Investments and Democracy

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June, 2021

Abstract

Our one period static model represents a typical backward economy where the Government invests in a costly effort to switch to a modern sector by attracting capital investments. Investors take investment decisions based on a noisy signal about the overall investment climate of the region. The strategic complementarity in profits resulting from positive externalities from investments gives rise to a coordination problem for the investors, turning investments into a collective action. We establish the substitutive role of local and foreign investors for investments in a poor economy. In the extension of our baseline model, the Government faces an electoral constraint on its effort choices for industrialization. This creates a trade off for the incumbent between allocating its budget on investment efforts and transfers. On comparison, the political constraint increases the government's effort for investments when welfare transfers for ensuring votes are costly, and reduces the effort for cheaper transfers. Our findings explain how a poor region with a democratic political system runs the risk of falling into a perpetual low investment trap.

Keywords: Complimentarities; Positive Externalities; Coordination Failures; Collective action; Global Games
JEL Codes: C7, F2, G11, H54, L2, O12, O25, R58

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1 Introduction

How does politics effect investments and economic development of poor countries? Why do large capital investments remain *historically* low in some regions? Why do some regions remain poor in industrialization? Does democracy help in economic uplift of less developed countries (L.D.C.s)? Why some regions remain industrially backward while others remain rich has been a central question of economic development and industrialization. These questions continued relevance get substantial attention from the scholars of economic literature. But what and how the *political constraints* on the policy maker effect investment policies of a country has not been attempted so far in the formal literature of economic theory. We attempt to answer this question in this paper by offering a new framework of political economy.

Inequalities persist across regions for *historic* reasons stemming from disbalances in income and capital accumulation. The relatively poor regions are limited in their capacities to invest productively. Hence deficits in necessary infrastructure and conducive climate for investments keep perpetuating over the time forming a loop. Examples of such hurdles can be lack of capital needed for a new business idea or the lack of innovative startup ideas itself, etc. Variations in initial beginnings of history or one time jolts may take countries to different paths of development altogether. This feature acts as the chief motivation of our study, and we look at the issue with an added new dimension, *democracy*. private investors tend to underinvest in some technologies, and hence need to be incentivized. The model of this paper rests on such a mechanism.

In this paper we imagine coordination failure as a key determinant of investments for a poor economy, with complementarities and positive externalities as a benchmark feature. In an economic system with the possibility of multiple equilibria, coordination failure occurs when a group of investors could achieve a more preferable equilibrium but fail to because they do not coordinate their decision making. Our model deals with a backward economy where the Government tries to switch to a modern sector for economic growth and development through investments. We model the investment decisions as a coordination problem for the investors. The investors are classified as local and foreign investors by their location, behaviour and investment decisions. The coordination feature concerns the foreign investors, and their returns are dependent on other foreign as well as the local investors. This feature of externalities gives rise to the strategic complementarity in investment decisions resulting in the need for coordination.

The possibility of undesirable under-investment equilibria arise when

investment decisions are taken independently and are only individually profitable when enough other investors invest. Variations on this theme of strategic complementarity and market failure are Scitovsky (1954), Murphy Shleifer and Vishny (1989), Redding (1996), Acemoglu (1996), and Masters (1998) amongst others.

We study situations with incomplete markets where investors must sink their investments before they can get to know how many others investors are investing, which all together generates the returns for each. Real life examples can be of any investments which only have value together. For this to happen, investors must have assurance of not having any widespread coordination failures, which is necessary for the value to be generated. This paper focuses on this concern of coordination failures within a political economic framework.

A growing literature looking at China identifies *collective action* by both state-owned and private businesses as playing an important role in enhancing the investment climate (Kennedy 2005; Zhang 2007; Deng and Kennedy 2010). In a similar spirit, we assume the role of both the state and private businesses in raising investments and development of a region.

