originally, β_t^* is at point β_t^{*1} in the figure on the left-hand side. An increase in p_t shifts the different equation of β_t upward to the right as shown in the figure on the right-hand side, leading to a higher value of β_t^* at point $\beta_t^{*2} > \beta_t^{*1}$.

Next, from equation 4.13, we can check the sign of the second derivatives of $\beta_t^*(p_t)$.

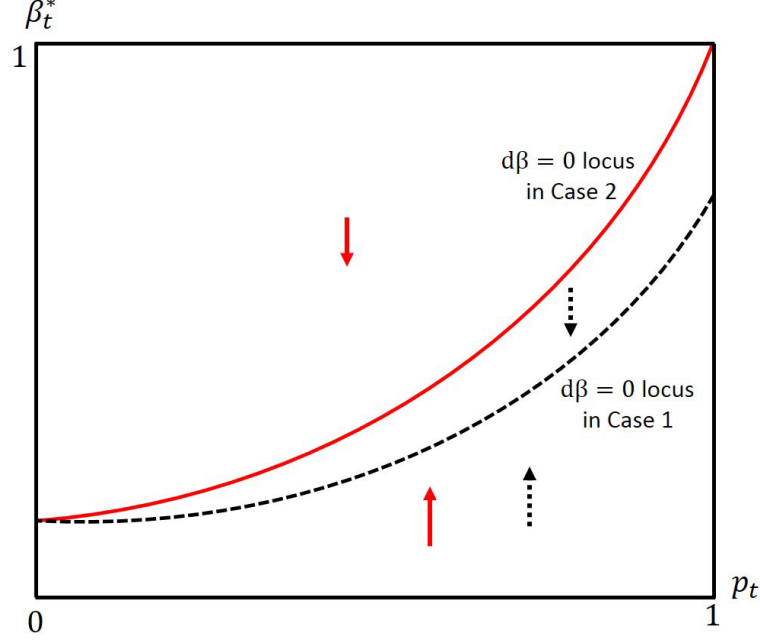


Figure 4.3: A concave function of $\beta_t^*(p_t)$

$$\frac{\partial^2 \beta_t^*(p_t)}{\partial^2 p_t} = \frac{2\phi^2[\theta(1-\alpha)\Pi_H + (1-\theta)(\gamma-b)]^2 q^{OT}}{\{q^{OT} + q^{TO} - \phi p_t[\theta(1-\alpha)\Pi_H + (1-\theta)(\gamma-b)]\}^3} \quad (4.14)$$

From Assumption 4.3, it can be confirmed that $q^{OT} + q^{TO} > \phi p_t[\theta(1-\alpha)\Pi_H + (1-\theta)(\gamma-b)]$, implying that $\frac{\partial^2 \beta_t^*(p_t)}{\partial^2 p_t} > 0$. Then, equation 4.13 and 4.14 indicate that $\beta_t^*(p_t)$ is a concave and increasing function of p_t . For ease of reference in the subsequent analyses, we state this result in the following Lemma.

Lemma 4.1 $\beta_t^*(p_t)$ is a concave and increasing function of p_t .

The graphical analysis of this equation is presented in Figure 4.3. Since

$\beta_t^*(p_t)$ is the direct result of $d_t^*(p_t)$, we presents two curves in this graph, which correspond to Cases 1 and Case 2 in Figure 4.1. Case 1 arises when Assumption 4.3 holds with inequality. Case 2, on the other hand, represents the case of equality of Assumption 4.3. Note that only in Case 2, β_t^* can reach 1, its maximum point. This is because d_t^* can reach its upper-bound value q^{TO} only under the equality case of Assumption 4.3.

For the subsequent analysis, we focus on Case 2 only. Therefore, we are restricted to the equality case, in which $\phi = \frac{q^{TO}}{[\theta(1-\alpha)\Pi_H+(1-\theta)(\gamma-b)]}$. This restriction is to assure that β_t^* may reach 1 at its maximum point, or that an economy comprising all trustworthy contractors is possible. Although we focus our analysis only on Case 2, the results in our subsequent analysis are not limited to this case only. Our qualitative results remain valid for other values of ϕ that is closely below $\frac{q^{TO}}{[\theta(1-\alpha)\Pi_H+(1-\theta)(\gamma-b)]}$. Moreover, our results may be valid even when ϕ is moderately below $\frac{q^{TO}}{[\theta(1-\alpha)\Pi_H+(1-\theta)(\gamma-b)]}$ for some ranges of parameters.

4.3.3 Dynamic Adjustment of Entrepreneurs

Now, we turn to consider the entrepreneurs' decisions about which production type to choose. Denote V_H and V_L as the payoffs of the entrepreneur who chooses modern and traditional production, respectively, in each period. We omit the subscript t from these two variables, as it does not cause any confusion. If the entrepreneur enters modern production, his payoff in each period, excluding the entry cost $k(p_t)$, is given by $V_H = [\beta\alpha + (1-\beta)(1-\theta)(\alpha-\delta)]\Pi_H$, which can be rearranged as follows

$$V_H = \{[1 - (1 - \beta)\theta]\alpha - (1 - \beta)(1 - \theta)\delta\}\Pi_H \quad (4.15)$$

On the other hand, if he chooses to stay in traditional production, his payoff is given as

$$V_L = \alpha\Pi_L \quad (4.16)$$

In addition, note that all entrepreneurs engage in either one of the two production types, and no entrepreneur chooses to stay inactive, because at least they can earn positive payoffs of $\alpha\Pi_L$ in the traditional production.

The entrepreneur keeps moving between the two types of production until the net profit of the two options are equal $V_H - V_L = k(p_t)$. Let $W = V_H - V_L$. By using equations 4.15, 4.16, the free-entry equation is given by

$$W(\beta_t) \equiv \alpha(\Pi_H - \Pi_L) - \eta(1 - \beta_t)\Pi_H = k(p_t) \quad (4.17)$$

where $\eta = \theta\alpha + (1 - \theta)\delta > 0$.

Now, define $p_t^* \in R$ which satisfies $W(\beta_t) = k(p_t^*)$ for a given β_t . Using equation 4.17, we derive the following results.

$$\left. \begin{array}{ll} p_t^* = 0 & \text{if } W(\beta_t) \equiv \alpha(\Pi_H - \Pi_L) - \eta(1 - \beta_t)\Pi_H < k(0) \equiv 0 \\ 0 < p_t^* < 1 & \text{if } W(\beta_t) \equiv \alpha(\Pi_H - \Pi_L) - \eta(1 - \beta_t)\Pi_H = k(p_t^*) \\ p_t^* = 1 & \text{if } W(\beta_t) \equiv \alpha(\Pi_H - \Pi_L) - \eta(1 - \beta_t)\Pi_H > k(1) \end{array} \right\} \quad (4.18)$$

These equations, along with the assumption about the speed of the en-

entrepreneur's movement, implies that p_t^* is a jump variable, meaning that the entrepreneur is always in equilibrium, switching quickly between the two production types in order to adapt to the changes.

Moreover, note that $W(\beta_t)$ is linear and increasing in β_t . This result, along with the free-entry condition and the assumption that $k(p_t^*)$ is a linear and increasing function, implies that p_t^* is also a linear and increasing function of β_t .

$p_t^{*'}(\beta_t) > 0$ implies that an increase in the number of trustworthy contractors induces more entrepreneurs to choose modern production instead of traditional production. The reason behind this result is that more trustworthy contractors lead to more expected payoffs from the modern production compared to the traditional production for a given k . We state this result in the following lemma.

Lemma 4.2 *$p_t^*(\beta_t)$ is a linear and increasing function.*

Figure 4.4 illustrates the free-entry condition and effect of an increase in β_t on p_t^* . The figure on the left-hand side shows the three possible values of p_t^* corresponding to those stated in equation 4.18. The figure on the right-hand side shows that an increase in β_t shifts $W(\beta_t)$ curve upward, resulting in a higher value of p_t^* .

The results from Lemmas 1 and 2 indicate that the numbers of modern producers and trustworthy contractors are complimentary to each other. More trustworthy contractors mean higher profits for modern producers, and more modern producers lead to more education effort of trustworthy parents, and thereby, an increase in the number of trustworthy contractors.

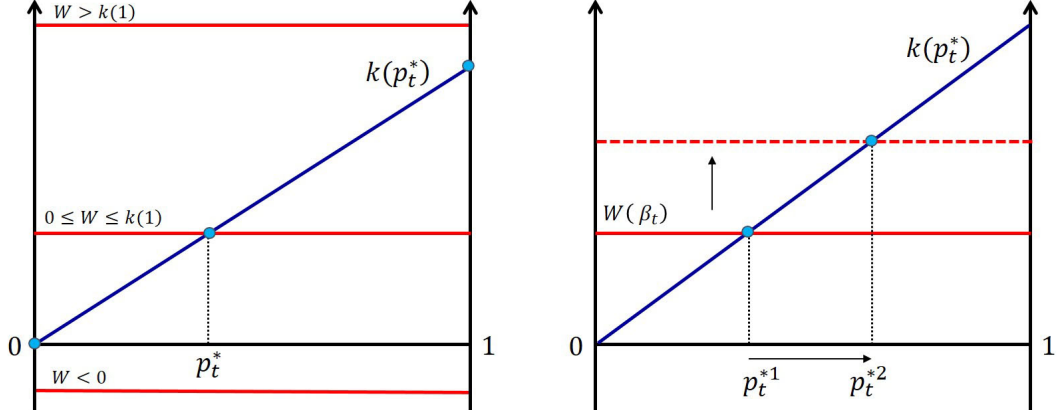


Figure 4.4: p_t^* at different levels of W (Left) and the effect of an increase in β_t (Right)

As we already have derived the dynamic equations of the two key variables $p_t^*(\beta_t)$ and $\beta_t^*(p_t)$, we are almost ready to solve for the steady-state equilibrium points $(p^*; \beta^*)$. However, we first need to introduce another assumption:

Assumption 4.4 $\alpha(\Pi_H - \Pi_L) > k(1)$

Assumption 4.4 is to assure that the output from modern production is high enough relative to Π_L and $k(p_t)$, such that the profitability in modern production remains always strictly higher than that in the traditional production, even when all entrepreneurs choose modern production (i.e., the economy with full modern producer is possible).

