

Technical Choice in Political Perspective:

Rethinking How Elites Selected Economic Strategy After WW II

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Abstract: The dominant development strategy chosen by political elites of late industrializing world after WW II was import-substituting industrialization (ISI) strategy, which aimed at catching up with the world technical frontier by rapid industrialization. The nature of the colonial legacies and the sense of external threats shaped the ideological inclination of decision makers and the resulting choice of development strategy and instruments, while the resources at their disposal and the existence of charismatic leaders who favor rapid catch-up determined to what extent the development strategy can be carried out. We argue if the nature of colonial ruling was exploitive and brutal and external threats were perceived to be high, then ISI strategy was more likely. Once ISI strategy was chosen, the abundance of resource endowments and the existence of a charismatic leader would render it a relatively long longevity.

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Following the spirit of Gerschenkron (1962), Acemoglu and Robinson (2006) (hereafter A&R) explained why and under what circumstances political elites, in particular at state level, intend to block technological development. According to their model, political elites do so for fearing the introduction of new technology and institutions may reduce their power and make it more likely that they will be replaced.

Although the path of economic development of some the world big powers during the period of 19th century was largely in line with A&R's hypothesis, their theoretical explanations run counter to the historical evidence in the wake of WWII. In contrast to their counterparts in the 19th century who feared technological development, after the end of WWII the political elites of the late industrializing countries, especially those which gained political independence recently, showed strong inclination of catching up with industrial core countries in terms of their technical level in relation to the latter. To do this, the means preferred by these LDCs was import-substituting industrialization (ISI) strategy, which favored disproportionately the development of heavy industrialization and thus called for such similar institutional responses across LDCs as state ownership, central planning, administered pricing, tariff walls, coalitional arrangements, and rent-seeking (Waterbury 1999).¹ Their efforts nearly lasted more than three decades until the advent of the new round of economic liberalizations and the structural reforms advocated by the so-called Washington Consensus. Then the question is: why did political elites who oppose technical changes or innovations as well as new economic institutions in the late 19th century but change their tune after WWII? Didn't political elites follow the similar logic when making political decisions concerning whether or not to block innovations of technology and institutions?

In addition, despite the fact that political elites in LDCs shared the strong intention to catch up with the frontier of world technology through industrialization, how and to what extent this ambition was materialized in reality, which was embodied by a wide variety of development policies and its implementation, varied across LDCs and over different historical periods. As a result, how should we explain the varying methods and degree demonstrated when LDCs implemented their development strategies in the hope of catching up with and even overtaking advanced industrialized countries?

Explanations and Hypotheses

In this paper we argue that after WW-II political elites of LDCs preferred advanced technologies, namely industrialization, because they believed only by industrializing their national economy can they reap huge benefits in politics, say, gaining legitimacy of their ruling, reducing external threats, and so forth. To understand why these political elites had such perception and the methods they took to materialize their ambitions, we should understand the political milieu in which their perception and methods took shape. We argue that historically the nature of colonial

¹ Since such strategy more or less deviated from the comparative advantage of LDCs, it was also called comparative-advantage-denying (CAD) strategy (Lin 2003).

rule in ex-colonies shaped the strength of nationalist sentiment of LDCs and in turn made political elites in these countries to be cognizant of the necessity of realizing industrialization. To accelerate the pace of industrialization, given the intellectual atmosphere prevailed after WW-II and the exemplary effect of the Soviet Model, planning instead of market was favored by governments of LDCs as the principal mean to bridge the gap between their technological level and the world frontier level. Similarly, for those LDCs without experiences of being previously colonized but faced the external threats from international imperialists, no matter whether such threats existed in reality or only in their historical memories, their political elites' attitude toward advanced technologies or industrialization and the corresponding policy choices were similar to their counterparts of the ex-colonies.

However, the nature of colonial rule in different ex-colonies was different. As pointed out by Acemoglu, Robinson and Johnson (hereafter ARJ 2002), the institutions established during the colonial periods demonstrated huge variations in terms of their influence on the long-term development and growth. In places where natural environment was unfavorable to colonizers, where natural resources were abundant, and where there were plentiful labors to be exploited as slaves, the colonizers tended to established institutions which only facilitated the short-term exploitations of natural resources and slave labors rather than enhanced the potentiality of long-term development and growth. As a result, the nature of colonial rules not only altered the trajectory of local economic development during the colonial age but also impacted the growth performance during the post-colonial periods.

Although we acknowledge that the impact of the colonial rule on subsequent development was substantial, what we disagree with ARJ (2002) is that we don't assume the nature as well as the impact of colonial institutions would necessarily persist after the independence. Rather, we argue the resolutions of the political elites of an ex-colony country to pursue ISI strategy in the post-colonial era were inversely associated with the nature of institutions formed during the colonial periods. Specifically speaking, the more the colonial ruling were perceived as brutal, exploitive, and unjust, or put simply, were perceived as the root cause of the economic backwardness of the ex-colony, the more likely political elites, most of them were genuine nationalists, would become the enthusiastic anti-imperialists or anti-colonialists after the independence, and stronger their resolutions would become to establish modern and sophisticated industries for fearing a widening technological gap would lead humiliatory history to repeat sometime in the future. In addition, due to the deep-rooted nationalist sensation, political elites believed that by successfully establishing modern industries and developing advanced technologies, they were able to increase the state prestige and build up their political reputations, which would enable them to reap huge political benefits such as increasing the legitimacy of their ruling. As a result, it is not surprising that political elites of these newly independent LDCs were more inclined to develop frontier technology to catch up with or overtake advanced countries. Due to the fact that all metropolises and imperialist countries were advocates of laissez-faire, combined with the achievement of USSR and the

dominant development idea between the 1950s and 1960s, it naturally led political elites with the ideology of anti-colonialism or anti-imperialism to conceive of planning or overwhelming state intervention as superior to market as the principal method to industrialize. In other words, the nature of the colonial ruling, namely, whether they were exploitive or constructive, impeding or helping, in a large part determine to what extent the political elites after the independence perceived the merits of ISI strategy and to what extent these elites made up their minds to catch up with the world technology frontier at any cost.

For those LDCs which escaped the fortune of being previously colonized, like Soviet Union and China, the misfortune of those ex-colonies reminded them of the danger of falling behind technically the world frontier. This perception of the merits of developing advanced technologies was further reinforced by the widely believed external threats from international imperialists, which might originated from their dismal historical memories or the hostile international environment in which their countries were believed to being encompassed by international imperialists and their allies. Thus, it was imperative that these countries should develop frontier technology rather than appropriate technology despite the fact that the latter was suited with their factor endowment and comparative advantage. In that sense, the military confrontation between the two camps and the associated regional conflicts during the Cold War also justified the adoption of ISI strategy by many LDCs.

No matter how ambitious political elites were, how far they can go was constrained by two conditions. One is the resources, including natural resource endowment, human capital of workforce, etc, that were available for political elites to mobilize. Natural resources, on the one hand, are one of the major sources of rents for incumbent elites whose power is not effectively checked by the public (Sachs and Warner 1997; Ross 1997). When technology innovation is associated with risk of the replacing the incumbent elites (Acemoglu and Robinson 2006), they tend to oppose the introduction of new technologies and institutions for fearing losing the substantial rents derived from natural resources. On the other hand, in case that nationalist sentiment is high and political elites determine to introduce advanced technologies by pursuing ISI strategy, sufficient natural resource endowment makes political elites of LDCs more confident about the viability of the chosen development strategy. As well known, the implementation of ISI strategy involved astronomical initial investment and incurred striking costs, which is unbearable for LDCs whose natural resources were scarce.² As a result, the viability of ISI strategy in a resource-scarce country was called into question. As to human capital, when national sentiments is high but human capital is low, which was the feature of most LDCs shortly after WW-II, adopting advanced technology does not make economic sense at macro level but it is a good strategy for sectors armed with these technologies because the price they pay to human capital will be relatively lower.