It is widely accepted among scholars now to perceive investments as a coordination problem of equilibrium selection. In reality many business associations are found to provide their members information and access to new opportunities for investments, where they intend to act like tools of coordination. Peng (2001) has argued that such coordination by business associations in a number of transition economies has made important contributions to wealth creation in poor countries. Efficient networks with non-market stakeholders have helped, especially the foreign firms, to obtain relevant information, accelerate investment decisions and reduce political risks (Peng 2001; Ho ltbruegge and Puck 2009, Batjargal 2007; Heikkila and Salmi 2015). In a similar manner in this paper, we have conceptualised the investment phenomenon as a coordination problem among the investors. The need of coordination arises from strategic complementarity, which is a result of the externalities. Industries are characterized by scale economies, and externalities are an integral part of them. This forms the main paradigm of our paper.

Economists have long studied coordination failures in markets that lead to multiple equilibria, with some outcomes being of diametrically opposite in character. For example, one equilibrium situation maybe characterized by both locally increasing returns that are conducive to capital accumulation and rapid income growth, where as some other outcomes may result in regions of rapidly diminishing returns where people face weak incentives

to invest.[1] Rosenstein-Rodan (1943), Hirschman (1958) etc. have long interpreted economic development as a massive coordination failure, when investments do not occur because other complementary investments are depressed. This can only happen in the presence of complementarity, which is a particular form of externality where the action taken by an agent increases the marginal benefit to other agents from taking the same action. Zenghelis (2011) has discussed how due to ignorance towards positive externalities,

In the extension of our baseline model, the Government faces an electoral constraint and we compare the results of the benchmark case to see how the political constraint affects investments. What motivates the political-economic question is that, even though the return to foreign direct investment being potentially large in many developing countries (for example, the opening up of Eastern Europe provided advantages to multinational firms because of the low cost of labor, low levels of capital in place, and the proximity to major markets), the flow of direct investment is concentrated in just a few countries. Lucas (1990) attributes this lack of FDI in countries with potentially large marginal returns to capital to the fact that many developing countries face higher political risk than industrialized ones. The relationship between democracy and investments have attracted attention from economists, and the dominant claim is that for more democratic countries, domestic investment is a more important driver of growth (Ingham and Read, 2016). But since the quality of democracy is itself poor in the L.D.C.s, low investments and under development is often evident. This evidence is particularly compelling to take up the question of political economy in the context of L.D.C.s.

The primary finding of our paper is a substitutive role of local and foreign investors in poor countries. and how electoral political constraints change the government's effort and priorities in democracies. A possible consequence of the findings in this paper indicates perpetuation of "poverty trap," which is a helpless self-reinforcing mechanism (Azariadis and Stachurski 2005) which causes regional backwardness to persist.

The investment dynamics in a democracy under a political constraint is the most novel contribution of this paper. We could not find, to the best

[1] A range of largely unintegrated theories exist to explain patterns of differential investment that lead to persistent poverty in equilibrium (Nelson 1956; Mazumdar 1959; Stiglitz 1976; Loury 1981; Dasgupta and Ray 1986, 1987; Banerjee and Newman 1993; Dasgupta 1993; Barham et al. 1995; Zimmerman and Carter 2003). For reasonably complete reviews of the poverty traps literature through early in the twenty- first century, see Azariadis and Stachurski (2005). Barrett, Garg, and McBride (2016) provide an updated summary of this literature.

of our knowledge, any notable micro-theoretic explanation of the political economy of a backward region from our approach in the current literature.

Our formal treatment uses Global Games to model the coordination behaviour of investors. Conceptually, participation games with multiple equilibria are similar to economic models of decentralized production subject to economies of scale. At low levels of participation, agents face the equivalent to increasing returns of production. Whenever an agent participates in a group activity, she lowers the cost faced by others, thereby encouraging them to participate, as a result lowering the cost for others to join. Low levels of participation, including free riding, may be an equilibrium, but if the players find themselves in a situation with increasing returns, their decision to participate "crowd in" more participants until a new, higher level of participation arrives. This feature is the central theme of this paper.

As coordination failures generate multiple equilibrium outcomes, the noisy economy in a Global Game framework helps us to overcome the problem of multiplicity of equilibria. Whether a coordinated equilibrium will arise depends on the expectation each investor holds about others' investments in that region. Formation of these expectations are primarily driven by the regional Government's expenditure on infrastructure for attracting investments, along with other exogenous factors.