From equation 4.18, we derive the following results:

- If $\beta_t \leq \bar{\beta} \equiv 1 - \frac{\alpha}{\eta} \frac{\Pi_H - \Pi_L}{\Pi_H}$, then $W(\beta_t) \leq \kappa(0) \equiv 0$, implying that $p_t^* = 0$
- If $\beta_t = 1$, then $W(\beta_t) = \alpha(\Pi_H - \Pi_L)$, and by Assumption 4.4, this implies that $W(\beta_t) > k(1)$, and thus $p_t^* = 1$

- If $\bar{\beta} \leq \beta_t < 1$, then $0 < p_t^* \leq 1$ (since $p_t^{*'}(\beta_t) > 0$).

Note that $\bar{\beta}$ always lies between 0 and 1, and p_t^* is always equal to 0 when $\beta_t \leq \bar{\beta}$. However, p_t^* may reach a value of 1 although $\beta_t < 1$. This is because Assumption 4.4 implies that $\alpha(\Pi_H - \Pi_L)$ is strictly larger than $k(1)$. In particular, assume there are some high values of β_t that are close to 1, denoted by $\tilde{\beta}_t$. Now assume that $W(\tilde{\beta}_t) = \alpha(\Pi_H - \Pi_L) + \varepsilon$, where $\varepsilon = \eta(1 - \tilde{\beta}_t)\Pi_H$, which is a small value since $\tilde{\beta}_t$ is close to 1. Then, if $\alpha(\Pi_H - \Pi_L) > k(1) + \varepsilon$, p_t^* reaches a value of 1 at $\tilde{\beta}_t$. For the subsequent analysis, we consider the case where $\alpha(\Pi_H - \Pi_L) > k(1) + \varepsilon$ to ensure that p_t^* may reach a value of 1 before $\beta_t = 1$. This case corresponds to the case in which full modern production is possible without full trustworthy contractors, providing that the number of trustworthy contractors is high enough. Figure 4.5 depicts the function of $p_t^*(\beta_t)$ corresponding to this case.

4.3.4 Steady States

In this model, the steady-state equilibrium points $(p^*; \beta^*)$ are derived from the intersection of the two dynamic equations 4.11 and 4.18. Since p_t is the jump variable and β_t adjusts slowly. The economy suddenly moves to the equilibrium point p^* , then starts to adjust slowly to the equilibrium point β^* along the $dp = 0$ locus.

We solve for the steady-state equilibrium points $(p^*; \beta^*)$ by using the graphical analyses, particularly, Figure 4.6. This figure combines the dynamics equations 4.11 and 4.18 together in $(\beta; p)$ spaces. Note that Figure 4.6 corresponds to the case in which $\beta_t^*(0) < \bar{\beta}$. For the subsequent analyses, we present only the case of $\beta_t^*(0) < \bar{\beta}$.

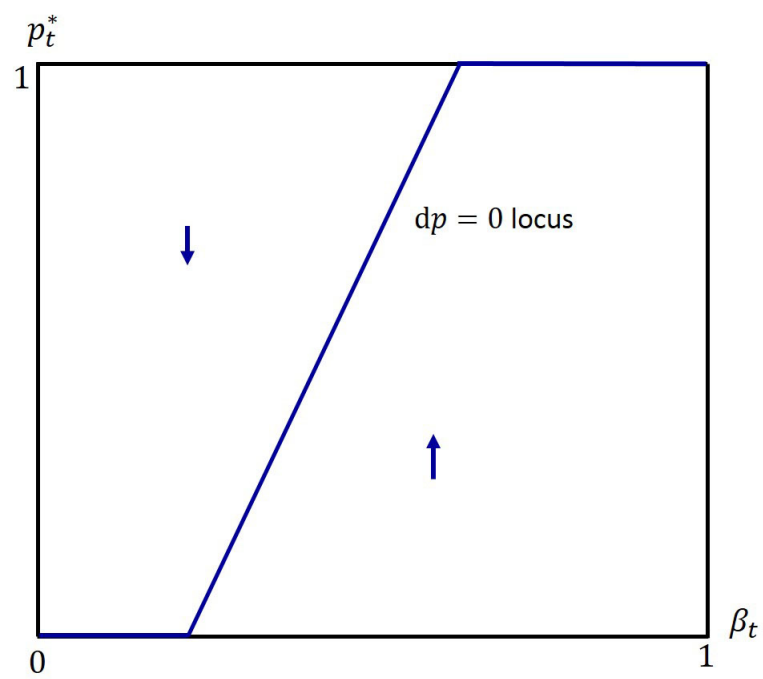


Figure 4.5: The function $p_t^*(\beta_t)$

In the following, we formally provide the proof that $\beta_t^*(0) < \bar{\beta}$ can be the valid condition that does not contradict our previous assumptions.

Proof. From equation 4.12, $\beta_t^*(0) = \frac{q^{OT}}{q^{OT} + q^{TO}}$, so $\beta_t^*(0) < \bar{\beta}$ if and only if $q^{OT} < \frac{\bar{\beta}}{1-\bar{\beta}} q^{TO}$. By using $\bar{\beta} \equiv 1 - \frac{\alpha}{\eta} \frac{\Pi_H - \Pi_L}{\Pi_H}$ and $\eta = \theta\alpha + (1-\theta)\delta$, it follows that $q^{OT} < q^{TO} \frac{\Pi_H(\delta-\alpha)(1-\theta) + \alpha\Pi_L}{\alpha(\Pi_H - \Pi_L)}$. Subsequently, since $q^{TO} \frac{\Pi_H(\delta-\alpha)(1-\theta) + \alpha\Pi_L}{\alpha(\Pi_H - \Pi_L)} > 0$, we need to assure only that $q^{TO} \frac{\Pi_H(\delta-\alpha)(1-\theta) + \alpha\Pi_L}{\alpha(\Pi_H - \Pi_L)} < 1$ so that the probability q^{TO} is in the valid interval $(0, 1)$, which requires that $\Pi_H > \frac{\alpha(q^{TO}+1)}{\alpha - q^{TO}(\delta-\alpha)(1-\theta)} \Pi_L$. The condition that $\Pi_H > \frac{\alpha(q^{TO}+1)}{\alpha - q^{TO}(\delta-\alpha)(1-\theta)} \Pi_L$ implies that Π_H must be large enough relative to Π_L , but does not contradict any of our assumptions for all valid values of α, δ, θ and q^{TO} . ■

From the proof, to assure that $\beta_t^*(0) < \bar{\beta}$ and the validity of our results in Figure 4.6, we introduce another assumption as follows:

Assumption 4.5 $q^{OT} < q^{TO} \frac{\Pi_H(\delta-\alpha)(1-\theta) + \alpha\Pi_L}{\alpha(\Pi_H - \Pi_L)}$ and $\Pi_H > \frac{\alpha(q^{TO}+1)}{\alpha - q^{TO}(\delta-\alpha)(1-\theta)} \Pi_L$

Now, observe Figure 4.6, which combines the loci of $d\beta = 0$ (Case 2) from Figure 4.3 and $dp = 0$ from Figure 4.5. The curved line is $d\beta = 0$ locus and the straight line represents $dp = 0$ locus. Note that because the straight line reaches $p_t^* = 1$ before β_t approaches 1, and the curved line may reach $\beta_t^* = 1$ only when p_t equals 1, the condition that $\beta_t^*(0) < \bar{\beta}$ implies that the straight line intersects with the curved line three times, determining three possible equilibria: two corner equilibria and one interior equilibrium. However, only the two corner equilibria are the stable equilibria in the steady state. These two corner stable equilibria are located at points $(\beta^* = 1; p^* = 1)$ and $(\beta^* = \frac{q^{OT}}{q^{OT} + q^{TO}}; p^* = 0)$, in which both β^* and p^* are higher in the former than the latter. Therefore, we call the former *high social capital/modern production equilibrium* and the latter *low social capital/traditional production*

