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Institutions, diseases, and economic progress: a unified framework

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Abstract: The sharp division between the 'institutions view' and the 'disease view' has been one of the distinctive features of the 'root causes of economic progress' literature. Based on evidence from cross-national data, the 'institutions school' claims that institutions are the only root cause of development, whereas the 'disease school' claims that diseases are also equally important. In this paper, I contribute to this literature by proposing a unified structure to marry the two conflicting views. I argue that overcoming diseases are of prime importance at an early stage of economic development, whereas institutions are more important at a later stage. I find support for this hypothesis in the development history literature on Africa, India, China and the Americas.

1. Introduction

One of the distinctive features of the recent debate on root causes of economic progress is the contest between two major views – the institutions view and the disease view. The institutions view suggests that the huge difference in living standards across nations can be understood in terms of the differences in institutional quality. Countries with better quality institutions characterized by better enforcement of property rights and contracts are comparatively prosperous because better institutions encourage investment in machinery, human capital, and technology which promotes growth, whereas the disease view suggests that incidence of disease limits the possibility of economic development by reducing productivity and household savings. A population suffering from debilitating or killer diseases are less likely to participate in the workforce. This dampens productivity. Household savings for the future, on the other hand, are affected by the threat of premature death from a disease in a disease infested area. Both of these factors affect growth negatively.

There is very little disagreement that both the views are plausible explanations of economic development or the lack of it. However, the disagreement lies with

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the claim that institutions are the only cause of economic development and all other factors including diseases have little or no effect. The institutions camp argues that the strong correlation between diseases and economic development in the cross-national data is not reflective of causation. They are often driven by omitted factors which are not included in the model. The disease camp dismisses this argument by claiming that the relationship between diseases and development is indeed causal.

In this paper, I make an attempt to resolve this conflict by marrying the two views. Drawing mostly from the writings of historians, I develop a unified framework which marries the two views in the context of Western Europe. I show that Western Europe managed to overcome an initial Malthusian type bottleneck through better food production driven by superior technology. This led to better organizational structure in the society. These were the building blocks of good institutions, which induced sustained technological progress, institutional innovations, and long-term economic growth. Then I apply this framework to Africa, India, China, and the Americas. The framework appears to do exceedingly well in explaining the historical process of development in these continents.

Even though demonstrably daring, this approach provides a fresh view to the whole debate. The literature so far has relied heavily on cross-section regressions. The historical narratives used to support the correlations are also used in isolation (see Acemoglu *et al*., 2001; Easterly and Levine, 2003; and Rodrik *et al*., 2004). This has somewhat confounded the causality issues. Therefore, there is a need for a fresh look into the debate to improve our understanding of the causal links. This is what I set out to do.

Given the vast scholarship in the area of development history, it is perhaps impossible to capture all aspects of history into one article; hence the tour of history in the article is a necessarily selective but broad brush. The choice of countries or continents is also not exhaustive. The article does not claim to make contributions to scholarship in economic history. The main contribution of the article is the unifying framework. Historical narratives are used to empirically test the framework. The narratives are consistent with the major predictions of the framework.

The paper is structured into five different sections. In Section 2, I deal with a conceptual issue very typical of an analysis of causality. I ask the question, is it justified to make a distinction between 'root' and 'proximate' causes of development? Also, how meaningful is it to label diseases and institutions as 'root causes' of development? In Section 3, I present a brief review of the arguments put forward by the institutions school and the disease school. The review shows that the literature up till now has dealt with these two views in isolation. In Section 4, I lay out the unified framework for Western Europe, which marries institutions and disease views of economic development. This framework is then applied to Africa, China, India, and the Americas. The framework does quite well

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in explaining the historical process of development in these continents. Section 5 concludes.

2. Institutions and diseases: 'root' or 'proximate' causes of development?

A major criticism of the 'root causes' literature is that its distinction of root and proximate causes is somewhat arbitrary. Furthermore, the justification for putting institutions and diseases into the 'root causes' basket is also unclear. A quick review indicates that the literature has used at least three different ways to justify this distinction. First, root causes are more fundamental than proximate causes. In other words, they cause long-run economic progress or decline by influencing the proximate causes (see, Acemoglu *et al.*, 2001; and Rodrik *et al.*, 2004). Second, root causes are durable, whereas proximate causes vary over time (Glaeser *et al.*, 2004). Third, it is difficult to influence root causes through direct policy intervention, whereas one can do the same with proximate causes relatively easily (Glaeser *et al.*, 2004). One can certainly question the merits of making this distinction, the justification provided by the literature, and the validity of labelling institutions and diseases as root causes. Some of the major ones are as follows.

First, is the distinction between proximate and root causes meaningful and the same in all contexts, especially when there is virtually nothing except geography that is truly fixed?[1] The answer to this is yes as the distinction between proximate and root causes relies more on causal linkages between factors rather than time invariance of a particular factor. The problem with relying too heavily on time invariance is that no factor is truly fixed when a big enough time frame is considered. In contrast, given a time frame looking at the chain of causation may provide some useful information about which factor is more fundamental. For the purpose of this paper, I tend to take the view that institutions and diseases are the root causes as they create incentives or disincentives for investments in physical and human capital which promotes development. Although one should not write off the possibility of causation running in the opposite direction, recent evidence shows that the possibility of such occurrence is negligible.[2]

Second, are the root causes more durable than proximate causes as it is often the case that they change rapidly due to revolution or technological breakthrough in medicine? Data from the Polity IV project show that economic and political institutions are indeed more durable compared to investments in physical or

1 Even geography is not truly fixed as we are facing the challenge of climate change.

2 The idea of reverse causality is from Seymor Martin Lipset's (1959) 'modernization hypothesis' which says that institutional quality, education, and health improve as countries develop. However, recent research in political science and economics show that institutions diverge not in a systematic manner as outlined by Lipset (1959), but due to exogenous shocks at critical historical junctures as outlined by the famous work of Barrington Moore (1966) on institutions (see, Thelen, 2000; Acemoglu *et al.*, 2007; and many others) . For a survey of 'critical juncture hypothesis' see Thelen (1999).