To the best of our knowledge, our attempt of modelling the *perception dynamics* of investment phenomenon using Global Games and studying the political constraints for the democratically elected Government in a poor country is a novel attempt in the economic literature.

2 Related Literature

In economics, coordination failure has seen plenty of applications like in explaining economic recessions and poverty traps through the failure of firms to coordinate. To model the coordination behaviour among the investors we use the structure of global games (see Morris and Shin 2000 etc). Apart from other applications of Global games in political economy (like in models of revolution (see Mesquita, Edmond 2011 etc) and macroeconomic problems like currency attacks and related financial investment decisions (see Morris and Shin 2000, Morris 2001), it has also seen recent applications in strategic voting (Sarkar 2018).

The traditional literature of economic development has a limitation in studying regional backwardness and investment inequalities. The more

recent literature on ”geography and trade” in the ”new trade theory” have enriched economists' understanding of regional inequality of development. Ray (2010) from the data on Income Mobility of Countries, 1980–2000 had illustrated how a history of underdevelopment or extreme poverty puts countries at a tremendous disadvantage by showing how not only the lowest-income countries but all countries in general might be caught in a difficult situation with downward direction of investments.

A range of largely unintegrated theories exist to explain patterns of differential investment that lead to persistent poverty in equilibrium (Nelson 1956; Mazumdar 1959; Stiglitz 1976; Loury 1981; Dasgupta and Ray 1986, 1987; Banerjee and Newman 1993; Dasgupta 1993; Barham et al. 1995; Zimmerman and Carter 2003).

The line of research in the literature of geography and trade is a natural consequence of focusing on how industry agglomeration and regional differentiation arise of any pattern of comparative advantage across regions. When a region has been trapped in a low-level investment loop for a long time, nothing in the traditional theory of economic development prevents the possibility of that region from suddenly transiting into a high-level equilibrium. This is an important problem with theories of multiple equilibrium in traditional theory.

A small literature has studied how the past might weigh on the present when a multiple equilibrium model is embedded in real time (see, e.g., Adser'a and Ray (1998) and Frankel and Pauzner (2000)). Rosenstein-Rodan argued that a “big push” of large, balanced infusion of funds is ideal for bringing out an economy from a low-level equilibrium trap. Many studies took place on different steady states well driven by distant histories (see, e.g Dasgupta and Ray (1986), Banerjee and Newman (1993), Galor and Zeira (1993), Ljungqvist (1993), Ray and Streufert (1993), Piketty (1997) or Matsuyama (2000)).

Our approach is close to Hirschman, who has argued that certain “leading sectors” should be focused to spur private investments in complementary sectors. Complementarities have been extensively studied in the literature of economic development. They have been used to explain persistence of technological inefficiencies (David (1985), Arthur (1994)), lack of financial depth in developing countries (Acemoglu and Zilibotti (1997)), lack of investments in physical and human capital (Romer (1986), Lucas (1988)), self-sustenance of corruption (Kingston (2005), Emerson (2006)), growth of cities (Henderson (1988), Krugman (1991)), currency crises (Obstfeld (1994)), fertility transition (Munshi and Myaux (2006)) etc.

Makowski and Ostroy (1995) have shown that in presence of comple-

mentarities, coordination problems arise in competitive markets. Following up on Makowski and Ostroy (1995), three important papers Cole, Mailath, and Postlewaite (2001a, 2001b) and Felli and Roberts (2016) have shown how coordination failures can manifest themselves into under-investment equilibria, over-investment equilibria, and mismatch equilibria.

Economic theory offers a tradition of different models that can give rise to such traps at both the macro and micro levels. An early example is given by Nelson (1956). A related strand of literature considers political economy reasons for why poor countries remain poor, stressing the possibility of self-reinforcing low-quality institutions (for example, Acemoglu and Robinson 2012). Among many theories of poverty traps, one commonly invoked mechanism is that a country that is poor will remain poor because it will not be able to accumulate sufficient capital per capita for incomes to rise. Caucutt and Kumar (2008) studied a "big push"–type model with a coordination failure arising from the fact that agents find it optimal to invest in labor-saving technologies only if other agents also do so. This coordination failure leads to a poverty trap when all agents fail to invest in the better technology.