The second condition is whether a LDC has its own charismatic leader favoring

² A resource scarce country can still pursue the ISI strategy for a long period if it can find a way to circumvent its resource constraint, say, if it can get access to huge foreign aid.

centralized planning and state intervention,³ who would make the adoption and implementation of the ISI strategy more likely. As well discussed in political economy literature, pursuing ISI strategy is not just a game which will change the total size of the economic pie but also affects how this pie will be distributed. The implementation of economic strategy is a process which will reward some social group and sectors but at the same time punish others. Generally speaking, elites who are in charge of the implementation of the ISI strategy and the staff of sectors armed with advanced technologies will get benefited at the cost of other elites as well as the general public. In fact, it is those political elites, who proclaim they successfully established an industrial system and appointed their kin, clans, friends, or supporters to key and lucrative positions, will be able to reaped largest political interests and economic rents from the implementation of the ISI strategy. The role of a charismatic leader, however, is to successfully persuade the losers so that they believe that their sacrifice is temporary and eventually they also can get more than before from a bigger pie in the future. In other words, a charismatic leader, due to his personal charisma, can reduce the political risk associated with the implementation of the ISI strategy and make such kind of development strategy more acceptable even for those potential losers without triggering strong political oppositions. A charismatic leader can do so not only because under some specific historical conditions people indeed trust him but also because his charismatic personality was backed on an authoritarian regime in which his people has little say with regard to any decisions of grave importance. No matter how a charismatic leader plays his role, the existence of such a leader makes the adoption and implementation of the ISI strategy more likely and draws out the duration of its operation.

In sum, our explanation places emphasis on the subjective agency of actors at the historical juncture rather than merely structural factors. At the juncture these actors, based on their understandings of the historical experiences and the perception of the surrounding international environment, made decisive choices which affect the long-term fortune of their countries. In particular we stress the importance of the emergence of the charismatic leadership whose pivotal role in policy making is largely neglected in political economy literature.⁴ In the following text we will develop a simple mathematic model to illustrate the political mechanism facilitating the adoption of advanced technology rather than appropriate technology.

The Basic Model

Our model is based on A&R (2006). Consider an infinite horizon economy in discrete time consisting of a group of citizens, with mass normalized to 1, an incumbent ruler, and an infinite stream of potential new rulers. All agents are infinitely lived, maximize the net present discounted value of their income and

³ Marx Weber (1968) defined charisma as “a certain quality of an individual personality by virtue of which he is set apart from the ordinary men and treated as endowed with supernatural, super-human or at least exceptional power or qualities.”

⁴ Jones and Olken (2005) might be an exception. They explore the role of leaders on economic growth after WW II. However, they say little about the mechanism through which how these leaders influence economic growth. And they fail to distinguish the leaders with personal charisma from those who do not have.

discount the future with discount factor, β . Whereas citizens are infinitely lived, and incumbent ruler may be replaced by a new ruler, and from then on receives no utility.

To innovate, incumbent ruler has two options: one is to introduce appropriate technology αA_{t-1} , where $\alpha > 1$ and A_{t-1} is the state of technology available to the citizens at time t . while the other is to introduce frontier technology \bar{A}_t . \bar{A}_t is exogenously determined and $\bar{A}_t > \alpha A_{t-1}$, which suggests there significant distance between the appropriate technology and frontier technology. In this paper whether the technology is appropriate depends on whether it is appropriate for production of consumption goods.

LDCs are abundant in cheap and low-skill labors but lack capital. This factor endowment structure determines the frontier technology is not appropriate for LDCs (Basu and Weil 1998; Acemoglu and Zilibotti 2001). In practice, LDCs choose to introduce frontier technology rather than appropriate technology because of their nationalist sentiment and the desirability to minimize the external threats. To do so they are willing to sacrifice production efficiency. So we assume adopting frontier technology will lower the efficiency of production. This effect can be captured by production functions (1) and (2),

$$y_t = \alpha_1 A_{t-1}, \text{ when a particular LDC introduces appropriate technology} \quad (1)$$

$$y_t = \alpha_2 A_{t-1}, \text{ when a particular LDC introduces frontier technology} \quad (2)$$

Where $1 < \alpha_2 < \alpha_1$.

We further assume the cost of adopting the new technology (including the cost of the associated institutional arrangements) is normalized to 0. In addition, the cost of replacing the incumbent ruler is zA when he doesn't adopt new technology, whereas this cost is $z'A$ when he introduces the new technology. Therefore,

$$A_t = A_{t-1} \left((1 - p_t) (1 + (\alpha_i - 1)x_t) \right) + p_t \left(1 + (\alpha_i - 1)\hat{x}_t - x_t z' - (1 - x_t)z \right), \quad i = 1, 2, \quad (3)$$

Where $x_t = 1$ or 0 denotes whether the new technology is introduced ($x_t = 1$) or not ($x_t = 0$) at time t by the incumbent ruler, whereas $\hat{x}_t = 1$ or 0 refers to the innovation decision of a new ruler. Also, $p_t = 1$ denotes that the incumbent is replaced, while $p_t = 0$ applies when the incumbent is kept in place.

More explicitly, we assume that z and z' are random variables drawn from the distribution function F^N and F^I , respectively. F^N is uniform over $\left[\gamma\mu - \frac{1}{2}, \gamma\mu + \frac{1}{2} \right]$,

whereas F^l is uniform over $\left[\mu - \frac{1}{2}, \mu + \frac{1}{2}\right]$, where $\gamma \geq 1$. In this formulation, μ is an inverse measure of the degree of political competition. In addition, γ is a measure of how much the incumbency advantage is eroded by the introduction of a new technology: when $\gamma = 1$, the costs of replacing the ruler are identical irrespective of whether a new technology is introduced or not. A new entrant becomes the incumbent ruler in the following period after he takes control, and it will, in turn, be costly to replace him. A higher γ , all else equal, also implies a lower probability of replacement for the ruler without innovation, thus makes the position of noninnovating rulers more secure.

Citizens replace the ruler if a new ruler provides them with higher utility. If an incumbent is replaced then whether or not innovation takes place in that period depends on what the new ruler does. The rulers levy a tax T on citizens. For simplicity, we assume that when the technology is A , citizens have access to a nontaxable informal technology that produces $(1-\tau)A$. All in all, we follow A&R's model by spelling out the exact timing of events within the period as follows:

1. The period starts with technology at A_t .
2. The incumbent decides whether to adopt the new technology, $x_t = 0$ or 1 .
3. The stochastic costs of replacement, z_t or z'_t , are revealed.
4. Citizens decide whether to replace the ruler, p_t .
5. If they replace the ruler, a new ruler comes to power and decides whether to adopt the new technology $\hat{x}_t = 0$ or 1 .
6. The ruler in power decides the tax rate, T_t .

Equilibrium

We limit attention to pure strategy Markov Perfect Equilibria (MPE) of this repeated game. At every stage of this dynamic game, the incumbent must decide whether or not to introduce appropriate technology ($x \in \{0,1\}$), and tax rate $T \in [0,1]$. After replacing the incumbent ruler, the new ruler also have to decide technology choice ($\hat{x} \in \{0,1\}$), and $\hat{T} \in [0,1]$. The strategy set of the citizens is $p(x, z, z') \in \{0,1\}$, where $p=1$ denotes to replace the incumbent ruler. In addition, if $x=0$ then the replacement cost is z , whereas the replace cost is z' when $x=1$. Therefore an MPE of

this game consists of a strategy combination $\{x, T, \hat{x}, \hat{T}, p(x, z, z')\}$, such that all these actions are the best responses to each other for all values of the state A.

Firstly, let's analyze this dynamic game when there's no nationalist sentiment as well as external threats. In such case the incumbent's optimal strategy is to introduce appropriate technology since frontier technology is not suited with LDCs.

The value function of citizens is $V(A) = A(1-T) +$

$$\beta \left[x \int \left[(1-p_I(z'))V(\alpha_1 A) + p_I(z')(\hat{x}V((\alpha_1 - z')A) + (1-\hat{x})V((1-z')A)) \right] dF^I + (1-x) \left[\int \left[(1-p_N(z))V(A) + p_N(z)(\hat{x}V((\alpha_1 - z)A) + (1-\hat{x})V((1-z)A)) \right] dF^N \right] \quad (4)$$

Equation (4) suggests citizens' total income consists of two parts: the present income $(A(1-T))$ and the future income .

The end-of-period value function for a ruler (again evaluated after step 6 in the timing of the game, so once he knows that he is in power) can be written as

$$W(A) = TA + \beta \left[x \int (1-p_I(z'))W(\alpha_1 A) dF^I + (1-x) \left[\int (1-p_N(z))W(A) dF^N \right] \right] \quad (5)$$

If there's no nationalist sentiment and external threats involved in the decision of the new ruler, then his decision depends on the comparison between $W((1-z)A)$ and $W((\alpha_1 - z)A)$. Since W is a monotonously increasing function, then $W((\alpha_1 - z)A) > W((1-z)A)$. This indicates that for the new ruler, his optimal strategy is always introduce appropriate technology.