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human or financial capital. Some empirical research however is guilty of using expropriation risk from the Political Risk Services as a measure of institutions, a private company which assesses the risk of expropriation of foreign investment in different countries. This measure is not durable as it assesses institutional outcome rather than institutions themselves and it is also a measure based on perception (Glaeser *et al.*, 2004). But overall there is evidence in both pre-independence historical data (Acemoglu *et al.*, 2005b) and post-independence data from Polity IV that institutions persist. The changes that we observe are due to exogenous shocks consistent with the critical juncture view. This however may not be the case with diseases. But it is perhaps fair, at least for the purpose of this essay, to classify diseases as a root cause when we are looking at the whole stretch of development history, including the period of primitive hunter-gatherer society. After all, back then diseases were very much a result of geography rather than lack of intervention of medical science.

Third, there is evidence that policy influences institutional quality and disease environment over time. Therefore, what is the usefulness of labelling institutions and diseases as root causes when they can also be influenced by good policy, as can many other proximate causes? This is perhaps the most difficult case to argue against. Recent research on policy and institutional development show that good policy does influence institutions in the short run (Thelen, 2000). However, the benefits of good policy never get translated into long-run economic development, unless they are locked into the institutional structure. Examples of short-lived policy-driven growth with poor institutions are not that difficult to find. Argentina in 1870s to 1920s, Czarist Russia in the decade leading up to World War I, Colombia from 1900 to the 1940s, Cote d'Ivoire in the first two decades after independence – all experienced short-lived growth when the benefits of good policies were not locked into institutions (Robinson, 2006). Therefore, what is critical for institutional change is to lock in either the benefits of good policy or the positives of an exogenous shock at a critical historical juncture. For my purpose however it still makes sense to label institutions as a root cause since policies are short lived compared to institutions in the time frame that I am looking at. I can present the same argument in the case of diseases since I start from a period when the Malthusian cycle was operational and there is no recorded evidence of public health intervention that far back in time.[3]

3. Institutions and disease: a tale of two islands

Theories of institutions and disease have been dealt with in isolation so far in the literature, largely because they have been treated as competing theories and

3 This argument however is not universally applicable. Especially this does not apply to the cross-national studies that focus on a shorter time period and also use variation in diseases that are not geography based and that can be influenced by public health intervention.

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not complements. Even though the institutions view makes some attempt to link institutions and disease, but the disease view treats disease in isolation. In this section I critically review some of the prominent theories of institutions and diseases and demonstrate how they have been dealt with in isolation.

3.1. Institutions and development: the dominant view

The empirical literature on institutions and economic development has been dominated by Acemoglu *et al.* (2001, 2002, 2003a, 2003b), Acemoglu and Johnson (2005), and Rodrik *et al.* (2004). Their main argument is based on the statistical significance of the institutional quality variable in a cross-country regression model and the following hypothesis. They assert that the Europeans resorted to a different style of colonization, depending on the feasibility of settlement. In a tropical environment the settlers had to deal with malaria and yellow fever and they faced a high mortality rate. This prevented them from settling in a tropical environment, and resource extraction became the most important if not the only activity in these colonies. In order to support these activities, the colonizers in the tropics and the sub-tropics erected institutions that were extractive in nature. On the other hand, in temperate conditions European settlers felt more at home and decided to settle. In these places they erected institutions characterized by strong protection of property rights and efficient enforcement of contracts. These institutions persisted over time and influenced the incentive structure in these societies. In settler colonies the incentive structure became more favourable towards capitalist development, whereas the non-settler colonies experienced the opposite. The shaping of the incentive structure during the colonial period has a long-run impact on economic development, which is reflected by the current standard of living of these places. As we all now observe, the settler colonies are more prosperous than the non-settler colonies, but all of this can be traced back to their respective institutional origins.

Solid as rock as it may appear, this theory suffers from the problem of isolation. Even though disease environment features as an initial condition for future institutions, this link is not explored any further in the literature. The other problem is that the story is only relevant for former colonies; it bears no significance for countries that were never been colonized. The theory also suffers from lack of formalism. The only attempt to formalize this theory is Nunn (2007), which is Africa specific. The lack of a general model still confounds the empirical findings in this literature.

Furthermore, the empirical literature mainly focuses on private property rights and enforcement of contracts as institutions (see, Acemoglu *et al.*, 2001, 2002; Acemoglu and Johnson, 2005; and many others).[4] It also uses the rule of law

4 Hall and Jones (1999), Knack and Keefer (1995), LaPorta *et al.* (1999), and Easterly and Levine (2003) are exceptions and they do incorporate other aspects of institutions, such as bureaucratic quality and the regulatory environment, into their overall measure. However, they do not control for

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index as an overall measure of institutions (Rodrik *et al.*, 2004). Even though these measures serve well in terms of capturing the overall effect of institutions on economic progress, they do not provide a more detailed account of what institutions mean. The literature mainly follows Douglass North's definition that, 'institutions are the rules of the game in society or, more formally, are the humanly devised constraints that shape human interaction' (North, 1990: 3).[5] However, more often than not, they only focus on the 'humanly devised constraints' that create incentives for economic and political exchanges, without taking into account the role of institutions that promote trust and facilitate social exchanges. North (1990) makes a distinction between formal and informal constraints. However, these distinctions are not free from ambiguities (Hodgson, 2006). Some scholars identify 'formal' with 'legal' and 'informal' with 'nonlegal' (see Djankov *et al.*, 2003 and LaPorta *et al.*, 1999) and others take it as a distinction between explicit and implicit forms of constraints. North (1990) however does not make this distinction sufficiently clear.[6] These ambiguities in North's (1990) definition of institutions are also carried over to the empirical literature by authors who followed North's definition.