A look at the literature of regional poverty gaps makes the scope and relevance of our study broader and wider. Notable studies on steady state traps with poverty breeding poverty are by Majumdar and Mitra (1982), Galor and Zeira (1993)), empirical surveys on economic conditions of the poor by Banerjee and Duflo (2007), Fields (1980) etc. One theory of mechanism is low levels of productivity born out of unfavourable natural environment and historical reasons such that in equilibrium most individuals or households of those regions continue to remain poor. This was labeled a single equilibrium poverty trap by Barrett and Carter (2013), and a geographic poverty trap by Kraay and McKenzie (2014).

The poverty traps are generated in a number of fashions, through institutions, and threshold effects in both physical and human capital. A seminal paper in this area is Azariadis and Drazen (1990) which considers poverty traps generated both by threshold effects in physical capital, There has been a relatively recent surge of activity in the literature on transitions. One strand of this literature is focused on the process of structural change, or a regime switch from an economy dominated by agricultural production, to one in which modern industrial production allows for sustained economic growth. Frequently, as in Hansen and Prescott (2002), and Galor and Weil (2000). Our model follows a similar threshold based framework, with the 'regime change' occurs when positive externalities generate competitive profits.

Foreign investors pay the key role of coordination in our model in spurring investments. Thus, a look at the literature of unequal distribu-

tion of F.D.I.s across countries is worth wile. Foreign direct investments have rapidly grown worldwide, peaking in the late 1980s. (See in particular articles by Krugman and Graham, and by Lipsey in that volume. See also Hummels and Stern (1994), the UNCTAD World Development Report (1993), and Markusen and Venables (1995)). But asymmetry has remained among the developed and developing countries. The developed countries not only account for the overwhelming proportion of outward direct foreign investment, but they are also the major recipients of direct foreign investment. Hummels and Stern (1994) report that in 1985 the developed countries were the source of 97 percent of direct investment flows and the recipient of 75 percent. Earlier, most empirical work on F.D.I. investments used to focus on US firms (Bloningen, Davies, and Head, 2003; Braconier, Norback, and Urban, 2005; Davies, 2008; Bergstrand and Egger, 2013). Later, studies on the determinants of foreign investments took up for the emerging economies. There are large differences across industries in the degree to which production and sales are accounted for by multinational firms (Brainard, 1993b). This asymmetry in investments and resulting inequalities in economic development has been the chief motivation for our study.

The relationship between democracy and economic growth has drawn wide attention. In "Democracy Does Cause Growth", Acemoglu et al. present evidence from a panel of countries between 1960 and 2010 challenging this view. Their central estimates suggest that a country that switches from nondemocracy to democracy achieves about 20 percent higher GDP per capita in the long run, i.e. over the next 30 years. The role of FDI in poverty reduction is also undisputed. One may refer to Uttama N.P. (2015) studying data at the country level for ASEAN-6 during the period 1995–2011. Their study concludes that FDI is conducive to poverty reduction. It supports the notion that regional value chain enhancement on FDI flows is beneficial for this region. For our context, we focus on the role of investments in a democracy.

The literature on political constraints for investments is relatively scarce, especially for the poor economies. Few very recent attempts are worth mentioning which validate our approach. Arslan, Ünal and Ökten, Zeynep. (2010) studied the relation between FDI and democracy in Turkey, covering the period 1970-2010 using Johansen (1988) cointegration and Error Correction Model (ECM) tests. The result of the cointegration analysis indicates that there is a long-run relationship between foreign direct investment (FDI) and democracy. Additionally, the Error Correction Model suggests an unidirectional causal relationship from democracy to foreign direct investment.

Li, Quan and Resnick, Adam, 2003 explored whether increased democ-

racy promotes or jeopardizes foreign direct investment (FDI) inflows to less-developed countries. They found that democratic institutions have conflicting effects on FDI inflows. On one hand, democratic institutions hinder FDI inflows by constraining host governments' ability to offer generous financial and fiscal incentives to foreign investors. On the other hand, democratic institutions promote FDI inflows because they tend to ensure more credible property rights protection, reducing risks and transaction costs for foreign investors. Hence, the net effect of democracy on FDI inflows is contingent on the relative strength of these two competing forces. Empirical analyses of fifty-three developing countries from 1982 to 1995 substantiate their claims. They found that democracy in general encourages FDI inflows.