From equation (4), citizens' income $(V(A))$ increases as A is greater. Therefore if the incumbent ruler chooses not to innovate and the potential ruler chooses not to innovate either, their income will be $V(A)$. If the potential ruler chooses to innovate, their income will be $V((\alpha_1 - z)A)$. Therefore, when the incumbent ruler doesn't innovate, citizens' optimal strategy is

$$p_N(z) = 0 \text{ when } z \geq \alpha_1 - 1; \text{ and } p_N(z) = 1 \text{ when } z < \alpha_1 - 1 \quad (6)$$

Similarly, if the incumbent chooses to introduce appropriate technology, citizens' optimal strategy is

$$p_I(z') = 0, \text{ when } z' \geq 0; \text{ and } p_I(z') = 1, \text{ when } z' < 0 \quad (7)$$

We then consider whether or not the incumbent ruler choose appropriate technology. According to equation (6), if incumbent ruler choose not to innovate, his income is

$$\int_{\gamma\mu - \frac{1}{2}}^{\gamma\mu + \frac{1}{2}} (1-p_N(z))W(A) dF^N = \int_{\alpha_1 - 1}^{\gamma\mu + \frac{1}{2}} W(A) dF^N = P \left[\gamma\mu + \frac{1}{2} - (\alpha_1 - 1) \right] W(A) \quad (8)$$

Where we define $P[h]=0$, if $h < 0$, $P[h]=h$, if $h \in [0,1]$, and $P[h]=1$, if $h > 1$.

Similarly, according to equation (7), if the incumbent choose to introduce appropriate technology, his income will be

$$\int_{\mu-\frac{1}{2}}^{\mu+\frac{1}{2}} (1-p_I(z'))W(\alpha_1 A) dF^I = \int_0^{\mu+\frac{1}{2}} W(\alpha_1 A) dF^I = P\left[\mu + \frac{1}{2}\right]W(\alpha_1 A) \quad (9)$$

According to the optimal strategies of the actors in this repeated game, we can calculate the their payoff. We now conjecture $V(A) = v(x)A$, $W(A) = w(x)A$.

According to equation (4) and (5), we have

$$v(x) = \frac{(1-\tau)}{1-\beta x \left(\alpha_1 - \int_{\frac{1}{2}-\mu}^0 z' dz' \right) - \beta(1-x) \left(\int_{\alpha_1-1}^{\frac{1}{2}+\gamma\mu} z dz + \int_{\frac{1}{2}-\gamma\mu}^{\alpha_1-1} (\alpha_1 - z) dz \right)} \quad (10)$$

And

$$w(x) = \frac{\tau}{1-\beta \left(xP\left[\frac{1}{2} + \mu\right] \alpha_1 + (1-x)P\left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1)\right] \right)} \quad (11)$$

In order to analyze the effect of nationalist sentiment and the perception of the external threats on technical choice, we assume leaders of LDCs suffer an expected psychological shock at $t+1$ period. On this occasion the ruler can choose not to innovate. But he will be facing a loss with the probability of $P(\phi \bar{A}_{t+1}/A_t) = 1 - e^{-\phi \bar{A}_{t+1}/A_t}$ due to the failure to meet nationalist sentiment or the occurrence of invasion from another country, and get zero utility from that point on. Here $\phi \geq 0$ parameterizes the extent of nationalist sentiment or the external threat.

Hence the incumbent's total income is

$$W(A_t) = \frac{\tau e^{-\phi \bar{A}_{t+1}/A_t}}{1-\beta P\left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1)\right]} \cdot P\left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1)\right] A_t, \quad (12)$$

when he doesn't innovate; Or

$$W'(A_t) = \frac{\tau e^{-\phi \bar{A}_{t+1}/\alpha_1 A_t}}{1-\beta P\left[\frac{1}{2} + \mu\right] \alpha_1} P\left[\mu + \frac{1}{2}\right] \cdot \alpha_1 A_t, \quad (13)$$

when he introduces appropriate technology.

Equation (12) and (13) indicate that the greater the distance between the present technological level and the world frontier ($\frac{A_t}{\bar{A}_t}$) is, the greater the loss of the

incumbent ruler will be.

When nationalist sentiment and the external threats exist, the incumbent ruler can also choose to introduce frontier technology. In such case his income is:

$$W''(A_t) = \frac{\tau \cdot e^{-\phi \bar{A}_{t+1}/\bar{A}_{t+1}}}{1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_2} \cdot P \left[\frac{1}{2} + \mu \right] \alpha_2 A_t \quad (14)$$

Like A&R(2006), we also assume $P \left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1) \right] > P \left[\frac{1}{2} + \mu \right] \alpha_1$, namely

$\gamma > \alpha_1 + \frac{3}{2} \frac{\alpha_1 - 1}{\mu}$. This assumption indicates if innovation will enormously erode the

incumbency advantage, the ruler never choose to innovate. In fact, the comparison between equations (12), (13) and (14) shows when no nationalist sentiment and external threats are involved, the incumbent will never choose to innovate, including introducing neither appropriate technology nor frontier technology. Furthermore, from equations (12)-(14), we have

$$W(A_t) \leq W'(A_t), \text{ when } \frac{\phi \bar{A}_{t+1}}{A_t} \geq \frac{\alpha_1 \ln \left(\frac{P \left[\frac{1}{2} + \mu \right] \alpha_1 \left(1 - \beta P \left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1) \right] \right)}{\left(1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_1 \right) P \left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1) \right]} \right)}{(\alpha_1 - 1)} = \delta; \quad (15)$$

or

$$W'(A_t) \leq W''(A_t), \text{ when } \frac{\phi \bar{A}_{t+1}}{A_t} \geq \alpha_1 \phi + \alpha_1 \ln \left(\frac{\alpha_1 \left(1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_2 \right)}{\alpha_2 \left(1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_1 \right)} \right) \quad (16)$$

Obviously, There exists an unique $\phi = \phi^*$ such that

$\alpha_1 \phi^* + \alpha_1 \ln \left(\frac{\alpha_1 \left(1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_2 \right)}{\alpha_2 \left(1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_1 \right)} \right) = \delta$. Therefore, based on equations (15) and (16), we state

Proposition 1: When $\phi > \phi^*$, if $\frac{\phi \bar{A}_{t+1}}{A_t} < \delta$, the ruler never adopts new

technology. If $\delta \leq \frac{\phi \bar{A}_{t+1}}{A_t} < \lambda$, the ruler introduces appropriate technology. If

$\frac{\phi \bar{A}_{t+1}}{A_t} \geq \lambda$, the ruler introduces frontier technology, where

$$\alpha_1 \phi + \alpha_1 \ln \left(\frac{\alpha_1 \left(1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_2 \right)}{\alpha_2 \left(1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_1 \right)} \right) = \lambda .$$

Because $\frac{\phi \bar{A}_{t+1}}{A_t}$ indicates the degree of nationalist sentiment and the degree of the external threats, the implication of Proposition 1 is straightforward. If the extent of nationalist sentiment or the external threat is great (i.e., $\phi > \phi^*$), then when $\frac{\phi \bar{A}_{t+1}}{A_t} < \delta$ and the ruler is afraid of the replacement effect due to the introduction of new technology, he tends to never innovate. By contrast, when the external threat and the nationalist sentiment increases to a certain level, namely, $\delta \leq \frac{\phi \bar{A}_{t+1}}{A_t} < \lambda$, the ruler is willing to introduce appropriate technology to improve economic efficiency in order to gain the legitimacy of his ruling by satisfying the nationalist sentiment or to counter the external threats. When the external threat and the nationalist sentiment increases to a high enough level, namely, $\frac{\phi \bar{A}_{t+1}}{A_t} \geq \lambda$, the ruler is willing to sacrifice the efficiency and resort to introducing frontier technology to please the populist appeal and to deal with the external threats.

In other words, the relationship between technical innovation and external threats is not linear and monotonous, as shown in A&R (2006). The reason is that not all technical choices will benefit the economic efficiency equally and the ruler's incentives to innovate vary in a nonlinear manner in the response to the varying nationalist sentiments and the external threats. Before nationalist sentiment and external threats rise to a certain valve, the ruler will choose to introduce appropriate technology to improve efficiency, whereas he will choose to introduce frontier technology at the cost of efficiency when nationalist sentiment and external threats exceed that valve. In that sense A&R (2006) is a special case of our model.

Human Capital, Resource Endowment, and Charismatic Leader: How Technical Choices will be Affected

So far we have considered a model in which the nationalist sentiment and external threats will influence the ruler's decision of technical choices. In this section we extend our model to analyze the importance of human capital and resource endowment (including land and natural resources) in affecting the political equilibrium.