3.2. Institutions and development: an alternative view

An alternative view on institutions suggests that a nation's economic and political institutions are broadly endogenous and they come out of a dynamic game of power struggle between the different segments of the society. At every point in time this power game is being played out between formal (for example: the Monarchy, Democracy, Autocracy, Dictatorship etc.) and informal (for example: economic and social interest groups etc.) institutions, and whoever prevails shapes or reshapes the formal institutions for the future. The future institutions are shaped by the triumphant party in such a way that they get a larger share of the resources in the current period as well as the future periods. Therefore, if a group representing minority interest takes control, then it leads to persistent inequality, violation of property rights, and weakening of incentives for investment. This has negative consequences for long-run development. But if a group representing the majority takes control, then it leads to better distribution of resources, protection of private property, and strengthening of incentives for investment, which has positive consequences

these institutions separately. Bhattacharyya (2008) unbundles institutions along these lines and finds that property rights, contracts, and the central bank as a market stabilizing institution are important determinants of economic growth. Regulatory institutions matter only up to an extent and over-regulation is bad for growth.

5 Acemoglu and Johnson (2005) distinguishes between property rights institutions and contracting institutions using North's (1981) 'predatory theory' of state and 'contract theory' of state.

6 For a more detailed account of the limitations of North's definition, see Hodgson (2006). Hodgson identifies ambiguities with North's treatment of organizations as institutions. He also proposes a more exhaustive definition of institutions.

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for long-run development. Acemoglu *et al.* (2005a), Acemoglu and Robinson (2000), Engerman and Sokoloff (2001), and Acemoglu and Robinson (2006) are the strongest proponents of this view.

Again the political power view focuses solely on institutions and their impact on development and not the links with diseases. Engerman and Sokoloff (2001) do look at the link between natural resource endowments and institutions.[7] They argue that the settlement colonies of the North and the South Americas differed significantly in terms of factor endowments, creating incongruous initial conditions. The North was favourable to mixed farming of grains and livestock, which encouraged the development of small family-size farms and a relatively homogeneous population in terms of the distribution of wealth and political power – a recipe for strong institutions. The South and the Caribbean in contrast were endowed with vast mining resources as well as climates and soil conditions conducive to commercial crops such as sugar, tobacco, and cotton. These led to the establishment of large mining firms and plantations. Mines and plantations, maintained with cheap slave labour, led to a very high level of inequality in the distribution of wealth and political power – a recipe for weak institutions. But, Engerman and Sokoloff (2001) do refrain from exploring the link between disease and political power.

3.3. Disease and development

The literature on disease and development is fairly recent. The interest in this area has grown over the last decade or so following the publication of quite a few influential empirical papers on this topic. Gallup and Sachs (2001) point out that the countries with intensive malaria grow 1.3 percentage points slower per person per year than countries without malaria and a 10 percentage point reduction in malaria might result in a 0.3 percentage point increase in annual per capita income growth. Bloom and Sachs (1998) also claim that the high incidence of malaria in sub-Saharan Africa reduces the annual growth rate by 1.3 percentage points a year. In other words, eradication of malaria in 1950 would have resulted in a doubling of current per capita income. Gallup *et al.* (1998), Sachs (2003), and Carstensen and Gundlach (2006) in their empirical studies report on the strong and negative effect of malaria on economic progress, even after controlling for institutions and openness. Analysing cross-national as well as sub-national data, Lorentzen *et al.* (2008) find that high adult mortality reduces economic growth by shortening time horizons. In a study specific to Africa, Bhattacharyya (2007) report that high disease incidence is the major bottleneck for African development and the effect acts via household savings. However, Acemoglu and Johnson (2008) disagree with these findings. In a study using historical data on diseases and life expectancy, they show that an increase

7 See Bhattacharyya (2006) for a survey of Engerman and Sokoloff's work.

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in life expectancy through better treatment do contribute positively to population growth but not so much to economic development.

The empirical literature is also supplemented by a growing body of work on theory. The theory models mainly argue that infectious disease has a debilitating effect on human productivity and directly affects economic performance. It also positively affects the mortality rate and the fertility rate, slowing down demographic transition and hence dampening economic growth indirectly. Chakraborty *et al.* (2005) and Bhattacharyya (2007) formalize this theory using the overlapping generation framework.

In spite of the growing interest in this area, none of the studies explores the link between diseases, institutions, and development. Diamond (1997) mentions this link in chapter 11 of his book *Guns, Germs and Steel*. He shows the link between livestock, diseases, technology, and more complex social structure. But this construct is not exploited by any of the mainstream economic models. Hence, the same criticism of looking at diseases and development in isolation can be levelled against the disease and development literature as well.