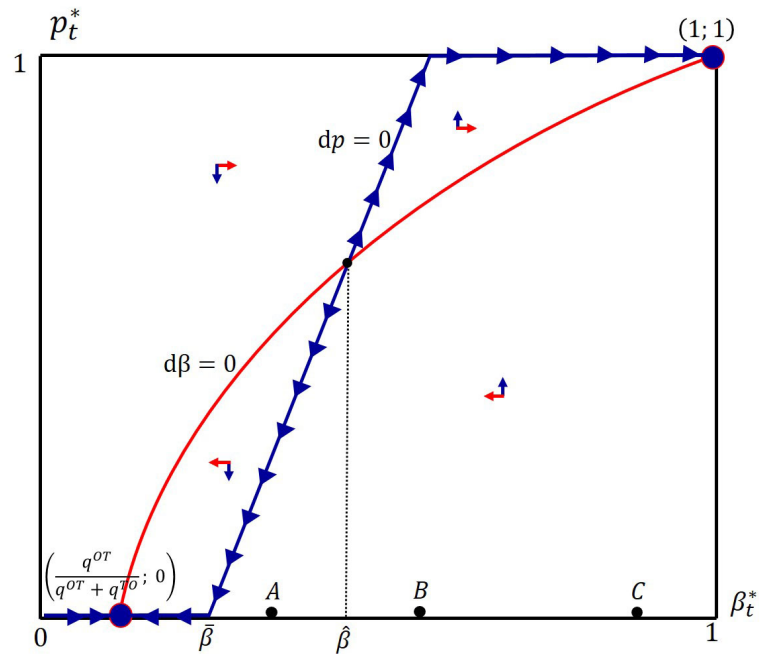


Figure 4.6: The steady state $(\beta^*; p^*)$ in case of $\beta_t^*(0) < \bar{\beta}$

equilibrium. Since the straight line crosses the curved line from the inside, particularly at points $(\beta_t^* = \widehat{\beta} ; p^* = p^*(\widehat{\beta}))$, the equilibrium at these points are not stable. However, this unstable equilibrium is the border point of β_t , which separates the economies into the two different stable equilibria. For example, Country *B* and *C*, which begin with $\beta_t > \widehat{\beta}$, move to *high social capital/modern production equilibrium at points (1;1)*. On the other hand, Country *A*, which has initial values of $\beta_t < \widehat{\beta}$, converge to the *low social capital/traditional production equilibrium at points $(\frac{q^{OT}}{q^{OT}+q^{TO}}; 0)$* . We formally summarize these results in the following proposition.

Proposition 4.1 *Under Assumption 4.1–4.5, there are two corner stable equilibria points $(\beta^* = 1 ; p^* = 1)$ and $(\beta^* = \frac{q^{OT}}{q^{OT}+q^{TO}}; p^* = 0)$ in the steady state. In addition, there is an unstable interior equilibrium that determines the threshold value, $\widehat{\beta} \in (\frac{q^{OT}}{q^{OT}+q^{TO}}, 1)$, such that the economies beginning with $\beta_t > \widehat{\beta}$ converge to "high social capital/modern production equilibrium," while those with initial value $\beta_t < \widehat{\beta}$ end up in the "low social capital/traditional production equilibrium".*

Proposition 4.1 indicates that cultural factors that support different kinds of production predominating in economies can be the root of divergence of different economies. Only economies that have already accumulated sufficiently high social capital to support new and more efficient modern production may be able to take advantage of this new technological advance. Without enough social capital, the economies remain in low social capital and traditional production.

The fundamental mechanism behind this result is the complimentary strategic interaction between the trustworthy parents' education effort and the entrepreneurs' choices of productions. Due to the risk of opportunistic behavior in modern production and uncertainty of the contractors' types, an initially insufficient number of trustworthy contractors induces some entrepreneurs to choose traditional production that is not vulnerable to opportunistic behavior. In turn, a lower number of modern producers discourages trustworthy parents from educating their offspring, leading to a lower number of trustworthy contractors. Again, this causes more modern producers to switch to traditional production. This cycle is repeated continuously until the economies end up in the *low social capital/traditional production equilibrium*. The opposite movement toward *high social capital/modern production equilibrium* occurs in economies with sufficiently high social capital.

4.3.5 Income

Next, we investigate the total income in an economy in the two possible stable equilibrium points. From Assumption 4.4, it can be noted that the entrepreneurs can always obtain higher net profits from choosing modern production than from engaging in traditional production, as long as the number of trustworthy contractors is high enough. Moreover, since $\Pi_H > \Pi_L$ and cheating is possible only in modern production, both trustworthy and opportunistic contractors are always better off when employed in the modern production. Therefore, the total income in the economy is always highest at the corner steady-state equilibrium points ($\beta^* = 1$; $p^* = 1$). From this, we obtain the following result.

Proposition 4.2 *Under Assumption 4.1–4.5, the total income of the economy in the corner stable equilibrium points $(\beta^* = 1 ; p^* = 1)$ always exceeds that in the corner stable equilibrium points $(\beta^* = \frac{q^{OT}}{q^{OT}+q^{TO}} ; p^* = 0)$ in the steady state.*

Since the *high social capital/modern production equilibrium* is associated with the highest total incomes, it may be referred to as *high development equilibrium*. Similarly, the *low social capital/traditional production equilibrium* can be referred to as *low development equilibrium* or *underdevelopment traps*.

Propositions 4.2 and 4.3 indicate that while countries with sufficient social capital are converging to the high development equilibrium, economies whose predominant cultural norms are favorable only for less efficient traditional production are left behind and become stuck in the *low development equilibrium*. These results clearly show that the causes of underdevelopment traps can be explained by cultural factors, such as social norms and preferences.

4.3.6 Development of Traditional Production

Now, we investigate the effects of the development of the traditional production on the dynamics of the two key variables $(\beta^*; p^*)$. As argued in the introduction of this chapter, some kinds of policies or reforms, such as globalization or free trade agreements, may lead to increases in the profits of traditional production, instead of the development of modern production. For example, trade openness might lead to an increase in the price of natural resources or primary products, such as agricultural products or raw material products. In this model, this effect is captured by the increase in Π_L .

Now suppose that Π_H remains the same, and Π_L increases, but in the ranges of values that still satisfy all our previous Assumptions 4.1-4.5. Then, it can be noted from equations 4.11 and 4.18 that the increase in Π_L affects only $p_t^*(\beta_t)$, but does not have any impacts on $\beta_t^*(p_t)$. In particular, an increase in Π_L shifts the straight line of the $dp = 0$ locus to the right, while the $d\beta = 0$ locus curve remains unchanged.

Figure 4.7 shows the graphical illustration of this effect. When Π_L increases, the straight line moves to the right. Although the two stable equilibria points remain unchanged, the threshold value of β_t , which separates the paths to the two stable equilibria, increases from $\hat{\beta}$ to $\hat{\beta}'$. Now Country *B*, which used to be on the paths to *high development equilibrium* in Figure 4.6, converges to the same underdevelopment traps as Country *A*. Only Country *C* with the highest social capital remains safe from this shock. This significant result leads us to another Proposition.

Proposition 4.3 *Under Assumption 4.1-4.5, an increase in Π_L shift the straight line of $dp = 0$ locus to the right, increasing the threshold level of social capital $\hat{\beta}$ below which the economies converge to underdevelopment traps.*

The mechanism that leads to this result is the quick adjustment of variable, p^* , which works behind the complimentary strategic interaction between the education effort of the trustworthy parents and the entrepreneurs' production choices. When the profits of the traditional production suddenly increase relative to those of the modern production, more entrepreneurs find it more profitable to engage in traditional production, and so, they respond to this change by switching quickly to the traditional production. The economy now

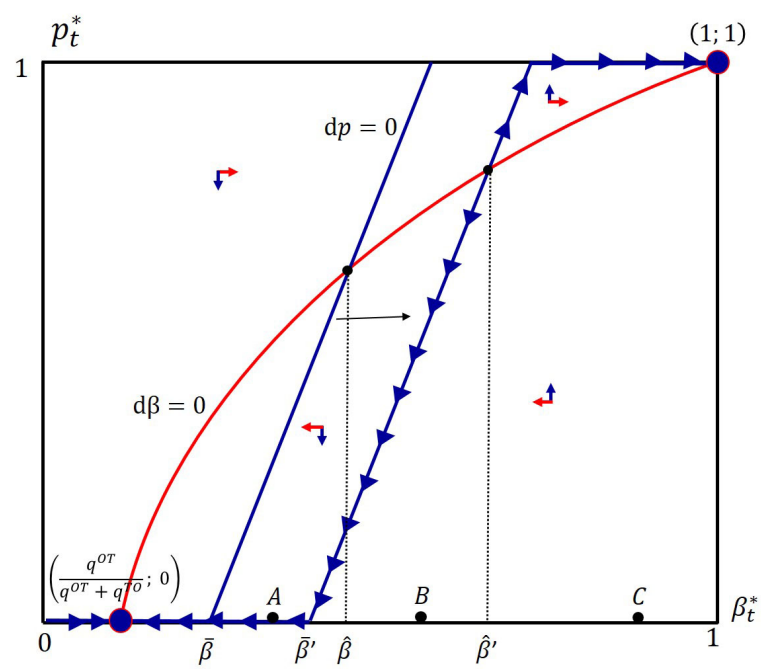


Figure 4.7: The effect of an increase in Π_L

needs more trustworthy contractors to assure that it remains on the paths to the high development equilibrium. However, the social capital in some economies that used to be sufficient to assure high development paths before an increase in Π_L now may no longer be enough to assure high development paths after the shock.

Since traditional production is usually agricultural and natural resource-based production, an increase in Π_L can be thought of as related to an abundance of natural resources. Regarding the resource curse implication, our result indicates that economies with more abundant natural resources (higher Π_L) are more likely to remain in underdevelopment traps than those with less abundant natural resources. That is, richer natural resources require higher social capital for economies to break free of low development traps and jump to the paths of high development equilibrium.