We first consider the effect of human capital. We model this issue in a simple way by allowing income at date t to be

$$y_t = \alpha_1 A_{t-1} h, \text{ if LDC introduces the appropriate technology} \quad (17)$$

or

$$y_t = \alpha_2 A_{t-1} h, \text{ if LDC introduces the frontier technology} \quad (18)$$

where h represents the exogenous shock of human capital.

Similar to the above section, we first consider the dynamic game in which no the nationalist sentiment and the external threats are involved. In such case citizens' value function is

$$\begin{aligned} \hat{V}(A) = & Ah(1-T) + \\ & \beta \left[x \int \left[(1-p_I(z'))V(\alpha_1 Ah) + p_I(z')(\hat{x}V((\alpha_1 - z')Ah) + (1-\hat{x})V((1-z')Ah)) \right] dF^I + \right. \\ & \left. (1-x) \left[\int \left[(1-p_N(z))V(Ah) + p_N(z)(\hat{x}V((\alpha_1 - z)Ah) + (1-\hat{x})V((1-z)Ah)) \right] dF^N \right] \right] \end{aligned} \quad (19)$$

The incumbent's value function is

$$\begin{aligned} \hat{W}(Ah, \varphi R) = & TAh + \varphi R \\ & + \beta \left[x \int (1-p_I(z'))\hat{W}(\alpha_1 Ah, \varphi R) dF^I + (1-x) \left[\int (1-p_N(z))\hat{W}(Ah, \varphi R) dF^N \right] \right] \end{aligned} \quad (20)$$

where R is related to the rents from natural resource endowment, φ ($0 \leq \varphi \leq 1$) denotes the strength of the leader's personal charisma. When the leader's charisma is greater (the value of φ is greater), then his mobilization capacity is greater and the implementation cost of ISI strategy is correspondingly lower. As a result, the net economic rents from the implementation of such type of strategy will be greater.

As far as the new ruler is concerned, his optimal strategy is always to introduce the appropriate technology.

Let's see citizens' optimal strategy. Because the incumbent reaps all rents from resource endowment, then whether or not citizens decide to replace the incumbent ruler has nothing to do with the endowment structure. In addition, because the influence of human capital enter the production function in a linear form, then citizens' optimal strategy can still be captured by equations (6) and (7).

Given citizens' optimal strategy, the incumbent's income is

$$\int_{\frac{\gamma\mu-\frac{1}{2}}{\gamma\mu+\frac{1}{2}}}^{\frac{\gamma\mu+\frac{1}{2}}{\gamma\mu-\frac{1}{2}}} (1-p_I(z))\hat{W}(Ah, \varphi R) dF^N = P \left[\gamma\mu + \frac{1}{2} - (\alpha_1 - 1) \right] \hat{W}(Ah, \varphi R), \text{ if he doesn't} \quad (21)$$

innovate,

or

$$\int_{\frac{\mu-\frac{1}{2}}{\mu+\frac{1}{2}}}^{\frac{\mu+\frac{1}{2}}{\mu-\frac{1}{2}}} (1-p_I(z'))\hat{W}(\alpha_1 Ah, \varphi R) dF^I = P \left[\mu + \frac{1}{2} \right] \hat{W}(\alpha_1 Ah, \varphi R), \text{ if he introduces the} \quad (22)$$

appropriate technology

We conjecture that $\hat{V}(Ah) = \hat{v}(x)Ah$, $\hat{W}(Ah, \varphi R) = \hat{w}(x)Ah + \hat{r}(x)\varphi R$.

According to equations (4) and (5), we have

$$\hat{V}(Ah) = \hat{v}(x)Ah, \quad \hat{W}(Ah, \varphi R) = \hat{w}(x)Ah + \hat{r}(x)\varphi R, \quad (23)$$

$$\hat{w}(x) = \frac{\tau}{1 - \beta \left(xP \left[\frac{1}{2} + \mu \right] \alpha_1 + (1-x)P \left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1) \right] \right)}, \quad (24)$$

and

$$\hat{r}(x) = \frac{1}{1 - \beta \left(xP \left[\frac{1}{2} + \mu \right] + (1-x)P \left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1) \right] \right)} \quad (25)$$

Because we have assumed when the nationalist sentiment is strong and the external threats exist, the incumbent ruler will have a psychological loss with the probability of $P(\phi\bar{A}_{t+1}/A_t) = 1 - e^{-\phi\bar{A}_t/A_t}$ if he doesn't innovate and the get zero utility after this loss indeed occurs, then the incumbent's income is

$$\hat{W}(A_t h, \varphi R) = \frac{\tau e^{-\phi\bar{A}_{t+1}/A_t}}{1 - \beta P \left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1) \right]} \cdot A_t h + \frac{e^{-\phi\bar{A}_{t+1}/A_t}}{1 - \beta P \left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1) \right]} \cdot \varphi R, \text{ if}$$

he doesn't innovate (26)

or

$$\hat{W}'(A_t h, \varphi R) = \frac{\tau e^{-\phi\bar{A}_{t+1}/\alpha_1 A_t}}{1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_1} \cdot P \left[\frac{1}{2} + \mu \right] \alpha_1 A_t h + \frac{e^{-\phi\bar{A}_{t+1}/\alpha_1 A_t}}{1 - \beta P \left[\frac{1}{2} + \mu \right]} \cdot P \left[\frac{1}{2} + \mu \right] \varphi R,$$

if he introduces appropriate technology (27)

or

$$W''(A_t h, \varphi R) = \frac{\tau e^{-\phi\bar{A}_{t+1}/\bar{A}_{t+1}}}{1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_2} \cdot P \left[\frac{1}{2} + \mu \right] \alpha_2 A_t h + \frac{e^{-\phi\bar{A}_{t+1}/\bar{A}_{t+1}}}{1 - \beta P \left[\frac{1}{2} + \mu \right]} \cdot P \left[\frac{1}{2} + \mu \right] \varphi R$$

, if he introduces frontier technology (28)

From equations (26), (27), and (28), we have

$$W(A_t) \leq W'(A_t), \text{ if } \frac{\phi\bar{A}_{t+1}}{\alpha_1 A_t} \geq \frac{\ln \left(\frac{m_1 A_t h + n_1 \varphi R}{m_2 A_t h + n_2 \varphi R} \right)}{(\alpha_1 - 1)} \quad (29)$$

$$W'(A_t) \leq W''(A_t), \text{ if } \frac{\phi\bar{A}_{t+1}}{\alpha_1 A_t} \geq \phi + \ln \left(\frac{m_2 A_t h + n_2 \varphi R}{m_3 A_t h + n_3 \varphi R} \right) \quad (30)$$

$$\text{where } m_1 = \frac{\tau}{1 - \beta P \left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1) \right]}, \quad m_2 = \frac{\tau P \left[\frac{1}{2} + \mu \right] \alpha_1}{1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_1},$$

$$m_3 = \frac{\tau P \left[\frac{1}{2} + \mu \right] \alpha_2}{1 - \beta P \left[\frac{1}{2} + \mu \right] \alpha_2}, \quad n_1 = \frac{1}{1 - \beta P \left[\frac{1}{2} + \gamma\mu - (\alpha_1 - 1) \right]}, \quad n_2 = n_3 = \frac{P \left[\frac{1}{2} + \mu \right] \alpha_2}{1 - \beta P \left[\frac{1}{2} + \mu \right]}$$

The effect of Human Capital Now we can show the effect of human capital on the ruler's decision on technical choice by focusing on the comparative statics. From (29), we have

$$\frac{\partial \ln \left(\frac{m_1 A_t h + n_1 \varphi R}{m_2 A_t h + n_2 \varphi R} \right)}{\partial h} = \frac{(m_1 n_2 - m_2 n_1) \varphi R}{(m_1 A_t h + n_1 \varphi R)(m_2 A_t h + n_2 \varphi R)} < 0. \quad (31)$$

It suggests that when nationalist sentiment is not strong and the external threats are low, the higher the human capital is, the greater the incentive of the ruler will be to introduce the appropriate technology. The reason is that in such case the economic efficiency of introducing the appropriate technology will be increasing so as to increase the benefits that accrue to the ruling elites. More importantly, the incumbent won't bear a psychological loss due to the low nationalist sentiment and there're no external threats which makes the security consideration not so imperative. By contrast, the smaller the human capital is, the more likely that ruling elite tend to not innovate.