4. Institutions, diseases, and development: a unifying framework

The evidence that I have reviewed so far does identify the important deep factor: namely, institutions and diseases can explain the long-run difference in living standards across nations. This also gives rise to the apparent conflict between the 'institutions view' and the 'disease view'. The genesis of the conflict is the statistical significance of the institutional quality variable in a cross-country regression model, estimated at a particular point in time when diseases and other geography measures are used as controls. One possible reason behind this empirical result is perhaps that institutions and diseases are important at different stages of development and the cross-section regression model is incapable of taking this into account as it solely focuses on a particular point in time. It could very well be the case that diseases are important at an early stage of development and institutions become important at an advanced stage. Bhattacharyya (2006) is perhaps the only study to test for the existence of stages of development in the cross-national data. Dividing the cross-national sample into low-income and high-income economies, he finds that diseases explain the majority of the variation in per capita income in low-income economies (which are at an early stage of development), whereas institutions explain the majority of the variation in the same in high-income economies (which are at an advanced stage of development).

In this section, I make an attempt to build on the empirical results of Bhattacharyya (2006) and explain the interrelationship between institutions, diseases, and economic development by using a method that may not satisfy the purists because of its somewhat speculative nature. But this method does have some advantages over the standard cross-country regression modelling approach.

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It can throw new light on the complex causality issues by bringing the 'stages of development' hypothesis to the forefront, which has been somewhat ignored by the empirical studies. The strategy is as follows. First, I put forward a unifying framework, which describes the process of development in Western Europe. This framework lays down the different stages of development in Western Europe. Second, I compare and contrast the Western European trajectory with the trajectories for Africa, China, India, and the Americas. This allows us to understand where it went wrong for the other continents. It also allows us to compare and contrast the stages of development across different continents.

4.1. A unifying framework for Western Europe

It is perhaps not inappropriate to divide the process of economic development in Western Europe into four different stages. The first stage is the era of the Malthusian cycle in which geography and epidemic diseases played a crucial part in determining food production. The widely known economic as well as social impact of the 'Black Death' and other epidemic diseases that hit Western Europe during the fourteenth century is a testimony to the power of geography and germs. The second stage is characterized by conflict, militarism, and increase in food production and population density. The third stage is the period of an increased demand for wealth. This epoch is characterized by state investments into daring expeditions to acquire wealth and resources from foreign lands to finance the soaring costs of war. Finally, the fourth stage is the stage of change in the nature of the state leading to rapid technological progress, industrial revolution, mass production, and the rise of the capitalist system.

In order to describe the first stage, one can think of a food production function that makes use of land, labour, human capital, technology, and climate. Land is fixed and is owned by the small state or group. The entire population supplies labour except the elite. Human capital is defined as the knowledge required for using the existing technology successfully. Technology signifies the development of new tools and it is spasmodic. Climate is exogenously given. Labour supply is affected by the disease environment with high incidence of diseases resulting in less labour supply. In this kind of world, an increase in food production, because of the positive effects from all of these factors, results in an increase in the population. Increased population raises the demand for food. However, there is a limit to what a fixed amount of land can yield given technology, climate, and diminishing returns to labour and human capital. Therefore, a food crisis ensues and eliminates a large proportion of the population. This cycle repeats itself in the absence of technological progress. In addition to this natural cycle, food production is also constrained by epidemic diseases and natural disasters. This is what Thomas Malthus described as the principle of population in his famous essay in 1750. This process took place in Western Europe approximately during the thirteenth and the fourteenth centuries when it was ruled by the small and medium sized feudal states. Robbins (1928) provides evidence of a Europe close

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to what I have described above. In her paper on the impact of the Black Death in France and England, she records that France was hit by famine on at least 15 occasions during the fourteenth century.

In stage two, the production of food may rise due to technological progress. New technology may evolve due to indigenous effort or due to technology transfer or can be completely serendipitous. At least in case of Western Europe, we know that most of the early technologies were acquired from the Chinese or the Arabs or from ancient Rome (Mokyr, 1990). There is support for this in Diamond (1997) as well. He writes:

> Until the proliferation of water mills after about A.D. 900, Europe west or north of the Alps contributed nothing of significance to Old World technology or civilization; it was instead a recipient of developments from the eastern Mediterranean, Fertile Crescent, and China. Even from the A.D. 1000 to 1450 the flow of science and technology was predominantly into Europe from the Islamic societies stretching from India to North Africa, rather than vice versa. (pp. 409–410)

The arrival of new technology increases agricultural production manyfold and creates a situation of food surplus. The food surplus also increases fertility and reduces mortality, raising the total population. Rising population puts pressure on land and other resources, inducing the state to get involved into territorial conflicts. This is what we observe during the age of the Crusades when Europe engaged in repeated conflicts and wars. The state also gained more in terms of tax revenue in the event of an increased agricultural yield. A significant proportion of this revenue is spent on the development of new armoury and the military. The logic is simple. More lethal weapons and a well-nourished army can win battles and winning battles was crucial to the very existence of the state. The state investment in military technology creates a positive externality for civilian research and development, leading to more breakthroughs in technology for agriculture and crafts. New technology in agriculture and crafts results in steady growth in output and population, causing more territorial conflict. This pattern is observed till the fifteenth century in Western Europe when the states become stronger and stronger. However, the increased frequency of military conflict did put enormous pressure on the state's exchequer and forced her to look for alternative and richer sources of revenue. Perhaps, this is what led Western Europe to the stage three.