4.3.7 Temporary Resource Boom

In this subsection, we apply the results of our model to explain the resource curse phenomena that exist in some countries but not in others. Many studies in the literature have argued that resource booms, particularly the rise in the price of natural resources, always have boom-and-bust characteristics. This boom-and-bust cycle has been proposed as the cause of resource curses owing to the macroeconomic instability generated from this cycle. Since the boom-and-bust cycles of natural resource prices are a global issue, it should affect resource-rich countries in similar ways. However, while a temporary resource boom may adversely affect many resource-rich countries, such as Nigeria, Indonesia, Iraq, Saudi Arabia, Sierra Leone, Venezuela, and Zam-

bia, other resource-abundant Scandinavian nations, particularly Norway and Sweden, have never experienced these adverse impacts. From the perspectives of cultural economics, our model provides the micro-foundational mechanisms that explain why a temporary resource boom may lead some countries, but not others, to underdevelopment traps.

Again, we use a graphical illustration to explain this phenomenon. Figure 4.8 presents the case of a temporary resource boom and its impacts on the development paths of different economies. There are two countries in this figure: *A* and *B*. In period 1, Countries *A* and *B* are located at points A_1 and B_1 , respectively, on the right-hand side of the threshold value of social capital $\widehat{\beta}$ and both countries are moving toward the *high development equilibrium*. Suddenly, in period 2, a resource boom occurs and shifts the straight line to the right, raising $\widehat{\beta}$ to $\widehat{\beta}'$. In period 2, Country *B* has already accumulated sufficient social capital and is now located at point B_2 which is higher than $\widehat{\beta}'$, and so, this country continues on its paths to the *high development equilibrium*. However, Country *A* has not yet accumulated enough social capital and remains at point A_2 on the left-hand side of the new threshold $\widehat{\beta}'$, implying that its development paths are now reversed, moving backward to the *low development equilibrium*. Finally, in period 3, the resource boom finishes and the prices of natural resources suddenly fall back to their original levels, shifting the straight line back to its original position. Although the threshold value of social capital falls back from $\widehat{\beta}'$ to $\widehat{\beta}$, Country *A* has already moved backward to point A_3 on the left-hand side of $\widehat{\beta}$, and thus, continues on the path to the *low development equilibrium* and becomes caught in underdevelopment traps. Meanwhile, Country *B* continues on its path to the *high development*

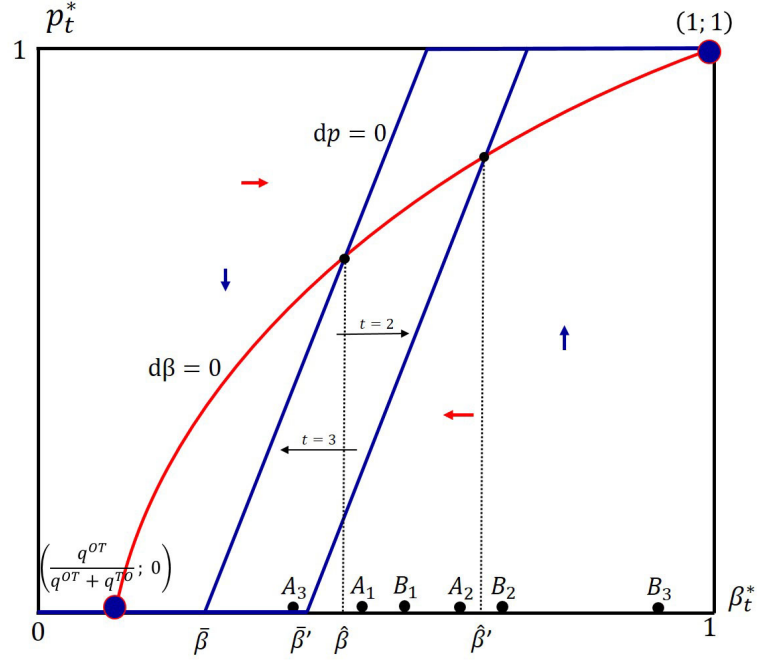


Figure 4-8: A Story of Temporary Resource Boom

equilibrium. This scenario clearly shows that a temporary resource boom may lead different economies that are initially on the same development paths to diverge if their initial social capital accumulation is different.

4.4 Concluding Remarks

In this chapter, we construct an intergenerational cultural transmission model of underdevelopment traps and the resource curse, under the setting of interaction between the development of social capital and the development of traditional production. We show that economies may converge to different paths of development, given their initial levels of social capital, which support different production types. The economies with sufficient social capital that

supports more efficient modern production converge to high development equilibrium, while those with insufficient social capital continue their practice of less efficient traditional production, and become caught in underdevelopment traps.

In addition, we investigate the effect of the development of traditional production on the development paths of the economies. Some policies and reforms, or market shocks that may lead to increased profits of traditional production vis-à-vis those of modern production, raise the threshold level of social capital needed for the economies to remain on the paths toward high development equilibrium. Such reforms or sudden shocks may cause some economies that are on the path to high development equilibrium to reverse their development paths toward the low development equilibrium. The implication from this result can be used to explain the resource curse phenomena from the perspective of cultural economics. Countries with more abundant natural resources, and thus, higher profitability of traditional production require higher levels of social capital than those with scarcity of natural resources to get out of low development traps.

Lastly, we apply our result to explain the effect of a temporary resource boom on the development paths of different economies. We show that a temporary resource boom may lead two economies that are initially on the same paths to high development equilibrium to diverge. While economies with initially higher social capital can assure movement to the high development equilibrium, those with initially lower social capital may reverse their paths to the low development equilibrium.

Our model suggests that the development of social capital that supports

more efficient modern production is crucial for economies to get out of underdevelopment traps and to join the convergence club of high development countries.

Chapter 5

Self-fulfilling Public Beliefs of Persistent Corruption

5.1 Introduction

Studies on corruption have, for a long time, focused on explaining why high or low levels of corruption can be persistent, formally known as the self-fulfilling prophecy of corruption. Although many anti-corruption policies and reforms have been carried out, corruption continues to feed on itself and persist over time. Many theoretical studies have stressed coordination dilemmas and herd behavior as the reasons for the incidence of persistent corruption (Gingerich, Oliveros, Corbacho, & Ruiz-Vega, 2015).

Scholars have devoted substantial efforts to constructing various specific mechanisms that provide plausible explanations for this phenomenon from different perspectives.

One explanation is that the existence of severe corruption weakens the sanctioning and punishment mechanism of corruption, thereby fomenting the corruption that exists in the first place. For example, Lui (1986) constructs a

two-period model of an overlapping generation to show that corruption may damage the sanctioning mechanism if the probability of corruption detection has an inverse relationship with the frequency of corruption.

Similarly, Andvig and Moene (1990) develop a model of pure economically motivated corruption and conclude that the corruption punishment mechanism, particularly the cost of detection, may be undermined by the fact that bureaucrats who monitor corruption may also be corrupted.

Another rationale of persistent corruption is proposed by Ryvkin and Serra (2012), who emphasize the role of searching costs of partners for corruption transactions. The less costly it is to find partners, the more attractive are corruption transactions.

From the perspective of cultural transmission theory, Tirole (1996) emphasizes the role of collective reputations. His basic idea is that agents cannot observe the history of their individual trading partners, and so, they based their trading decisions on the reputations of the organizations to which their partner agents belong. A member of an organization with a bad reputation has less incentive to act honestly because his potential partners always expect corrupt dealing on his part.

Along this line, Accinelli and Carrera (2012) suggest that persistent corruption is a result of imitative behavior. Agents tend to behave corruptly if they observe that corruption has been a successful strategy in the past. Hauk and Sáez-Martí (2002) claim that dishonest parents invest in transmitting their cultural values of dishonesty to their children if they expect future policy to be favorable for dishonest behavior.

In the field of political economy, persistence of pervasive corruption is said

to be generated by the externalities of political strategic interactions. For example, Caselli and Morelli (2004) argue that existing corruption among incumbent public officials may affect the selection mechanism of future public officials. In particular, if there are negative externalities between office spoils of good and bad politicians, and the incumbent public officials influence the rewards of future office holders, a corrupt government would sow seeds for a more corrupt government.

In line with this rationale, Dal Bó, Dal Bó, and Di Tella (2006) construct a model in which the interest group attempts to influence public policies using both bribery and threats of punishment. The lower the overall quality (honesty and/or ability) of the public officials, the more likely it is that the interest group would threaten the latter by means of punishment. Since the value of holding office is decreasing in the threats of punishment by the interest group, the more corrupted are the existing public officials, the less attractive is public office for potential honest politicians.

These two political economic theories on corruption point to the supply of high-quality politicians as the rationale for persistent corruption. Existing low-quality government provides insufficiently low value of holding office (office spoils or ego rents) to attract enough potential high-quality candidate politicians to join the competition for public office. Self-fulfilling corruption occurs due to insufficient supply of high-quality candidate politicians who are interested in public office. Based on this argument, reforming the selection mechanism to attract high-quality candidate politicians, albeit a challenging task, may break the corruption spiral.

However, considering the perspective of the political economy of corrup-

tion, we argue that even enough supply of high-quality candidate politicians may not be able to break the corruption cycle for at least two possible reasons. First, high-quality candidates who have incentives to compete for public office may be defeated by low-quality candidates in the competition game for public office. Indeed, the election mechanisms generated by the voters themselves may result in low-quality politicians being elected due to such reasons as informational asymmetry. Second, high-quality politicians are subject to corruption. Perfect candidates exist only in an imaginary ideal world.