In addition, we also have

$$\frac{\partial \ln \left(\frac{m_2 A_t h + n_2 \varphi R}{m_3 A_t h + n_3 \varphi R} \right)}{\partial h} = \frac{(m_2 n_3 - m_3 n_2) \varphi R}{(m_2 A_t h + n_2 \varphi R)(m_3 A_t h + n_3 \varphi R)} > 0. \quad (32)$$

It shows that when the nationalist sentiment is strong and the external threats are high enough, the smaller the human capital is, the more likely that the ruling elite tend to introduce frontier technology despite the fact that it will decrease efficiency. The reason is that when the human capital is low, the price the ruler needs to pay for the introduction of the frontier technology is low. On the other hand, introducing frontier technology will satisfy the nationalist sentiment and lower the external threats.

In summary, we state

Proposition 2. When the nationalist sentiment is not strong and the external threats are low, a smaller human capital corresponds to a higher likelihood that the ruler chooses not to innovate. However, when the nationalist sentiment is strong and the external threats are high, a smaller human capital corresponds to a higher likelihood that the ruler chooses to introduce frontier technology rather than the appropriate technology.

The Effect of Resource Endowment From (29), we have

$$\frac{\partial \ln \left(\frac{m_1 A_1 h + n_1 \varphi R}{m_2 A_1 h + n_2 \varphi R} \right)}{\partial R} = \frac{(m_2 n_1 - m_1 n_2) A_1 h \varphi}{(m_1 A_1 h + n_1 \varphi R)(m_2 A_1 h + n_2 \varphi R)} > 0 . \quad (33)$$

This comparative statics suggests when the nationalist sentiment is low and the external threats are small, the more abundant the natural resources are, the more likely that the ruler tend to not innovate. The reason is that in such case the ruler fears the new technology is associated with the replacement effect which will erode his incumbency advantage and in turn reduce the economic rents available for him. In addition, from (30), we also have

$$\frac{\partial \ln \left(\frac{m_2 A_1 h + n_2 \varphi R}{m_3 A_1 h + n_3 \varphi R} \right)}{\partial R} = \frac{(m_3 n_2 - m_2 n_3) A_1 h \varphi}{(m_2 A_1 h + n_2 \varphi R)(m_3 A_1 h + n_3 \varphi R)} < 0 . \quad (34)$$

It indicates that when the nationalist sentiment is high and the external threats are great, the more abundant the natural resources are, the more likely that the ruler tend to introduce the frontier technology rather than the appropriate technology. For one thing, when resources are abundant, the loss due to the foreign invasion will be high. In addition, the huge rents from the resources will correspondingly reduce the cost of pursuing ISI strategy as the ratio to the total benefits that accrue to the ruler. As a result, the ruler is willing to catch up with the world frontier at the cost of economic efficiency.

The Effect of Charismatic Leaders From (29), we have

$$\frac{\partial \ln \left(\frac{m_1 A_1 h + n_1 \varphi R}{m_2 A_1 h + n_2 \varphi R} \right)}{\partial \varphi} = \frac{(m_2 n_1 - m_1 n_2) A_1 h R}{(m_1 A_1 h + n_1 \varphi R)(m_2 A_1 h + n_2 \varphi R)} > 0 . \quad (35)$$

It suggests that when nationalist sentiment isn't strong and the external threats are small, a leader with greater personal charisma is more likely to choose not to innovate at all, which will impede economic efficiency. The reason is that in such case the incumbent is more afraid of the replacement effect of the technical innovation brought about by the new comers. Because a charismatic leader can extract more rents, then the cost associated with the replacement effect is also higher. As a result, the incumbent tends to not innovate.

From (30), we have

$$\frac{\partial \ln \left(\frac{m_2 A_1 h + n_2 \varphi R}{m_3 A_1 h + n_3 \varphi R} \right)}{\partial \varphi} = \frac{(m_3 n_2 - m_2 n_3) A_1 h R}{(m_2 A_1 h + n_2 \varphi R)(m_3 A_1 h + n_3 \varphi R)} < 0 . \quad (36)$$

The result suggests that a leader with greater personal charisma will be more likely to introduce the frontier technology. The reason is that when nationalist sentiment is strong and the external threats are great, the ruler is more willing to catch up with the world frontier to satisfy nationalist sentiment and keep its ruling from foreign invasions. In addition to that, a charismatic leader is able to enlist the populist

supports, appease the grievance of the discontent, and extract considerable economic rents from the state intervention. In short, a charismatic leader has both the incentive and the capacity to adopt frontier technology, despite the loss of efficiency associated with such technical choice.

Equations (33), (34) and (35) are one of the two mechanisms through which resources endowment and charismatic leaders can influence the political decision of the technical choice. Current political economy literature seldom notice the fact that because frontier technology will cause the loss of economic efficiency in LDCs, therefore in order to maintain a necessary growth rate LDCs must try to mobilize both social and economic resources as much as possible to prolong the longevity of the ISI strategy (Easterly 2001) as well as the political life of the ruling elites. Abundant natural resources means potential resources that can be invested in ISI strategy are high. On the other hand, given the resource endowment, the existence of the charismatic leadership means the backup that can be mobilized for implementing the ISI strategy are also high.⁵ In a nutshell, from (17) and (18) we can deduce that introducing frontier technology becomes possible only when the following condition is satisfied,

$$\varphi R \geq Ah(\alpha_1 - \alpha_2) \cdot L \quad (37)$$

where L denotes the population size.

In summary, we state

Proposition 3. If the natural resources are more abundant (the value of R is greater), and the ruler has more personal charisma (the value of φ is greater), and a particular LDC is more economically backward (the value of Ah is smaller), then the ruling elites tend to be more likely to introduce the frontier technology rather than the appropriate technology.

Historical Evidence

At the beginning of this paper we argue that the historical evidence regarding technical choice by political elites after WW II is different from the story told by A&R (2006). In post-WW II era, political elites of LDCs, no matter whether they were newly independent or not, dreamed to industrialize their homelands as rapidly as possible. Many of them chose different types or the combinations of the ISI instruments to encourage the introduction of frontier technology, while their counterparts of other LDCs relied on more market-oriented policies to develop their economy. According to our analysis in preceding section, we expect to see that political elites of LDCs with strong anti-colonialism or anti-imperialism sentiment, due to either their memories shaped during the colonial period or the sense of the external threats from international imperialists, or both, were more likely to implement the ISI strategy in order to facilitate the adoption of advanced technology, if they were resource abundant and had a charismatic leader. For LDCs which were

⁵ The charismatic leader can do it by either facilitating the cooperation between ruling elites, or increasing the nationalist passions of the mass, or doing both.

resource scarce or lacked a charismatic leader, even if their polite elites' ideological inclination was anti-colonialism or anti-imperialism oriented, they could not carry out ISI strategy to the extent as much as the first group of LDCs did.

Here we consider five cases, including Egypt, India, China, Taiwan (China) and South Korea. As far as the first three countries are concerned, after WW-II they shared similar ideological inclination and hoped to rapidly industrialize their economy. All of them were resource abundant countries or could get access to enough foreign aid. And more importantly, they had their own charismatic leaders, namely, Mao in China, Nehru in India, and Nasser in Egypt. As a result, these three countries chose ISI strategy such as heavy state intervention, strict trade protection, pervasive financial repression, and so forth, to establish their own modern industrial sectors. In contrast, although Taiwan (China) and South Korea didn't have an anti-colonialism or anti-imperialism ideology as strong as the first three countries did, they indeed confronted with the military threats from their communist opponents (Taiwan Versus mainland China, South Korea versus North Korea) so that they also tended to become industrialized as rapidly as possible. In fact, when making up development strategies at the outset, political elites in both Taiwan (China) and South Korea attempted to adopt ISI strategy to introduce advanced technologies. However, because both of them were resource scarce and lack their own charismatic leaders strongly favoring state planning and control, they could not pursue the ISI strategy to the same extent as the first three countries did and had to rely on market and private sector as the principal method to develop their economy.

Egypt under Nasser

Egypt gained its nominal independence as early as in 1920s. However, after that the British imperialism kept its de facto rule by maintaining its troops there and continued to influence Egyptian affairs. However, the British had become resented for their racist, arrogant ways of ruling Egypt. In 1952, the Egyptian monarchy, which was regarded as the puppet of the British imperialist, was overthrown in a military coup led by Nasser. In 1956, the Suez Crisis erupted as Nasser declared the nationalization of the Suez Canal. And the British played along with France and Israel to invade Egypt in order to "destroy Nasser" and take back the canal. However, the result was the old imperialists were forced to retreat and their power in Egypt was completely wiped out. By contrast, Nasser's personal reputation reached its apex after the crisis.