Stage three signifies a state in which investments in maritime expeditions, in order to hunt for alternative sources of wealth and resources, become extremely important. Michael Beaud (2000) describes this process in his book. He writes, 'Monarchs greedy for greatness and wealth, states battling for supremacy, merchants and bankers encouraged to enrich themselves: these are forces which inspired trade, conquests, and wars' (p. 14). These investments led to the

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discovery and conquest of new land. The prevailing mercantilist philosophy[8] induces explorers to search for bounty in these newly discovered lands and bring it back to their motherland. This is what Hernan Cortez did when his band of conquistadors came in contact with Montezuma's Aztecs in the new world. Similar was the fate of Atahualpa's Inca when Francisco Pizzaro's army of two hundred conquistadors defeated them in Cajamarca in 1532. The Capture of Atahualpa by Pizzaro's men yielded the largest ransom recorded in human history. The ceaseless pillage of wealth and precious stones from the new land triggers inflation in the home country as too much money chases too few goods. To counter inflation, the state imposes restrictions on imports but encourages exports so that the state does not run out of wealth. This policy leads to the expansion of maritime trade and commerce. The 'no-imports' ideology also boosts domestic manufacturing, providing it with a large domestic as well as overseas market. Outward orientation and trade in manufacturing leads to specialization, division of labour, and increased gains from trade. The nature of the distribution of gains from trade changes the structure of the political economy and the distribution of political power. Two distinct patterns emerge. The first is an absolutist state, which takes control of all gains from trade and concentrates political power. The second is a type of state that allows private accumulation (such as money lending, trading of precious metals, real estate etc.) by the bourgeoisie and hence a relatively equitable distribution of wealth and political power. In an absolutist state, no change occurs in the institutional structure. However, in the second type of state, institutional changes take place, which are favourable to capitalism. The increase in wealth of the bourgeoisie due to private accumulation provides them with *de facto* political power. The bourgeoisie invest in private manufacturing and trade, which generates more wealth for the future. This further strengthens their *de facto* political power. The bourgeoisie with their new found political power start demanding institutional change by challenging the authority of the monarchs. They demand protection of private property and a more equitable distribution of political power. If the *de facto* political power of the bourgeoisie is greater than the *de jure* political power of the monarchs, then the will of the bourgeoisie prevails over the will of the monarchs. This leads to the establishment of institutions that protect the private property and political rights of the bourgeoisie. Democratic institutions are established to cement the power of the bourgeoisie and also to make sure that the monarch cannot take over power in the future.

This pattern of institutional development is observed in Western Europe from the sixteenth century onwards. The Spanish and Portuguese monarchs were absolutist in nature and they centralized the process of manufacturing and trade, discouraging private enterprise (Acemoglu *et al.*, 2005b). This prevented the

8 The major argument of the mercantilist philosophy is that a nation's wealth depends on the amount of precious metal it has.

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development of institutions, which provide incentive for private investment. However, in Britain and in the Netherlands, the state allowed private enterprise, which led to the Civil War in 1642 and Glorious Revolution in 1688 in Britain and the Dutch war of independence, which began in the 1570s. Describing the events in Britain and the Netherlands Acemoglu *et al.* (2005b) writes:

> The victory of Parliament in the Civil War and after the Glorious Revolution introduced major checks on royal power and strengthened the rights of merchants. After the Civil War, the fraction of MPs who were merchants increased dramatically. (p. 564)

> Dutch merchants always had considerable autonomy and access to profitable trade opportunities. Nevertheless, prior to the Dutch Revolt, the Netherlands (in fact, the entire Duchy of Burgundy) was part of the Habsburg Empire, and the political power of Dutch merchants was limited. ... The critical improvement in Dutch political institutions was therefore the establishment of the independent Dutch Republic, with political dominance and economic security for merchants, including both the established wealthy regents and the new merchants immigrating from Antwerp and Germany. (p. 566)

Stage four signifies more private as well as state investments in technology, which leads to the development of the factory system and industrial revolution. The institutional changes of stage three create the ideal incentive structure for private investments in technology development. This induces rapid technological progress. The rapid improvement in technology increases the cost of moving information relative to the cost of moving people (Mokyr, 2001). This leads to the rise of the factory system and a subsequent breakdown of the cottage industry. Such pattern is observed in Britain and other parts of Western Europe during the period of the Industrial Revolution (1760–1830).

Therefore, in sum the story that I want to get across is as follows. Western Europe managed to beat the constraints imposed by its geography, in particular diseases, on food production early on and started her journey on an independent growth trajectory. Availability of food increased population density, which caused territorial conflicts and war. Ceaseless conflicts induced more investment in military technology. The conflicts also put enormous pressure on the finances of the state. The state commissioned daring naval expeditions to search for bounty so that it could finance its military expenditures and from avarice. These expeditions brought wealth from overseas which also caused inflation. In order to remedy inflation and also to abide by the principles of mercantilist philosophy, the state restricted imports of foreign goods and promoted exports of domestically manufactured goods. This induced specialization and division of labour in the domestic economy. Institutional changes followed, depending upon the initial distribution of the gains from trade. A non-absolutist state allowed bourgeois accumulation, which increased the power of the bourgeoisie, resulting in major institutional changes favourable to capitalism. In contrast, an

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absolutist state allowed very little or no bourgeois accumulation, which arrested the prospect of any institutional change. The states with capitalist institutions attracted private investment in production and technology building. This led to rapid technological progress, the rise of the factory system, and industrial revolution.

Therefore, what we learn from the unifying framework is that breaking the disease bottleneck is crucial for future institutional development, which leads to sustained technological progress and economic growth.

4.2. What was Different in Africa, China, India, and the Americas?

Africa

Africa has a long history of diseases. Epidemic diseases such as small pox, measles, yellow fever, cholera, tuberculosis, malaria, typhus have always been a part of African life. Many of these diseases and some new killers (HIV AIDS is an example) play a significant role in African life to date. Africa has also been a subject of huge climatic variations. Long dry seasons were followed by considerable humid periods with heavy rain (Miller, 1982). These factors have impacted in the past and still continue to impact on Africa's growth trajectory. If one seeks an explanation in terms of the unifying framework that I have outlined in the previous section, the obvious question to ask is at what stage did African economies go wrong? My answer is stage one. How does it happen to be stage one? The intuitive explanation is as follows.