Therefore, another question is what other possible political mechanisms of self-fulfilling corruption may be. By admitting that all incumbent politicians, including high-quality ones, are also subject to corruption, we attempt to answer this question by arguing that the public's beliefs about corruption levels that exist in the first place may result in a self-fulfilling corruption cycle. The underlying mechanism behind our argument is that being in a corrupt society in the first place makes agents skeptical about corruption. They tend to think that all candidate politicians, including high- and low-quality ones, are more likely to be as corrupt as each other, and so, the agents create a voting mechanism with a higher degree of tolerance toward political corruption. This in turn reduces the incentives of high-quality incumbents to avoid corruption, feeding on the prior beliefs of voters, which eventually leads to the formation of a vicious cycle of systemic corruption suffered by many countries, especially poor countries.

The concept of the relationship between public trust and corruption has been discussed widely in many empirical studies (e.g., Moreno, 2002; Davis, Camp, & Coleman, 2004; Manion, 2004; Morris & Klesner, 2010). The em-

pirical results regarding the casualty between the two variables are mixed depending on how they measure corruption and public trust. More theoretical explanations are needed to justify these mixing results. However, to the best of our knowledge, the formal theoretical models that provide the micro-foundation of the mechanisms regarding this relationship have so far not yet been undertaken.

In this chapter, we develop a new principal–agent model of persistent corruption, by suggesting a new mechanism, in the realm of political economy, in which public beliefs about political corruption are self-fulfilling. In terms of contribution, our model sheds light on the understanding of persistent political corruption and its relationship with public beliefs of corruption. The rest of the chapter is organized as follows. Section 2 describes the basic setting and rules of the game in the model. Section 3 solves the equilibrium and derives the key results. Section 4 concludes.

5.2 Model

Our model has two time periods denoted by t_1 and t_2 , and a general election held at the end of period 1. The players in the game consist of an incumbent politician, a challenger, a representative voter, and an interest group. An incumbent politician decides on the implementation of two public projects, discussed in detail below. After observing the policy outcome, a representative voter decides whether to re-elect the incumbent for the second term or to replace him with a challenger. The incumbent politician may be one of the following two types: competent or incompetent. The voter cannot know the real competency of the incumbent with certainty, but the voter has prior

knowledge of whether an incumbent is competent with probability $\lambda \in [0, 1]$.

The incumbent competes in the election with the potential challenger whose appeal (i.e., the probability that he is of competent type) is given by $\eta \in [0, 1]$, which is unknown to the incumbent. Because the incumbent knows his own type, but does not know the type of the challenger, this assumption assures that, from the viewpoint of the incumbent, the election outcome is probabilistic, although the voter's decision is deterministic. We assume that, from the viewpoint of the incumbent, η is drawn from a known prior distribution $F(\cdot)$ with the positive density distribution function $f(\eta) > 0$ for all η .

In period 1, the incumbent is chosen exogenously. He then has to make a decision on the implementation of two public investment projects, denoted as P_1 and P_2 . P_1 is a short-term project, and so, if it is implemented, its outcome will be revealed completely in period 1 (before the election). On the other hand, P_2 is a long-term project, whose outcome is realized in the second period (after the election). In period 2, the elected incumbent will not undertake any new projects, but merely continues the implementation of P_2 and realizes its outcome.

We assume that P_1 is a public project that is proposed to the politician in office by an interest group. We can consider such an interest group as a group of lobbyists who try to persuade the government to undertake investment projects that may directly benefit them. We assume that with probability $\alpha \in [0, 1]$, the public project provides positive payoffs V_I to the interest group, whose members attempt to lobby the incumbent to undertake the project. In the case in which the project does not benefit the interest group, which occurs

with probability $(1 - \alpha)$, the group will not propose it to the incumbent. Without a proposal from the interest group, the incumbent cannot undertake P_1 . The project P_1 that is proposed by the interest group may be a good or bad project for the voter. With probability β , P_1 is good and the voter receives payoffs $\bar{V}$; with probability $(1 - \beta)$, it is bad and yields zero payoffs to the voter. However, the implementation of P_1 incurs a public cost, denoted as $c > 0$, which has to be paid by the voter, regardless of whether it is a good or bad project.

Since the interest group receives positive payoffs from the proposed project regardless of whether it is bad or good for the voter, the group always advertises that the project is good for the voter in order to lobby the incumbent to undertake it. However, if the interest group proposes a bad project to the incumbent, the latter may, with some probability, receive hard evidence that the interest group's advertisement is a lie and the project is indeed a bad one. The probability that the incumbent obtains the evidence depends on his competency type. We denote the probability that the competent and incompetent incumbents receive the hard evidence by Π_H and Π_L , respectively, where $0 < \Pi_L < \Pi_H < 1$. The incumbent receives no evidence or signal when a good project is proposed.

P_2 , on the other hand, is assumed to be a public project originated by the government itself. In other words, it is an obligatory government project that all politicians in office should implement in both periods. Implementation of P_2 incurs public cost of c_2 , which is normalized to zero without loss of generality. As stated earlier, it is a kind of long-term project that must be implemented from period 1 until period 2 and will only yield payoffs to the

voter in the second period. The payoffs of P_2 to the voter depend on the competency types of the elected politician in the second period. That is, the voter receive payoffs U_H if the elected politician is competent, and U_L if he is incompetent, where $0 < U_L < U_H$. This assumption is to ensure that voters prefer the competent politician to be in office in period 2. In addition, we may assume that the payoffs depend on the types of incumbent in period 1, when it is originated, but this will not change the results at all. Hence, we omit incumbent type to save the notations.

Furthermore, in order to ensure that all incumbents, regardless of their type, carry out P_2 , we assume that both types of incumbents receive the same and fixed payoffs Ω from the implementation of P_2 in each period. In addition, each incumbent politician receives fixed office spoils $E > 0$ from being in office in each period. Again, this assumption is for simplicity. Assuming different values of office spoils in different periods would not affect our results.

Finally, we discuss an assumption regarding corruption. As observed from the previous assumption, the incumbent politician does not receive any direct payoffs from his decision on the implementation of P_1 . However, the voter who does not know the real type of the incumbent observes the incumbent's decision on P_1 (whether to implement the project) and the corresponding outcomes, based on which the voter makes his election decision. Therefore, the incumbent's decision on P_1 affects his re-election probability, implying that the incumbent may want to avoid a bad project in order to appeal to the voter that he is of competent type. On the one hand, the interest group that always benefits from P_1 may offer a bribe, denoted by B , to the incumbent to induce him to implement a bad project. The incumbent can choose whether to accept

the bribe and implement the project as proposed by the interest group, or to reject the bribe and make a decision on P_1 based on his own knowledge. When he accepts the bribe, we consider him to have been captured by the interest group and corruption exists.

In this chapter, we use the term “politician’s capture” and “corruption” interchangeably. We assume that the voter has a rational expectation that the incumbent may be captured. We denote the probability that the interest group captures the incumbent by $\gamma \in [0, 1]$, which is endogenous in this model. Note that the interest group never offers bribes when the incumbent receives no hard evidence in the case in which the proposed project is good one.

The timing of the game is as follows:

1. Nature exogenously determines an incumbent politician in period 1.
2. The interest group decides whether to propose P_1 , and chooses whether to offer a bribe to the incumbent.
3. The incumbent chooses whether to accept or reject the bribe, and makes a decision on the implementation of the two public projects: P_1 and P_2 .
4. All players receive their payoffs in period 1, and the election is held.
5. The voter observes the outcome of P_1 , updates his posterior belief about the incumbent type with rational expectation that the incumbent may be captured by the interest group, and decides whether to re-elect the incumbent, accordingly.
6. The elected politician holds office in period 2 and decides whether to continue the implementation of P_2 .

7. All players receive their payoffs in period 2 and the game ends.

5.3 Equilibrium

We apply a backward induction method to solve the problem of the strategic decisions between all players in this game.

First, consider the equilibrium subgame in period 2. There is no strategic game in period 2 and the elected politician simply decides on the implementation of P_2 to maximize his payoffs in that period. His total income in period 2 is conditional on the implementation of P_2 , denoted by U_P , and is given by

$$U_P = \begin{cases} E + \Omega & \text{if } P_2 \text{ is implemented} \\ E & \text{if } P_2 \text{ is not implemented} \end{cases} \quad (5.1)$$

Equation 5.1 straightforwardly implies that the incumbent always chooses to implement P_2 in period two. Consequently, the voter's payoffs in the second period, denoted by U_G , are conditional on the types of politician in office

$$U_G = \begin{cases} U_H & \text{if competent politician is elected} \\ U_L & \text{if incompetent politician is elected} \end{cases} \quad (5.2)$$

By assumption $U_H > U_L$, the voter always wants to re-elect the competent incumbent. The voter votes for the incumbent if the voter believes the incumbent is a competent politician with higher probability than his competitive challenger. Let σ_x be the ex post probability the voter believes that the incumbent is competent, conditional on the observed outcome of P_1 , where the index $x \in \{y, \phi\}$, and $y \in \{g, b\}$. $x = y$ implies that P_1 is implemented. In this case, $x = g$ if it turns out to be a good project, and $x = b$ otherwise.

$x = \phi$ denotes the case of no implementation of P_1 . Subsequently, the incumbent is re-elected if $\sigma_x \geq \eta$ or $\sigma_x - \eta \geq 0$. The voter updates his posterior beliefs about the incumbent types after observing x and rationally taking into account the possibility that the incumbent may be captured by the interest group via bribery.