Some scholars have argued that democracy attracts FDI through the mechanism of political constraints, which reduce the risk of negative policy changes. For example, Tyson Roberts (2018) has proposed a theoretically more comprehensive argument claiming that political constraints are attractive to investors when the host country policy environment is FDI-friendly, because these political constraints reduce the probability of negative policy changes in the future. Our argument is close to this of approach with using political constraints, with a different objective of the political agent.

Quan and Resnick 2003 explored the under-researched dimension of political risk: electoral uncertainty, which is close to our approach. Using 56,996 MandA and greenfield investments into 55 countries, they showed that close upcoming elections reduce the likelihood of foreign investments. Based on political cycle theory, they hypothesized and empirically showed that countries with lower political constraints allow incumbent governments to offer cheaper and more profitable deals to foreign investors for their own political benefits, thus moderating the negative effect of close upcoming elections. Finally, they showed that firms with previous experience in pre-election bargaining are more likely to invest under electoral uncertainty. We don't go into that much detail here and model our political constraint as a re-election only.

We present our formal model in the next section.

3 Theoretical Framework

Consider a one period model with an open economy, with the production of a single industrial commodity. The economy consists of a country A and and an outside option called country B. The Government of country A is trying to attract investment for industrialization. Investing in B is the outside option

of these investors. We assume each unit of invested capital generates a unit employment in A and labor in each region is immobile.

3.0.1 The Investors

Total investors in the economy are n, each having a unit capital to invest. There are two types of capital investors, *foreign* n_F and *local* n_L, such that $n_F + n_L = n$. Local investors are domestic firms who can invest only in A, where as foreign investors are multinational firms who can invest either in A or B. We differentiate between the foreign and local investors by their available options of investment destinations. Foreign investors have the option of investing in another region, viz. region B, whereas domestic firms do not have any such option. We assume from the beginning that foreign investors will invest in A only when total expected investment in A is sufficiently high; otherwise they invest in B *by default*. The local investors have only two choices; either to invest in A or not invest *at all*. All the investors are taking their investment decisions *simultaneously* in our single period model. For the rest of this paper, we carry our analysis with respect to the region A.

3.0.2 Business Climate

Let λ be the investment climate in region A, which can take any real value. A high value of λ indicates over all conducive and favorable climate of investment, where as a lower λ indicates difficulty in generating favorable returns.[2] It depends on the Government of region A's effort e to attract investment, $e \in [0, \infty)$. This effort can be comprised of infrastructural spending, different kinds of subsidies, administrative reforms, business-friendly rules and regulations, etc. But the Government's effort is not the sole determinant of investment environment, as many additional factors may come into play. We model them all together as a random exogenous shock ξ.

Thus we define

$$\lambda = e + \xi \tag{1}$$

where the random shock ξ is defined over the support of real axis $(-\infty, +\infty)$ and follows a bell shaped distribution $F(\xi)$ with mean normalised at 0 and variance σ^2. The Government's problem is to choose an e such as to maximize the probability of investment in A. It's benefit from investments in normalized to unity. The Government's motivation for putting up this effort

[2]Note that λ can be negative, indicating unstable and risky climate of investment in A

may come from different aspects like attempts for development, re-election prospects, liberal economic ideology, etc.[3]

Each investor observes the investment climate λ in region A with a noise ϵ. This noise is generated from the imperfect information about A's investment climate.[4] In particular, if λ is the actual state of investment in A, an investor observes a signal $s \in [\lambda - \epsilon, \lambda + \epsilon]$ where $\epsilon > 0$.