Geography has always constrained food production in Africa. Long stretches of drought causing major reductions in cultivation have always weakened African population, making them subject to malnutrition. Malnutrition made them vulnerable to epidemic diseases. A return of the rain also brought diseases further weakening the labour force, an important input in food production.

Miller (1982) writes, 'Outbreaks of diseases paralleled the chronology of drought in an epidemiological sequence familiar from many other regions. Africans weakened by malnutrition and exhausted by dispersal into the bush or by flight into lowland became particularly vulnerable to endemic pathogens' (pp. 22–23).

A Portuguese observer in eighteenth-century Angola commenting on the increase in disease incidence after the rain writes: 'Rain brings food in abundance but leaves no one alive to eat it.'[9] This situation was further complicated by the African involvement in the slave trade. Africa had a long history of slavery as a social institution. However, it was never commercialized in such a large scale prior to European engagement.[10] The slave trade led to depopulation of

9 Cited in Miller (1982: 23).

10 The Islamic slave trade started in A.D. 700. But it never reached the epic proportion of the Atlantic slave trade.

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the continent, reducing food production further (Inikori, 1992).[11] However, the fact is that, even without depopulation, Africa struggled to produce more than a subsistence level of food grains. This restricted Africa from attaining stages two, three, and four and moving towards the development of a fully homegrown capitalist system. The engagement with the Europeans during the sixteenth century and formal colonization during the nineteenth century aborted the independent trajectory of institutional development in Africa. In the colonies with a high European mortality rate, the colonizers erected extractive institutions. The slave trade encouraged the African elites to go for violent slave raids inland, which institutionalized the culture of violence and lawlessness in certain parts of the continent. Many of these institutional features have persisted over time and still exist in the economic and political institutions of modern Africa. These weak institutions continue to influence the economic performance of the continent. Coupled with diseases and geographic constraints, poor institutions perhaps explain the bulk of the African growth tragedy.

Another observation is that if contemporary Africa is stuck at stage one due to diseases and other geographic constraints, then the data are going to show a strong correlation between the current level of development and these factors. The correlation between institutions and other factors will not be visible if it is a poverty trap situation similar to stage one. This is precisely what the data show.

China

The case of China is somewhat surprising. The Chinese were at the forefront of Old World technology and knowledge till the mid fifteenth century. Cast iron, the compass, gunpowder, paper, printing, and many others were first invented in China. The Chinese also invented sophisticated irrigation canals, which increased rice production many fold (Diamond, 1997). Despite this long list of technological breakthroughs, why did the Chinese fail to achieve the same heights as the Western Europeans? Why did they waste their early technological advantage? Why is it that Britain and not China progressed towards building an industrial society? The answer lies with Chinese institutions. The following paragraph attempts to provide an intuitive explanation in terms of the broad structure.

Food production developed in China as early as 7500 BC (Diamond, 1997: 100). By the start of the millennium, Chinese agriculture was able to support a large population and the hierarchical structure of Chinese society was comparable to the social institutions of stages two and three of the proposed broad structure. One can claim that, by the fourteenth and the fifteenth centuries, China had taken significant steps towards reaching stage four. The treasure fleets of the early fifteenth century and the discoveries of gunpowder and the compass suggest that the Chinese were incredibly close to making it to stage four.

11 The historians are yet to reach any agreement on this. For alternative views see Lovejoy (1982).

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However, the question remains as to what went wrong. The fate of the treasure fleet after it returned in 1433 gives us a clue to the answer. After the return of the fleet in 1433, the composition of the Chinese state changed significantly. The previously powerful eunuchs were overthrown by their opponents within the Chinese court. This was partly triggered by Li Zicheng's rebellion and the collapse of the Ming Dynasty into the hands of the Manchu-led Qings. The eunuchs were in favour of technology, scientific discovery, and daring expeditions. Ming rule under which the eunuchs were influential saw rapid growth in the size of the navy, in construction projects related to infrastructure,[12] and in private maritime trade,[13] especially with Portugal and Spain (see, Ebrey, 1999; and Ebrey *et al.*, 2006). The commander of the treasure fleet, Cheng Ho, was himself a eunuch. When their opponents assumed power, they aborted all the activities that the eunuchs were involved in, either directly or indirectly. Gradually they dismantled the entire infrastructure that was put in place to encourage these activities. The absolutist nature of their regime also did not allow private initiatives in these activities. In this way the absolutist regime destroyed all institutional incentives for technological research (Landes, 1998) and China went backwards over the next five hundred years. This is a good example of the theoretical claim that bad institutions can destroy all incentives for economic progress, even when the region is endowed with the right geography.

In summary, the Chinese experience shows that escaping the poverty trap is a necessary but not sufficient condition for development. In other words, a transition from stage two to stages three and four is not automatic. It also demonstrates that institutions are a deeper cause of development than technology, as technological progress is not sustainable without strong institutions.[14]

India

India escaped the strong grips of the Malthusian cycle (stage one) long before the British arrived. India was an exporter of industrial goods and an importer of primary and intermediate goods when Sir Thomas Roe visited the court of the Mughal emperor Jahangir in 1615.[15] The structure of the Mughal Empire was

12 Irrigation projects, restoration of the Grand Canal and the Great wall are some of the construction projects that the Ming Dynasty undertook.