Before we proceed to the analysis of the re-election probability, we omit one case that is not so interesting and is irrelevant to our objective. Note that the voter's ex ante expectation about corruption does not affect σ_g . This is straightforward from our assumption. When the project turns out to be a good one, the voter can expect there is no offer of a bribe from the interest group. The incumbent does not receive any hard evidence when the good project is proposed, and thus, there is no bribe offer either. The voter should never expect any corruption in this case. Moreover, since our main focus is on corruption, hereafter, we ignore the case in which the good project is proposed and focus only on the case in which the interest group proposes a bad project to the incumbent.

5.3.1 Voter's Beliefs and Re-election Probability

Now, let denote γ^e as the probability that the voter expects political capture. By applying the Bayesian rule, σ_x is given as follows:

$$\sigma_b = \frac{\lambda(1 - \beta)[\gamma^e \Pi_H + (1 - \Pi_H)]}{\lambda(1 - \beta)[\gamma^e \Pi_H + (1 - \Pi_H)] + (1 - \lambda)(1 - \beta)[\gamma^e \Pi_L + (1 - \Pi_L)]} \quad (5.3)$$

$$\sigma_\phi = \frac{\lambda[(1-\alpha) + \alpha(1-\beta)(1-\gamma^e)\Pi_H]}{\lambda[(1-\alpha) + \alpha(1-\beta)(1-\gamma^e)\Pi_H] + (1-\lambda)[(1-\alpha) + \alpha(1-\beta)(1-\gamma^e)\Pi_L]} \quad (5.4)$$

Rearranging $\gamma^e\Pi_H + (1-\Pi_H)$ and $\gamma^e\Pi_L + (1-\Pi_L)$ as $1 - (1-\gamma^e)\Pi_H$ and $1 - (1-\gamma^e)\Pi_L$, and using some mathematical simplification, the above equations can be rewritten as a function of γ^e

$$\sigma_b(\gamma^e) = \frac{1}{1 + \frac{1-\lambda}{\lambda} \frac{1-(1-\gamma^e)\Pi_L}{1-(1-\gamma^e)\Pi_H}} \quad (5.5)$$

$$\sigma_\phi(\gamma^e) = \frac{1}{1 + \frac{1-\lambda}{\lambda} \frac{(1-\alpha)+\alpha(1-\beta)(1-\gamma^e)\Pi_L}{(1-\alpha)+\alpha(1-\beta)(1-\gamma^e)\Pi_H}} \quad (5.6)$$

Expecting this kind of beliefs of the voter, the incumbent has one of two strategies: either to implement or to avoid the bad project. If he implements the bad project, his probability of re-election is

$$\Pr(re-elect | x = b) = \Pr(\sigma_b - \eta \geq 0) = F(\sigma_b) \quad (5.7)$$

If he chooses not to implement the bad project, his re-election probability is

$$\Pr(re-elect | x = \phi) = \Pr(\sigma_\phi - \eta \geq 0) = F(\sigma_\phi) \quad (5.8)$$

Since $f(\eta)$ is an increasing function, $F(\sigma_b)$ and $F(\sigma_\phi)$ are monotonically and strictly increasing in $\sigma_b(\gamma^e)$ and $\sigma_\phi(\gamma^e)$, respectively. Hereafter, we use $F_b(\gamma^e)$ and $F_\phi(\gamma^e)$ as shorthand for $F(\sigma_b(\gamma^e))$ and $F(\sigma_\phi(\gamma^e))$, respectively.

Note from equation 5.5 that

- When $\gamma^e = 0$, $\frac{1-(1-\gamma^e)\Pi_L}{1-(1-\gamma^e)\Pi_H} = \frac{1-\Pi_L}{1-\Pi_H}$, and thus, $\sigma_b(0) = \frac{1}{1+\frac{1-\lambda}{\lambda}\frac{1-\Pi_L}{1-\Pi_H}}$
- When $\gamma^e = 1$, $\frac{1-(1-\gamma^e)\Pi_L}{1-(1-\gamma^e)\Pi_H} = 1$, and thus, $\sigma_b(1) = \frac{1}{1+\frac{1-\lambda}{\lambda}} = \lambda$

Since $\Pi_L < \Pi_H$, $\frac{1-\Pi_L}{1-\Pi_H} > 1$, implying that $\sigma_b(0) < \sigma_b(1)$. We state this result in the following lemma:

Lemma 5.1 $\sigma_b(\gamma^e)$ and $F_b(\gamma^e)$ are increasing in γ^e .

Lemma 5.1 indicates that the voter's expectation of incumbent type and the re-election probability of the incumbent when he implements the bad project are positively related to the voter's skepticism about political capture (corruption).

When the incumbent implements a bad project, he appears more likely to be of incompetent type. However, when the voter believes there is severe corruption in the society, he tends to consider that even the competent incumbent would be captured in this corrupt society. Therefore, when the voter observes the implementation of the bad public project, he tends to raise his posterior belief that the incumbent is incompetent, less than when he expects low corruption in the society. This in turn increases the chance of re-election of the incumbent. On the other hand, when the voter expects that political corruption in the society is very low, he tends to consider that both the competent and incompetent incumbents should be free from corruption. Therefore, when observing the implementation of the bad project in this case, the voter tends to punish the incumbent more severely than when he expects severe corruption, and thereby decreases the re-election probability of the incumbent.

In summary, the greater is the voter's skepticism about corruption, the more tolerance he has toward corruption, while the lower is the voter's skepticism, the more punishment he reaps on wrongdoing.

Similarly, from equation 5.6 it can be noted that

- When $\gamma^e = 0$, $\frac{(1-\alpha)+\alpha(1-\beta)(1-\gamma^e)\Pi_L}{(1-\alpha)+\alpha(1-\beta)(1-\gamma^e)\Pi_H} = \frac{(1-\alpha)+\alpha(1-\beta)\Pi_L}{(1-\alpha)+\alpha(1-\beta)\Pi_H}$, and thus, $\sigma_\phi(0) = \frac{1}{1+\frac{1-\lambda}{\lambda} \frac{(1-\alpha)+\alpha(1-\beta)\Pi_L}{(1-\alpha)+\alpha(1-\beta)\Pi_H}}$
- When $\gamma^e = 1$, $\frac{(1-\alpha)+\alpha(1-\beta)(1-\gamma^e)\Pi_L}{(1-\alpha)+\alpha(1-\beta)(1-\gamma^e)\Pi_H} = 1$, and thus, $\sigma_\phi(1) = \frac{1}{1+\frac{1-\lambda}{\lambda}} = \lambda$

$\Pi_L < \Pi_H$ implies that $\frac{(1-\alpha)+\alpha(1-\beta)\Pi_L}{(1-\alpha)+\alpha(1-\beta)\Pi_H} < 1$, and so, we confirm that $\sigma_\phi(0) > \sigma_\phi(1)$, and thereby the following lemma.

Lemma 5.2 $\sigma_\phi(\gamma^e)$ and $F_\phi(\gamma^e)$ are decreasing in γ^e .

Lemma 5.1 indicates a negative relationship between the re-election chance of the incumbent when he avoids the bad project and the voter's expectation of corruption. This result may appear counterintuitive at first glance.

Why would a more skeptic voter tend to decrease his expectation that the incumbent is competent when observing no implementation of the project? Indeed, one may consider that when the incumbent abandons the bad project, he should appear more likely to be of competent type. This rationale is correct, but not complete. When the voter expects a high level of corruption in the society, she believes that both competent and incompetent incumbents are almost equally captured in this corrupt world. By the same logic, he considers that the probability that the incumbent who does not implement the project is incompetent is almost equal to the probability that the incumbent is competent. The voter considers that it is more likely that the project is not

$\sigma_b(0) \equiv \frac{1}{1 + \frac{1-\lambda}{\lambda} \frac{1-\Pi_L}{1-\Pi_H}} < \sigma_b(1) \equiv \lambda$	$\sigma'_b(\gamma^e) > 0$	$F'_b(\gamma^e) > 0$
$\sigma_\phi(0) \equiv \frac{1}{1 + \frac{1-\lambda}{\lambda} \frac{(1-\alpha) + \alpha(1-\beta)\Pi_L}{(1-\alpha) + \alpha(1-\beta)\Pi_H}} > \sigma_\phi(1) \equiv \lambda$	$\sigma'_\phi(\gamma^e) < 0$	$F'_\phi(\gamma^e) < 0$

Table 5.1: The political beliefs of the voter and re-election probability

beneficial to the interest group and thus, the group does not offer a bribe to the incumbent. This is the reason why α appears in equation 5.6. It is not that the incumbent does not want to obtain the bribe, it is simply because no one offers him a bribe. Therefore, when the voter observes that the project is not implemented, he tends to decrease his rewards for such behavior, and thereby lowers the re-election probability of the incumbent.

In summary, the more skeptical is the voter, the less rewards there are for honest behavior. By contrast, when she expects low corruption, honest behavior provides a stronger signal of competency than in the case of the skeptic voter. The voter increases rewards for better behavior. The re-election probability of the incumbent who does not implement the bad project also decreases or increases, depending on the voter's expectation of incumbent type.

Moreover, note that $\sigma_\phi(1) = \sigma_b(1) = \lambda$, and $\sigma_\phi(\gamma^e)$ and $\sigma_b(\gamma^e)$ are monotonically decreasing and increasing in γ^e , respectively. This implies that the $\sigma_\phi(\gamma^e)$ -curve and $F_\phi(\gamma^e)$ -curve always lie above the $\sigma_b(\gamma^e)$ -curve and $F_b(\gamma^e)$ -curve for all $\gamma^e \in [0, 1)$, respectively. The illustration of the results in Lemmas 5.1 and 5.2 is depicted by Figure 5.1 and Table 5.1.