Nasser's new rule of Egypt, which was labeled as Nasserism, was widely considered as "a product of Egypt's national struggle against imperialism and dependency" (Hinnenursch 1985). This struggle, as demonstrated by Egyptian modern history, was primarily a protest movement against Western colonialism and imperialism. And it led to the birth of a charismatic leader, namely Nasser, and encouraged him to believe that his top priority was to transform Egyptian traditional society through the modernization, and in the first place the industrialization, of its economy and society, ⁶or further, to unite the whole Arabian world under his new

⁶ Nasser always stressed rapid industrialization, as recalled by his saying "To produce from the needle to the

leadership. Because of the insult and embarrassment of long subjugation to foreign domination, it was believed that the modernization and industrialization should be furthered by non-capitalist policies (Cooper 1979).

In practice Nasser adopted ISI strategy to industrialize Egyptian economy. The main characteristic of this development strategy is a centralized planning economy, including a giant state sector, tightly controlled foreign trade, and an extensive system of cost and price controls, etc. In 1957, a National Planning Committee was set up to prepare a long-term plan for social and economic development. In 1958, the first-five year plan for industry was launched, in which the state was to provide 60 percent of the finance, mainly for heavy industry.⁷ In the meantime, although between 1952 and 1956 the private enterprises constituted the engine of the economy, after the Suez Crisis the state intervention began to escalate. By 1960, while still accounting for only 18 percent of GDP, the public sector undertook nearly 74 percent of gross investment. In 1973 perhaps 90 percent of investment and 63-70 percent of the total availability of resources was accounted for by the public sector. In the eyes of Nasserites, the public sector was the backbone of modernization. In fact, from 1960 to the mid 1970s the public sector continued to own most of modern industry, all banks, insurance companies, and financial intermediaries; and a large proportion of construction firms, modern transport, and wholesale trade. The bulk of foreign trade operations remained in the public sector. In agriculture, old land remained privately owned within the ceilings defined by the agrarian reform laws, but the new land was largely in public ownership. In addition, since 1960 price administration affected all the major sectors of the economy, such as agriculture, housing, and industry (Ikram 2006). Besides, the public sector was granted domestic monopolies.

Despite heavy government protection and subsidization, the practice of the ISI strategy was somewhat disappointing. Industrial output growth in the 1960s was low,, amounting to only 5.5 percent annually or less than half of the planned rate of 11.5 percent. In addition, although Nasser's social policies indeed had some achievement such as redistributing income toward low-income population, they failed to meet the exaggerated title of "Arab socialism" propagated by Nasser. But Nasser successfully drew on his charismatic appeal to gain popular support so that he was able to continue to pursue ISI strategy for a relatively long period given Egypt was an overpopulated, low human capital, and capital-scarce country. However, Nasser's personal charisma, no matter how appealing it was, cannot fill in the gap between what he promised and what is actually accomplished for the people it aspired to represent. As pointed out by Jawdat (1974) in retrospect, "...The master of past became a demigod: to honor him, statues were erected and sacrifices were made; institutions and organizations were created hailing his name and fostering his ideology. This was the façade. As to reality, matters were utterly different." As time passed by, Nasser's strategy led to mounting imbalance between resources and commitments, supply and demand. Finally, under the double pressure of decreasing foreign assistance and increasing foreign debt, the

missile" (El-Ghonemy 2004).

⁷ Egypt accorded industry with the highest investment priority in 1952-70, as expressed in the First Industrial Development Plan for the years 1957-61, in the First Five-Year Development Plan of 1960-65, and in the 1956 justification for the establishment of the Ministry of Industry.

Second Five-Year Development Plan (1960-70) crumbled. Nasser died in 1970. And his death was followed by an organized campaign of de-Nasserization masterminded by his successor, Sadat.

India under Nehru

Before India gained independence in 1947, it was under the colonial rule by the British, which was in service of the benefits of the metropolis and led to a ruthless exploitation of local population as well as a backward industrial sector. In short, in British colonial period, India was turned into a supplier of primary products for the metropolitan capital, and a market for its finished goods. At independence, the state in India was confronted with a dismal and deteriorating economic situation (Sen 1982: 46-88).

The colonial experience led Indian political elite to believe that that free-market and free-trade regime was biased against India and other developing countries, and building an indigenous modern technological base and industry should become an important objective of economic policy after independence. In fact, the leadership of the freedom movement had been pressing hard for industrial development even while the political struggle was going on (Dhar 2003: 16). In the meantime, it was felt that the Britain did not simply fail in actively helping with industrialization, but that in actual fact in thwarted industrialization as a matter of deliberate state policy. Therefore, it is inevitable that after independence when facing the dismal economic situation, the response of Indian political elite was to make a sharp break with the inherited colonial economic policy of *laissez faire* and turn to heavy state intervention to hasten industrialization. As a result, Indian elite gave the priority to the development of heavy industry when they formulated the Second Five-Year Plan (1956-61), which was labeled as the Mahalanobis Model.

In Mahalanobis Model, the emphasis was placed on capital goods, especially heavy industries. As Mahalanobis saw it, heavy industry is so important and necessary because India should acquire both the means of production and technical knowledge to be able to manufacture essential investment goods within the country, which is necessary for economic independence. In addition, these industries were inward-oriented and were expected to make the Indian economy self-reliant. As Mahalanobis asserted, "One important aim is to make India independent, as quickly as possible, of foreign imports of producer goods ... The heavy industries must, therefore, be expanded with all possible speed". Because India has plenty of iron ore, coal and other natural resources, this long-term goal was thought to be possible (Price 1967). Moreover, they were to be both owned and managed by the state.

The Mahalanobis Model was immensely influential for it not only settled the contours of the second Plan, but also set the tone for Indian development strategy, and hence, its economic pattern, over the long term. In fact, This development pattern have lasted until 1985 and indeed until 1991 (Dhar 2003). However, although Mahalanobis provided economic rationale for Indian development strategy, it was Jawaharlal Nehru who was the true fountainhead of this country's economic model for he not only provided the ideological foundation for this strategy but also made it

viable politically.

Unlike his predecessor Mahatma Gandhi, who was against industrialization, Nehru was an ardent modernizer and favored nothing less than a full-dress industrialization of the country. Feeling disappointed with the colonial authorities which failed to bring industrialization to India and fascinated by what he saw when he visit USSR in 1927, Nehru declared as early as in 1936 that he believed in the rapid industrialization of the country and thought only by industrialization would the standards of the people rise substantially and poverty be combated (Norman 1965: 434). And thereafter Nehru repeatedly underline the necessity of developing heavy industry and the importance of economic planning, urged that big industry must be encouraged and developed as rapidly as possible, and so forth, which resembled the essences of the Mahalanbois Model. As Nehru explained his attachment to industrialization, especially heavy industry in 1930s and 1940s, the reason was that he believed for a country to try to do away with industrialization would lead to that country falling a prey, economically and otherwise, to other more industrialized countries, which would exploit it. An industrially backward country, even if a country retains its political independence, this will be nominal only and economic control will tend to pass to others. Besides that, for assuring India a role in the future in the international community commensurate with its perceived importance stemming from its territorial and population size, geographic location and its past as a centre of civilization, this country must try its utmost to industrialize. It's obvious that Nehru's philosophy was embodied by the Mahalanbois Model and made concrete through Indian development strategy.

More importantly, as the de facto leader of Congress Party and the first Prime Minister of India after Independence, Nehru make Mahalanbois acceptable politically and in fact survive for nearly 40 years. Like what happened in Egypt, the cost of the Indian development strategy was very high and its theoretical ground and practical effect were questioned and even criticized since its presence (Nayar 2001: 72).⁸ But Nehru evoked loyalty among the masses and party members for he was a political hero to them and his personal charisma as a philosopher and a great patriot. Besides that, despite the fact that there was no consensus over Nehru's development model in the ruling party, The Congress Party, Nehru could impose that consensus because he was so important to the party that in order to win the election, the party had to exchange the acceptance of Nehru's model as its ideology for the assurance of power through electoral mobilization under a representative system. In short, Nehru successfully made the ISI strategy persist until the early 1990s.

China under Mao

Unlike Egypt and India, China escaped the misfortune of being colonized by

⁸ For example, the negative effect of the Mahalanbois Model became more and more apparent since the Third Five-Year Plan period. Economic progress in the Third Plan period was very slow. The actual output fell behind the target set by the Plan. For example, as against the targets or forecasts of about 70 percent in the mining and factory sector and 25 per cent in agriculture, the realized output may be only 40 percent and 10 percent respectively. Per capita consumption was even lower than it was five years ago.