13 Initially the Ming court wanted to control trade by using some formal rules. However, these rules became impossible to sustain with the advent of international trade with the Europeans. In support of this, Ebrey *et al.* (2006) writes: 'In the sixteenth century, this formal system [of containing trade] proved unable to contain the emergence of an international East Asian maritime trading community composed of Japanese, Portuguese, Spanish, Dutch, and Chinese merchants and adventurers. Because the profits to be had from maritime trade were high, both open and clandestine trade took place all along the coast.' (p. 277)

14 This is somewhat similar to the Portuguese and the Spanish experience who failed to capitalize on their initial technological advantage in maritime trade and shipbuilding, largely due to absolutist institutions (Acemoglu *et al.*, 2005).

15 Sir Thomas Roe was the emissary of King James I and he gained for the British the right to establish a factory at Surat, a port city where the British East India Company's ships first arrived in India.

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already very hierarchical with power concentrated in the hands of the minority elites. It also generated enormous amounts of wealth. In support of this fact Landes (1998) writes:

> India also had a large and skilled industrial workforce, whose products circulated throughout the region. As a result, the Indian yielded a substantial surplus that supported rulers and courts of legendary opulence. (p. 156)

Therefore, it is perhaps fair to say that the Mughal Indian society achieved living standards and an institutional structure comparable to stage three of the proposed broad structure. However, this pattern reversed as the British started gaining more political control during the late eighteenth century. The obvious question that one would like to ask is why?

The answer is not as complicated as it may seem. Acemoglu *et al.* (2002) talks about an institutional reversal that brought about this change. Their definition of institutional reversal however is very broad. They argue that the British colonizers never considered India and other tropical colonies as possible settlements and therefore they erected extractive institutions in these colonies. These extractive institutions reversed the trend of economic performance. In the case of India however it was not only the lack of settlement opportunities that persuaded the British colonizers to erect extractive institutions. It was also a direct result of the then prevailing political economy in both countries. Dutt (1992) argues that strong parliamentary lobbying by the British cotton manufacturers against the import of Indian textiles forced the East India Company to resort to policies that led to a systematic destruction of the Indian textile industry. He writes, 'Even in 1813, witness after witness in the Select Committee of the House of Lords testified that free Indian textile imports (of both finer and coarser varieties) would damage British industry' (pp. 148–149). The British East India Company resorted to policies of imposing internal tariffs and transit duties on Indian goods, of dislocation, and direct exploitation of the artisans, and of the forceful reduction of market demand to destroy the industry.[16] Indian textiles also lost their overseas markets due to the imposition of high import tariffs in Britain.

The Company had an influence on the land tenure system and property rights during that time. In many areas, the existing landlords received proprietary rights in land. The Company extracted rents from them without caring much about investment. The landlords passed on this burden of rent to the farmers and the poor farmers struggled to make investments in capital and technology. This system of rent seeking significantly reduced agricultural productivity and trapped

16 According to Dutt (1992), many artisans were subjected to flogging, imprisonment, and worse. Cutting off the thumbs of winders of raw silk has been documented. The domestic demand for textiles was also reduced significantly due to the decline of the Indian royal courts, as they were the major buyers of the quality products.

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farmers into a vicious cycle of poverty. One such institution is the Permanent Settlement concluded by the Cornwallis administration in 1793. It was a grand contract between the Company government and the Bengal landlords. Under the contract, the landlords were admitted into the colonial state system as the absolute proprietors of landed property and the government was barred from enhancing its revenue demands from the landlords. This arrangement institutionalized the alliance between the landlords and the colonial rulers. It also legitimized rent seeking. In a recent study, Banerjee and Iyer (2005) show that these institutional arrangements had and continue to have a significant impact on the economic outcome within India. Areas where proprietary rights were given to the landlords have significantly lower agricultural investments and productivity than areas where rights were given to the cultivators.

Therefore, colonization by the British led to institutional reversal, which prevented India from reaching stage four and developing an efficient capitalist system. The progressive forces within the Indian society, which had the capacity (at least theoretically) to push the economy towards large-scale industrialization, were systematically destroyed by the existing polity. The domestic extractive institutions were allowed to continue and they strengthened the feudal landlords both economically and politically. These institutional changes systematically destroyed the incentives for private investment in land, capital, and technology. As the incentives changed, so did the comparative advantages. India soon became a net exporter of raw materials and primary products and a net importer of industrial goods. What ensued is two centuries of deindustrialization and economic slowdown.

The Americas

When the Europeans first arrived to the Americas in the late fifteenth century, the indigenous American civilization of the Incas and the Aztecs were quite developed both economically and politically. The Incas and the Aztecs developed agriculture capable of supporting a large population. Their political structures were also very advanced and somewhat similar to the Europeans. The majority of the political power was concentrated in the hands of the minority elites and the ruling nobility. If one wants to make a comparison between the then states of the Europeans and the indigenous Americans, one would be able to point out that there were certain things that the indigenous Americans were able to achieve and there were certain things that they failed to achieve. Whatever they may be, they are secondary to my focus. The important issue is that the European arrival stalled the independent process of development in the Americas. The indiscriminate massacre of the indigenous population and epidemic diseases such as small pox contracted from the Europeans rapidly reduced the indigenous population to an inconsequential level. This allowed the Europeans to grab more indigenous land and erect institutions along the lines of institutions in Western Europe. However, in case of the Spanish colonies in South America, the Spanish

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colonial rulers continued with the Inca tribute system and other rent-seeking institutions for their own benefit. Engerman and Sokoloff (2001) argue that the institutional differences between the North and the South Americas after the European conquest stem from the factor endowments of the two continents. The following is their theory.