Combining these two lemmas, we formally state the result in the following proposition.

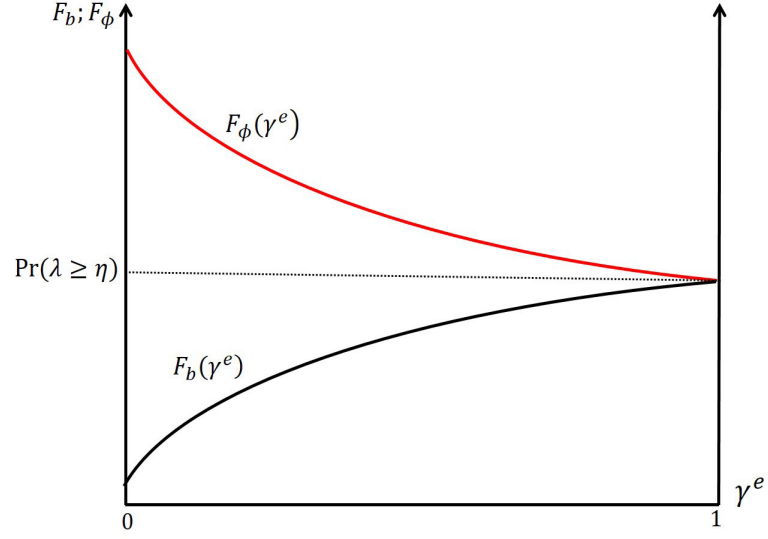


Figure 5-1: γ^e and re-election probability

Proposition 5.1 *When the incumbent implements a bad project, his reelection chance is positively related to the voter's expectation of corruption. However, when the incumbent chooses not to implement the project, his reelection chance is inversely associated with the voter's expectation of corruption.*

5.3.2 Voter's Beliefs and Corruption

Next, we analyze the total payoffs of the incumbent in the two periods, and his strategic decision when facing the proposition of a bad project and a bribe offer from the interest group. Note that the incumbent always implements P_2 in the first period as it provide him payoffs Ω with no cost at all.

Let $\omega = E + \Omega$. If the incumbent avoids the bad project, his total expected payoffs for the two periods are $\omega[(1 + F_\phi(\gamma^e))]$. His total expected income

when implementing the bad project is given by $\omega[(1 + F_b(\gamma^e))]$. The net loss of expected payoffs when the incumbent implements the bad project is given by

$$W(\gamma^e) = \omega[F_\phi(\gamma^e) - F_b(\gamma^e)] \quad (5.9)$$

The incumbent accepts the bribe if and only if $B \geq W(\gamma^e)$. Given this condition, we now consider the decision of the interest group. They offer a bribe to capture the incumbent if and only if the bribe level is less than or equal to their total payoffs from the implementation of P_1 , that is, $B \leq V_I$. From $B \geq W(\gamma^e)$ and $B \leq V_I$, the incumbent is captured only when $V_I \geq W(\gamma^e)$, otherwise there is no political capture or corruption.

Next, from Lemmas 5.1 and 5.2, we show that $W'(\gamma^e) < 0$, indicating that the net loss of payoffs to the incumbent when he chooses to implement the bad project is a decreasing function of the voter's expectation of corruption. When the voter expects that corruption is severe in the society, he tends to consider that even the competent incumbent is corrupt. The voter's higher degree of tolerance toward corruption behavior implies that the incumbent can choose to implement the bad project with lower net loss. Figure 5.2 provides a graphical illustration of this relationship.

If V_I is very high, the interest group always captures the incumbent, but if it is very low, the group never captures the incumbent. For the following analyses, we focus on the case of medium value of V_I in which political capture depends on the voter's expectation of corruption. In this case, using, $V_I \geq W(\gamma^e)$, we solve for the threshold value of $\bar{\gamma}^e(V_I, W)$ such that:

- When $\gamma^e > \bar{\gamma}^e(V_I, W)$, the incumbent will be captured.

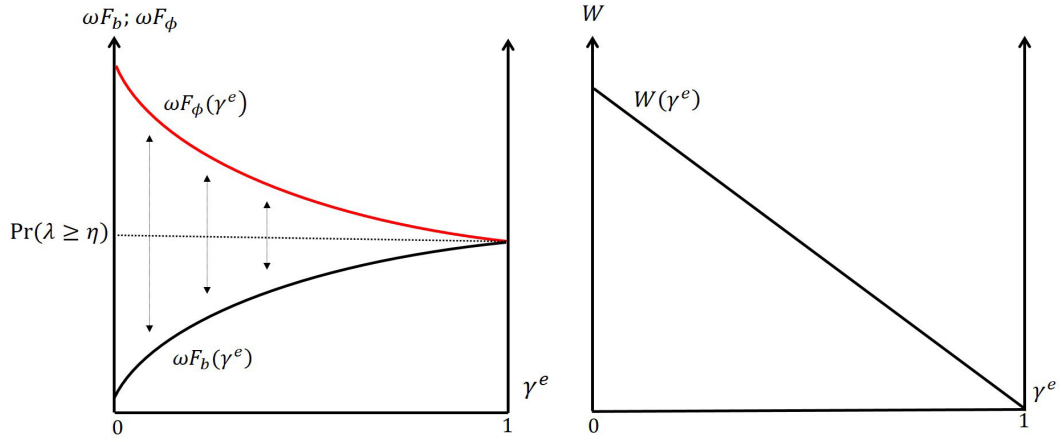


Figure 5.2: γ^e and $W(\gamma^e)$

- When $\gamma^e < \bar{\gamma}^e(V_I, W)$, there will be no capture of the incumbent.
- When $\gamma^e = \bar{\gamma}^e(V_I, W)$, the interest group is indifferent between capture and no capture.

Figure 5.3 provides a graphical explanation of these results. We summarize the results in the following proposition.

Proposition 5.2 *There is a threshold value of voter's expectation of corruption $\bar{\gamma}^e(V_I, W)$ below which there is no corruption, and above which the incumbent become corrupted. This threshold value $\bar{\gamma}^e(V_I, W)$ is increasing in W , but decreasing in V_I .*

When the voter is very skeptical about corruption, for example γ^e is higher than the threshold value $\bar{\gamma}^e$, he tends to consider that all type of incumbents, including the competent one, will be captured. Such tolerance and low punishment, in terms of re-election probability, as argued above, decrease the net

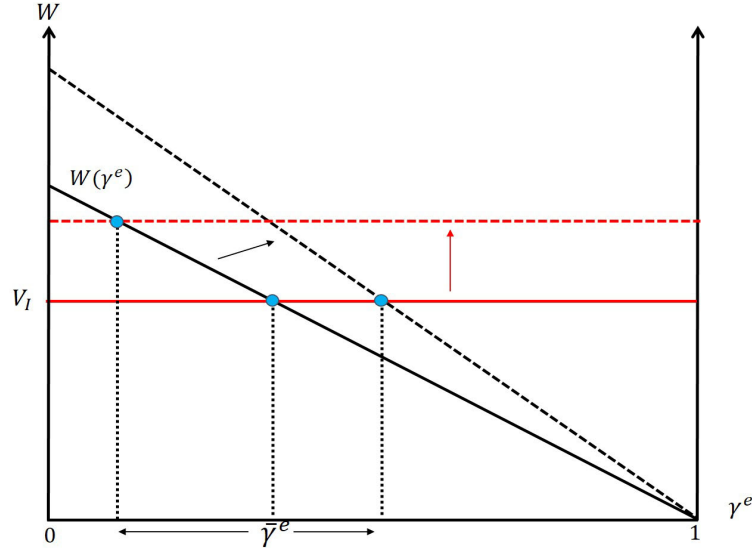


Figure 5.3: Threshold $\bar{\gamma}^e(V_I, W)$

loss of the incumbent when he chooses to implement the bad project. This induces the incumbent to commit corruption. The opposing result applies when the voter is very optimistic about corruption. Lower W and higher V_I decrease the threshold value $\bar{\gamma}^e$, which implies that lower skepticism of the voter about corruption might be sufficient to induce the incumbent to behave corruptly.

5.3.3 Self-fulfilling Corruption

Finally, because all players choose their optimal interaction strategies given γ^e , in Nash equilibrium, the voter's belief about the probability of corruption must be equivalent to the ex ante expectation he has about corruption, that is, $\gamma(\gamma^e) = \gamma^e$. Combining this with the result in Proposition 5.2, we can show that the threshold $\bar{\gamma}^e$ is also the threshold level of equilibrium of the voter's expectation about corruption, which divides the following two stable

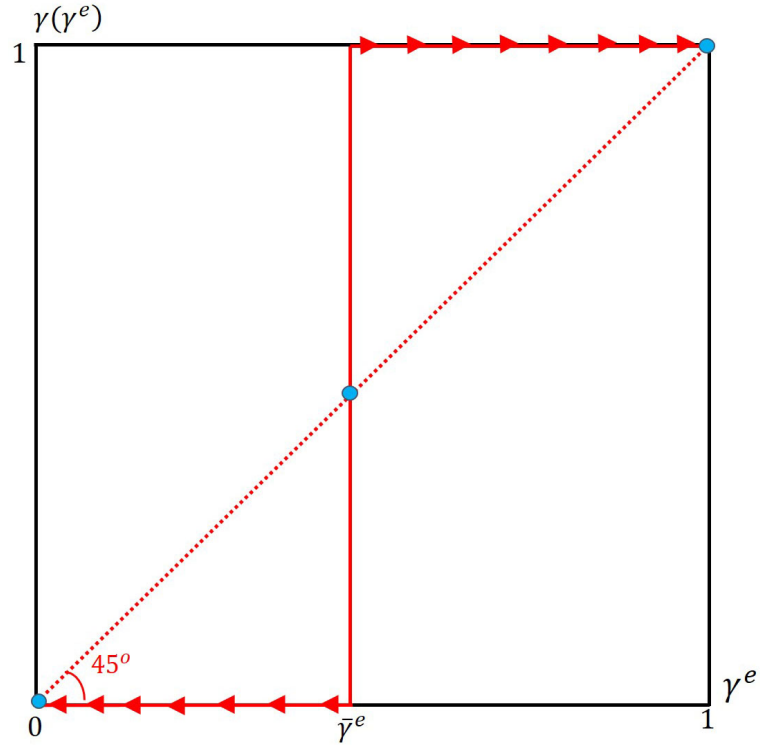


Figure 5.4: Stable Equilibrium γ^*

equilibria.