European countries. But China's experience with world big powers from mid 19th century left Chinese with humiliating memory. Between 1840, when the First Opium War erupted, and 1945, when Japan surrendered and World War II ended, China almost lost every foreign war against Western and Japanese imperialists. Besides, China was harassed by endless rebellions, rapacious warlords, corrupt government officials, and bloody civil wars. These tragedies were in the eyes of Chinese intellectuals the results of failing to modernize, and especially to industrialize, the country. Furthermore, based on their perception of Chinese modern history since 1840, they ascribed the failure of modernization and industrialization of China largely to the obstruction and invasions from international imperialists. Impelled by this perception of history, together with the ideological orientation toward communism and a hostile international environment after Korean War between 1950-1952, Chinese Communist Party, after it came to power in 1949, rapidly gave the priority to the development of heavy industry when its leaders made up their development strategy, which put industrialization at the central place and eventually produced a so-called "trinity" system consisting of the centralized planning, the distorted prices, and state ownership (Lin, Cai and Zhou 2003).

In 1953, the Central Committee of the CCP formulated its "General Line during the Transitional Period". According to this general line, from now on until the accomplishment of socialist transformation of non-socialist industries and business, the top priority of the party was to industrialize the country and manage the whole economic system in socialist manner. In the meantime, by emulating Soviet model, China formulated the First-Five Year Plan (1953-57), which stressed the development of heavy industry on the Soviet model. Soviet economic and technical assistance was expected to play a significant part in the implementation of the plan, and technical agreements were signed with the Soviets in 1953 and 1954. For the purpose of economic planning, the first modern census was taken in 1953.

Among China's most pressing needs in the early 1950s were food for its burgeoning population, domestic capital for investment, and purchase of Soviet-supplied technology, capital equipment, and military hardware. To satisfy these needs, the government began to collectivize agriculture. Despite internal disagreement as to the speed of collectivization, which at least for the time being was resolved in Mao's favor, preliminary collectivization was 90 percent completed by the end of 1956. In addition, the government nationalized banking, industry, and trade. Private enterprise in mainland China was virtually abolished.⁹ The First Plan shaped the economic pattern of China and its achievement encouraged the CCP to believe that more could be achieved in the Second Five-Year Plan (1958-63) if they could mobilize more resources into industrial production. In fact, in 1958 the Great Leap Forward movement was launched by Chairman Mao and his fellow radicals with the attempt to overtake the UK and the USA in terms of production of the principal industrial goods, among others the iron and steel production.

As a charismatic leader, Mao's role as an advocate of industrialization and a

⁹ By 1957, capitalist economy accounted for less than 1 percent in total national income (NI). See <http://www.china.com.cn/chinese/zhuanti/211740.htm>.

chief director of de facto economic institutions was unmatched compared with other top officials of the party. As early as in 1949, Mao has proclaimed that China's future as a great power lay on its achievement in industrialization. And the primary target of the New Democratic Revolution was to turn China from a backward agrarian country into a modern industrial country (Mao 1948). In 1957, in his famous article "On Ten Relationships", Mao made it clearly that China should place the development of heavy industry on the top priority, and maintain the balance between industrial sector and agriculture. More importantly, because of his personal charisma and masterful political skill Mao's authority as the No.1 leader of China was never effectively challenged when he was alive so that he can crumble quickly and decisively any challenges from both within and outside the party, including those who questioned his thinking and concrete method of industrialization. In 1953, Mao criticized Liang Shuming, the leader of China Democratic League, that Liang was making grave mistakes because he argued that the CCP should not pursue industrialization by sacrificing the interests of peasants and lowering the consumption level of the ordinary citizens (Wang 2001: 38-40). From 1957 to 1958, after declaring that the output of main industrial goods of China would overtake the UK and the USA in ten to fifteen years, Mao escalated his critiques on Zhou En'lai, the Premier at the time, and other top officials who were cautious about the radical targets set in the Second Plan and worried that economy might become too hot, and forced them to acknowledge their faults in front of other top officials at a series of top level conferences (Xiao et al 2000: 281-284). Mao was even fascinated with spreading a specific farming tool in the countryside and designing the blueprint of the People's Commune, which was the grassroot agency to organize peasants in rural China after collectivizing agriculture, no matter whether peasants liked them or not (Song 2002: 21-31). In short, Mao justified the necessity of industrialization, set the current tasks and goals for the nation, gave instructions on how to carry out it, and cleared the obstacles on the way.¹⁰ Mao's efforts culminated in the launch of the Great Leap Forward (GLF), a political movement with the aim of overtaking the US and the UK by producing more industrial output, especially in terms of the steel output, by mobilizing huge scale of workforce into the industrial production. However, the GLF movement ended up with a great failure and disaster.¹¹ As a result, Mao was forced to make self-criticism speeches in 1962 at a national conference convening all major party cadres, though this self-criticism was orally and largely duplicity. After Mao died in 1975, Deng Xiaoping launched the market-oriented economic reform in 1979 and Mao's economic strategy was virtually discarded.

South Korea and Taiwan (China)

¹⁰ Chan (2001) gave a detailed description of the policy-making process in a Mao-dominated system. Particularly, he pointed out that in this process how Mao drew on his charisma as well as his status of being the regimes' chief ideological authority to steer the direction of policy debates and bully all his detractors into submission.

¹¹ The GLF led to unprecedented famine in the whole country and caused millions of people, the majority of them were peasants living in the rural area, dying of hungry. The estimation of the amount of death population are very different, ranging from around 10 millions (Coale 1981; Su 1999) to more than 40 millions (Banister 1987; Ashton 1984). For a good introduction of the famine during this period, see Becker (1996). For the causes of the great famine, see the discussions by Yang (1996), Lin and Yang (2000).

In history, both South Korea and Taiwan were under the brutal colonial rule by Japan. And during the Cold War period, both became the bridgeheads confronting with the threats from the communist camp. Strong nationalist sentiment and anti-colonialism ideology, as well as the external threats from their military opponents, impelled political elite of both South Korea and Taiwan to adopt ISI strategy to industrialize at the beginning when formulating their economic policies. As pointed out by Bruton (1998), like what other developing countries did after WW II, throughout most of the 1950s, Taiwan used a variety of trade and exchange rate policies, such as high tariff, multiple exchange rate, etc, to limit external competition. Public sector imports were given a preference relative to private sector requests. However, ISI strategy syndrome, including marked inflation and payment-of-balance problems, appeared in full regalia. Then in the late 1950s Taiwan began to dismantle the typical ISI strategy then turned to export-oriented policies to develop its economy. The Korean conversion story was similar.

When trying to explain why South Korea and Taiwan were able to break away with ISI strategy and to expand its exportation, most observers believed the reasons were that Japan's colonial rule, however unpleasant experience was for Korean and Taiwanese people, left both with a major accumulation of human and physical capital (Bruton 1998). However, this rosy view of the Japanese colonial rule exaggerated its contribution to these ex-colonies. Take Taiwan as an example, as a matter of fact, the human capital endowment in terms of the illiteracy rate and the ratio of college educated individuals to the total population did not distinguish Taiwan from the average LDCs at the time when Taiwan commenced development in 1950s (Gregor et al 1981: 86). Apart from that, we want to emphasize the fact that both South Korea and Taiwan faced strict resource constraints, which means both countries have very limited capacity to bear the high cost brought about by ISI strategy.¹² More importantly, they lacked their own charismatic leaders who strongly favored such anti-market instruments as centralized planning and at the same time tended to interfere with economic affairs in person. Therefore when they were harried by the problems associated with ISI strategy, it was relatively easier for them to abandon or revise the outdated strategy to espouse the market and exploit their comparative advantage. In the following text we discuss these two countries respectively.

South Korea under Park

In South Korea, autocratic leaders relied on military force and secrete police rather than personal charisma to guarantee their rule. Beofre Park Chung Hee, the fifth president after South Korea's independence, came to power through a military coup in 1961, the leadership of South Korea was ridden with faction struggle and corruption (Olson 2002: 21). Though adopting many typical ISI policy measures, South Korea didn't have a mature development strategy until after President Park came to power. Under the rule of Park, South Korea made up its first Five-Year Plan to direct the economic development. Although Park government still emphasized the

¹² Most natural resources in Korean peninsula are located in the North rather than in the South. Except for a few coal mines and limestone, there are almost no valuable mineral resources deposited in Taiwan.

importance of industrialization, it also made it clear that the role of planning should be reduced to the minimum level and expand (market) freedom to the maximum level (Park 1962). In fact, in the whole 1960s Korea's model combined strong government regulation and export orientation, which aimed at promoting exportation of labor-intensive products to exploit Korea's comparative advantage at the time. According to Lee (2003:106), after the first Five-Year Plan took shape, it was substantially modified in a supplementary plan, which emphasized the role of private companies and shifted major export items from primary industrial products to manufactured goods and exports as a means of acquiring foreign capital. Only from the early 1970s on did Korea begin to shift its development priority from light industry to heavy and chemical industries (HCI) (Lim 1998).