They argue that the factor endowments in the South supported resource extraction and rent seeking. Huge reserves of precious metals supported mining. The climate in many of the southern colonies was suited for growing sugar, which can be efficiently produced in large plantations. To enjoy economies of scale and extract maximum value, the owners of mines and plantations employed slave labour extensively. These labourers had no rights and no assets. This contributed to the extreme differences in the distributions of landholding, wealth, and political power, which shaped future institutions in the South. In contrast, the factor endowments in the Northern colonies supported small family-sized farms and farming of grains and livestock. This led to the development of a society with a relatively equitable distribution of wealth and political power and institutions that honour private property rights. The better institutions of the North contributed to her development as an advanced capitalist society, whereas for the South it was always a struggle thereafter.

Robinson (2006) in an excellent survey of North American development history also finds support for the Engerman and Sokoloff theory. He writes:

> British American colonies were founded by entities such as the Virginia Company and the Providence Island Company whose aim was to make profits. The model that they had in mind was not so different from that adopted by the Spanish or Portuguese (a system that other British colonizing entities, such as the East India Company, used to great effect). Yet these colonies did not make money and indeed both the Virginia Company and the Providence Island Company went bankrupt. A colonial model involving the exploitation of indigenous labor and tribute systems was simple infeasible in these places, because of lack of large indigenous population and the absence of complex societies. (Robinson, 2006: 28)

Setting up a manorial system as envisaged by Charles I failed to materialize in places such as Maryland due to the acute shortage of labour. As a result, institutions in these settlements ended up giving far more economic and political rights (access to land, property rights, and suffrage) to the migrants than they had originally wished for. Therefore, institutions encouraged private enterprise and investments, which resulted into economic growth in the long run.

In contrast, the Spanish and the Portuguese colonies of the South were abundant with indigenous labour and natural resources, which the colonizers used to a good effect to set up extractive colonies. These colonies ran on exploitation of indigenous labour and a native tribute system. After Pizzaro's conquest of Peru, he set up several institutions to extract rent from the indigenous

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population (Robinson, 2006). Among these institutions were: (a) encomienda (forced labour), (b) mita (forced labour used in the mines), (c) repartimiento (forced sell of goods at a higher price to the native population). Many of these institutions persisted till independence and they discouraged private enterprise and investment throughout. This is perhaps a major reason for the lack of growth and for economic stagnation in Latin America.

In summary, the above discussion shows that two different styles of colonization policies and hence institutions created two different types of capitalist society in the Americas after the European conquest. Many of the old indigenous institutions were replaced after the conquest. The economic performance of the two continents thereafter depended on the new institutions. The Engerman and Sokoloff (2001) theory shows that the difference in living standards of the two continents can be explained by institutional differences, which have their roots in the respective factor endowments.

4.3. Summary

In summary, the framework shows that diseases are important at an early stage of development. But as technology coupled with population growth and some good luck allow a society to escape this early stage then institutions become important. The interactions of institutions, technology, and trade drive the economy on a sustained growth path thereafter. This is perhaps an appropriate way of describing the process of economic development in Western Europe.

In China and India, the Malthusian cycle was broken fairly early on and institutional weaknesses played a crucial role in their respective declines. In the Americas, colonial institutions were a crucial factor.

The African case was somewhat different from the others as the continent struggled to escape from the strong grip of the Malthusian cycle. Long history of slave trade and colonial institutions complicated the story even more later on.

Therefore, the unifying framework does show that there is a case for dealing with diseases and institutions in the same framework rather than in isolation. This is a major departure from the existing studies, which tend to view these two factors as mutually exclusive rather than interlinked.

5. Concluding remarks

In the introduction, I began by noting that the 'root causes' literature has largely viewed the debate between institutions and diseases as a contest between two opposing schools of thought. In this article, I contribute to the literature by making an attempt to marry the two views using historical narratives. This supports the earlier empirical findings of Bhattacharyya (2006), which show that diseases are important for poor countries, especially those located in sub-Saharan

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Africa. However, institutions become more important as countries come out of the grips of diseases. This is indicative of a 'stages of development' hypothesis. I argue that poor countries, especially the ones in sub-Saharan Africa, are perhaps facing the poverty trap over centuries because of the high incidence of disease in these regions. This however requires further scrutiny.

I put forward a unifying framework for Western Europe to explain the pattern in the data reported by Bhattacharyya (2006). The framework is backed up with historical narratives. It shows that diseases are important at an early stage of development but institutions become more important at a later stage. It is then applied to explain the process of development in Africa, China, India, and the Americas and I show that the framework is also capable of explaining the stories of these continents.

As keen followers of this literature may have noticed, so far too much emphasis has been put on the empirical side. On the positive side, this has helped in identifying the reduced form impacts of some of the 'root causes'. But on the negative side, this has led to the view that institutions and diseases are two competing theories and they should be dealt with in isolation. This negative aspect is what I try to address in this article. The lack of a formal theoretical structure is perhaps what feeds into this negativity. Hence, there is an urgent call for formalizing existing ideas.

The obvious question is where do we start? In my opinion, the inherent causality problems associated with some of the empirical results can only be resolved through appropriate general equilibrium modelling. The structure that I have outlined in this article is perhaps not a bad place to start. Packaging the analytical structure into a general equilibrium model will give us insights on how the development process unfolded in different continents. Models are useful when it comes to the empirical testing of ideas.

Another aspect that needs more attention is country case studies. The literature can benefit from more research into country experiences as there are differences in how the development process unfolded across countries. Even though colonized by the Dutch, the development history of Suriname is not the same as the development history of Batavia. Banerjee and Iyer (2005) appear to be a promising start. Country knowledge supplemented by the cross-country results will perhaps take us closer to success in untangling the complex web of causal relationships between institutions, diseases, and development.

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