- When $\gamma^e > \bar{\gamma}^e$, the equilibrium $\gamma(\gamma^e) = \gamma^e = \gamma^* = 1$.
- When $\gamma^e < \bar{\gamma}^e$, the equilibrium $\gamma(\gamma^e) = \gamma^e = \gamma^* = 0$.

We ignore the case in which $\gamma^e = \bar{\gamma}^e$, because it is not a stable equilibrium. Figure 5.4 shows that only the equilibrium points $\gamma^* = 1$ and $\gamma^* = 0$ are stable.

Note that $\gamma^* = 1$ corresponds to the case in which corruption is severe and most likely to occur, while $\gamma^* = 0$ corresponds to the case in which corruption is least likely to occur. This analysis leads to the main and most important

result of our model.

Proposition 5.3 *In equilibrium, the voter's belief about political corruption is self-fulfilling. If the voter believes that politicians are more (less) corrupt, they are more (less) likely to behave corruptly.*

As argued in the introduction, the skepticism of the public's beliefs regarding the severity of political corruption in the society may eventually feed on itself, resulting in severe corruption in the society. The main mechanism of this result, as shown in the model, is the voting mechanism generated by the voter himself. The voter's skepticism about political corruption increases the degree of the voter's tolerance toward wrongdoing by politicians, which eventually reduces the incentives of incumbent politicians to avoid corruption. Taking into account this expectation of the voter, even high-quality incumbents are better off behaving corruptly.

5.4 Concluding Remarks

In this chapter, we construct a principal-agent model of government corruption in order to shed light on the persistence of widespread corruption, which is harmful to many developing countries. By constructing a new mechanism in which the election rule is generated by the voter's expectation about political corruption, we analyze the relationship between public beliefs and public corruption.

We show that the voter's belief or expectation about corruption may be self-fulfilling. If the public expects that corruption is severe in the society, this

expectation feeds on itself. This leads to a self-fulfilling prophecy of persistent corruption.

Suppose that corruption has existed in the society for some exogenous reasons; then, agents who have been born in and lived in this society have always experienced pervasive corruption and become skeptical about corruption. This skepticism in turn strengthens and furthers the existence of the corruption, creating a vicious cycle of political corruption. Such type of self-fulfilling corruption is prevalent and persistent in many developing countries.

The improvement of the coordination problem regarding public beliefs about political corruption should be considered in anti-corruption policies or reforms.

Chapter 6

Conclusion

This dissertation provides theoretical analysis on some contemporary issues related to economic development and underdevelopment traps. Some key insights and results are obtained from the analyses in this dissertation, which contribute to understanding the causes of underdevelopment traps from different perspectives.

6.1 Summary of the Results

The survey of theoretical literature on the political economy of development offers some insights into the political and institutional influences on economic development and public accountability. Political institutions, particularly the level of democratic institutions and corruption in an economy, have significant influence on development. The effects of democracy on economic growth can be understood via the analysis on microfoundational economic factors, such as innovation, inequality, protection of property rights, and resource abundance. On the other hand, issues regarding public accountability can be examined by means of principal–agent models. Information, election, voting mechanism, strategic interaction between voters and politicians, as well as concepts of

irrationality from behavioral politics are key factors for the analysis of accountability.

In contribution to the study of the consequences of poor institutions for economic development, our model of the resource curse shows that the institutional quality of the source countries of foreign investment matters for economic development in host countries that have poor institutions and high rent-seeking activities. The analysis on the relationships between institutions, foreign investment, and the resource curses yields two important results. First, the prevalence of South foreign investment firms, which are less discouraged by corrupt environments than North foreign investment firms, may complement domestic rent-seeking activities in host countries, which eventually leads to lower total income of the host economy. Second, the negative impacts of the complementarity between South foreign investment and domestic rent-seeking activities are more severe in countries with more abundant natural resources or during resource booms.

Our model of intergenerational cultural transmission in Chapter 4 provides several key insights regarding the roles of cultural factors, particularly social capital, in explaining the persistent difference of development in different economies. First, our model predicts that the complementary interaction between different types of production and the social capital that support them may lead to multiple equilibria of development paths. The economies that have accumulated sufficient social capital that supports more efficient modern production can enjoy the advantages of technological development, and will converge to high development equilibrium. However, the economies whose predominant cultural norms are favorable only for less efficient traditional pro-

duction (natural resource-based and agricultural production) will end up in underdevelopment traps. Second, some policies or reforms that lead to the development of traditional production (e.g., increased price of natural resources) may lead some economies that are on the path toward high development to reverse their development paths toward low development. This result may also explain the resource curse phenomenon associated with cultural factors. Countries with more abundant natural resources need higher levels of social capital to support modern production in order to be able to escape from low development traps. Our model shows that a temporary resource boom could cause two economies that are on the same development paths to diverge if their initial levels of social capital are different.

Lastly, our model on public beliefs and corruption sheds light on the understanding of the persistence of corruption, or the vicious cycle of corruption, from the perspective of political economy. This model predicts that voters' political expectations or beliefs about corruption may be the cause of persistent corruption. That is, voters' beliefs about corruption are self-fulfilling. The more skeptical voters are about corruption, the less effective is the voting mechanism in keeping politicians accountable and the more likely politicians are to behave corruptly. The vicious cycle works as follows: severe corruption in the society causes public trust to deteriorate, which in turn reinforces and furthers the corruption that exists in the first place.

6.2 Policy Implications

The key results derived from the theoretical analyses in this dissertation provide several important implications for policymaking in developing countries

and least developed countries related to foreign investment, economic development, and corruption.

First, developing countries with abundant natural resources should attempt to improve the quality of their institutions, with more focus on combating corruption or rent-seeking activities in order to be able to realize the blessing of their natural wealth. In the stage of development in which institutional quality remains very poor, resource-rich countries should be cautious about their policies to attract foreign investment in the natural resource sector. Since foreign investment inflows from countries with similarly poor institutions might reinforce domestic rent-seeking activities, resulting in the resource curse and lower development, foreign investment policies should prioritize attracting foreign investment from source countries that already have good-quality institutions to avoid the curse.

Second, since different cultural norms may be favorable for different types of production, economies with predominant cultural norms that support only traditional production may not be able to take advantage of the access to new and modern technologies. Countries that are stuck in underdevelopment traps should focus on policies that promote the development of social capital, which supports more efficient modern production. Moreover, any policies or reforms that may lead to the development of traditional production vis-à-vis modern production should be implemented with caution and should be balanced with the development of social capital.

Lastly, a coordination problem regarding voters' beliefs implies that skeptical political expectations by the public about corruption may become self-fulfilling, and so, anti-corruption and development strategies should focus on

the solution to this coordination problem by promoting public awareness and rebuilding public trust in order to break the spiral of persistent corruption. Policymakers should establish nationwide education programs and awareness campaigns (e.g., by means of mass media) to enhance public information and knowledge regarding the true nature, causes, and consequences of corruption. Enough information and true knowledge about corruption may enable voters to differentiate better between bad and good politicians, thereby enabling the creation of efficient voting mechanisms that promote public accountability.

6.3 Suggestions for Future Research

The model of the resource curse in this dissertation incorporates the role of institutional quality of foreign investors' source countries. The mechanism of this model lies in the key assumption that foreign investors from corrupt countries are more effective at investing in corrupt environments of host countries. The model takes this assumption as given because it can be justified by a lot of empirical evidence. Future research on this topic should attempt to build microfoundational mechanisms for this assumption.

Our model of the resource curse treats only the institutional factors and ignores the role of cultural factors, while our cultural model of underdevelopment traps focuses on the roles of cultural factors only, but excludes the roles of institutions. Since both factors can be considered as similarly important in the development process, treating these two factors in different frameworks has the advantage of simplifying the model and enabling precise analysis of the individual effects on economic development. However, as mentioned earlier, these two factors are interrelated, and so, the analysis of the interaction

between these two factors may provide new insights. Further study on the causes of underdevelopment traps should take up the challenge of building a theoretical model in which the two factors can be analyzed jointly in a unified framework.

Lastly, our model of persistent corruption treats corruption as only one general form of moral hazard. However, corruption is a complicated phenomenon that may take different forms and structures. Considering the persistence of different forms or structures of corruption along this line may provide more interesting results and new insights into corruption issues.

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