As many researchers point out, Park was blessed with a Japanese education and related experiences in Japanese colonial era and therefore his personal ideology had its roots in Japanese imperial fascism, which should have led him to emulate Japanese prewar and wartime statist industrialization model or even Hitler's fascism (Lee 2002). But rather than being a nationalist leader who led his people to the independence from Japan, Park assumed the reins of government via a military coup. As a result, he was a military strongman enjoying no personal charisma in Weberian sense and must instead create and maintain legitimacy by taking modern Korean people's anti-Japan passion into account and showing that he was capable of delivering robust growth and fulfilling industrialization. Given South Korea's resource and factor endowment in 1950s and 1960s, the goal of achieving growth and industrialization cannot be attained by simply following policy measures embodied by ISI strategy. In consequence, it is natural for Park to rely primarily on market, and especially on export, to spur growth and accumulate capital in 1960s and then again reemphasized the development of HCI by introducing ISI instruments in 1970s (Lee 2003).

Taiwan under Two Chiangs

Before KMT retreated from mainland China to Taiwan in 1949, the party had an economic ideology favoring state dominance and central planning. This tradition could be traced back to the party's architect, Sun Yat-sen, who from 1924 on adopted the strategy of creating alliances with Soviet Union and the Chinese Communists as well as endorsing an anticapitalist peasant-worker coalition. His successor, Chiang Kai-shek initiated a purge of the Communists in 1927. But this action wiped out Communist members but not their ideology. In 1935, KMT launched the Movement of National Economic Construction in the name of "Planned Economy". This new development strategy emphasized statism based on traditional statecraft, self-sufficiency, and egalitarianism. After the end of Anti-Japanese War in 1945, KMT government began to consider a new strategy for the post-war period. The guideline for the new strategy was to "combine economic freedom for the population with a national economic plan" (Ching 1951, 78-79). Due to the rise of the new technocrat class since the 1930s, who were highly educated people graduated from the well-known universities in China and Western advanced countries, the new strategy began to recognize the need and importance of "enterprise freedom" and decided to

assign major responsibilities to technocrats in the enlargement of economic policies. However, the economic construction process was interrupted by the civil war between the CCP and KMT. In 1949, KMT was defeated and retreated from mainland to Taiwan.

In Taiwan, the two Chiangs, Chiang Kai-shek and his son and successor Chiang Ching-kuo, acquired a status of charismatic leadership which is seldom matched in other non-communist authoritarian countries (Simon and Kau 1992:6). The failure of KMT in mainland led the two Chiangs display a strong anticommunist posture that effectively minimized socialist elements and enhanced liberal elements in the party's economic ideology. By learning the lessons from the past experiences and relying on the military protection provided by the America, for the first time KMT disallowed "equalization of land right and restriction of capital" and upheld "equality and wealth" as the ultimate goal of economic development.

Despite that, however, this conversion of economic ideology was stable and slowly. As a result, on the one hand, KMT still believed that under current circumstance Taiwan's industrial development must be carried out as quickly as possible and this cannot be achieved under a *laissez faire* economy, which means that the economic development, especially industrial development, should proceed according to government plans.¹³ On the other hand, the new technocrats began to realize that the plans here should be quite different from the planned economy of communist countries, which implies control over all means of production and all economic activities. The overall economic system should be primarily a free system that allows the various industries to have the fullest freedom of operation (Yin 1954, 4-11). Obviously this doctrine of economic idea helped Taiwan made a swift change from ISI strategy to the export-oriented strategy when serious problems, like balance-of-payment crisis and inflation, etc, emerged in the 1950s.

What is interesting is that the two Chiangs, especially Chiang Ching-Kuo, under whose rule Taiwan's economy successfully took off, ruled by iron hand in political and military spheres, but their influence in terms of economic policymaking was rather weak. In fact, as we have discussed above, although they both had strong nationalist sentiment and like industrialization, they didn't insist on relying on policies embodied by ISI strategy, especially centralized planning, to fulfill industrialization. As a result, the two Chiangs, and Chiang Ching-kuo in particular, demonstrated much less fascination with the dispute between the merits of market versus planning, and gave sufficient room to economic and financial technocrats to deal with economic affairs.¹⁴ Their attitude and stance in economic sphere enabled the economic and financial technocrats to adjust economic strategy in time to fit in with the ongoing change of economic environment.

The historical experience of South Korea and Taiwan also sheds a light on the dispute with regard to the role of government vis-a-vis market in the process of policy making. It's widely believed, as the developmental state school goes (World Bank

¹³ Taiwan started the First Four-Year Plan in 1950 and concluded the second in 1960.

¹⁴ Chiang Ching-Kuo temporarily continued to use planning agency to oversee economic policy. However, when he became premier in 1973, he transferred much of the planning commission's power back to the constitutional ministries (Winckler and Greenhalgh 1988: 160-161).

1995), that the East Asian Miracle can be ascribed to the friendly relationship and interplay between state and market, in which the (strong) state directs the market to exploit the comparative advantage, get the basic price signals right, and expand exportation. Though recent literature points out that nearly all of these successful models had a experience of carrying out ISI strategy until late 1950s and argues that the enforcement of ISI strategy during this period laid a solid foundation for the later export success (Wade 2003: 85),¹⁵ the key question is that some LDCs proved to be more able than others to abandon or revise ISI strategy and turn to a new strategy when facing similar ISI syndromes. Our analyses unraveled here contribute to an explanation that some LDCs could swift their development strategy timely because, whatever reasons were, they fortunately did not have charismatic leaders who were preoccupied with rapid industrialization as well as ISI strategy used to materialize it. Both South Korea and Taiwan traditionally have so-called strong governments with autonomous and skillful bureaucrats, which were thought to be favorable to the adoption and implementation of ISI strategy. However, even these strong governments must response quickly to the dissatisfaction with the ISI strategy when its high social and economic cost began to mount. Because the leaders, no matter whether they had personal charisma or not, needed to appease the public and maintain the solidarity between political elites, and because they had to deliver strong and sustained economic growth to maintain their legitimacy, they were relatively more willing to concede the reality and let the professional autocrats to maneuver, once they found the old strategy were not appropriate, and try alternatives to keep them in power. Not surprising, only in these LDCs could the conditions that gives birth to the embedded autonomy, in Evansian's term (Evans 1995), be met.

Conclusion

On the morrow of WW II, ISI strategy was a preferred method in developing world of rapid industrialization and economic development. The paradox is, however, compared with Egypt, India, and Mainland China, in which ISI strategy was adopted for a relatively long period, South Korea and Taiwan did away with ISI strategy after they tried this development pattern for a rather short period and soon chosen to develop export-oriented industries which is suitable to their comparative advantage. The latter's models have been proved more successful in fostering high economic growth, reducing income disparity, and in the end in industrializing their economy. The key question is, why political elites after WW II, compared with their counterparts of the 19th century, were on average more fascinated with introducing advanced technology rather than appropriate technology to industrialize their countries, and to attain this goal, why in some countries ISI strategy was more likely to be chosen and implemented for a relatively longer period than in other countries.

In this paper we provide a hypothesis in which when political elites of LDCs formulate their development strategy, their perception of the nature of colonial legacies or of the external threats influenced their understanding of the necessity of

¹⁵ Wade also defends the merits of ISI strategy by attributing the failure of ISI experiment not to the strategy per se but rather to the inability of governments to implement it in an appropriate manner. In other words, the policy response should be to do ISI better, not less.

industrialization and the merits of methods to realize it, and in turn affect their final choices. In addition, conditions including the natural resource and human capital endowment, and especially the existence of charismatic leaders whose preference of the policy tools embodied by different types of development strategy were different, determined to what extent ISI strategy could be implemented and how long it could persist. We acknowledge that in reality the process of selecting development strategy is much more complex than what we present in this paper because more political, social, and cultural factors might be taken into account by political elites and associated social groups and therefore more deep analysis is necessary in future research. However, the historical experience we examined in this paper in a large part supports our hypothesis and enriches our understanding of the importance of the key political figures at critical historical juncture.

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