We assume that s is uniformly distributed over its support. After observing the signal, each investor tries to infer the true state of λ by arriving at the conditional expectation $E(\lambda|s)$. Local investors in A get a positive return from investment only if there is sufficient total investment in A, which will be possible only in a conducive environment for investment. Specifically, they believe they will get a positive return from their investment only when λ is high enough, or better than say $\underline{\lambda}$. It's an exogenous threshold value of λ for the local investors, above which they will be willing to invest. Hence, based on their signal, each local investor decides to invest in A *iff* $E(\lambda|s) \geq \underline{\lambda}$. Otherwise, they do not invest. We assume that the local investors get a fixed positive profit each, when $\lambda \geq \underline{\lambda}$.[5]

3.0.3 Herd Behaviour of Foreign Firms

Each local investor's decision is based directly on her inference about λ. But unlike them, the decision of an individual foreign investor to invest in A depends on how many other investors are investing in A. Her decision is based on comparing the expected benefit from investing in A with that of B. The return from investing in B is equivalent to the opportunity cost of investing in A. Her expected benefit from investing in A is based on how many other investors, *both* foreign and local, are investing in A. If she expects total investment there is to be large enough, she may expect her benefit there may surpass that of B and hence can invest in A. So this investment decision becomes *strategic*. This expectation about total investment is formed from her perception about the state of investment λ prevailing in A. Based on her signal s about λ, she first infers the true state of λ there, and then tries to perceive how many others may invest in A.

[3] The Government's benefit is assumed to capture the gain from any such possible source.

[4] In reality, an investor's assessment about a region's investment opportunity depends much on collective perception stemmed from allied factors. This also gets captured by ϵ

[5] We do not need to model their profit function explicitly to reach our results.

3.0.4 Investment Externalities

To formalize our story, we assume $\underline{I}$ as that exogenous size of investment in A, which is just sufficient to generate a non-zero profit from investing a unit capital in A. This pre-specified investment threshold $\underline{I}$ is exogenously given and perfectly known by all the investors. Thus, the profit for a foreign investor in region A is derived from a non-convex profit function

$$\begin{aligned} \pi &= \pi_A \text{ for } I \geq \underline{I} \\ &= 0 \text{ otherwise} \end{aligned}$$

where I is the total investment in A and $\underline{I}$ is the minimum investment required in A to earn a competitive profit from A. Otherwise, they will invest in B where the return is π_B.[6]Such formulation of production function captures our idea of *investment externality*. Note that $\pi_A > \pi_B$, which ensures the possibility of foreign investors investing in A. All non competitive profits are normalised to 0.

3.0.5 Timing of Game

We summarize the sequence of events below:

1. In the beginning, the Government of region A chooses an effort level e to attract investment in A from its local investors n_L and the global investors n_F from region B.

2. Their effort e is chosen so as to maximize the probability of industrialization investment in A less the cost of its effort. The choice of e depends on parameters like the distribution function of ξ, the marginal cost of effort e.

3. The random shock ξ is realized.

4. Given ξ, the actual investment climate in A, i.e. λ is realized.

5. Consequently, all the investors observe the signal s for λ, with some noise ϵ.

We next turn to compute the equilibrium outcome of this co-ordination game.

[6]This profit may be expected or deterministic. We do not need to specify the profit function in region B explicitly and take it as exogenous.

3.1 Equilibrium

We start with computing the size of investment in A from the local investors first. As each local investor receives a signal s about λ, she first tries to infer the true λ by arriving at the conditional expectation $E(\lambda|s)$. We can calculate it as

$$E(\lambda|s) = \int_{s-\epsilon}^{s+\epsilon} \frac{1}{2\epsilon} d\lambda = s \tag{2}$$

Then she decides to invest *if and only if* $E(\lambda|s) \geq \underline{\lambda}$, which in turn implies $s \geq \underline{\lambda}$. As we are considering a representative investor, every local investor thinks in this manner.

From here, using 2, we can calculate the total proportion of local investors who will invest in A. We define the total investment size from local investors in A as $a(n_L, \lambda)$ and calculate to find it as

$$a(n_L, \lambda) = n_L P(s \geq \underline{\lambda}) = \frac{n_L}{2\epsilon} \int_{\underline{\lambda}}^{\lambda+\epsilon} ds = \frac{n_L}{2\epsilon}[\lambda + \epsilon - \underline{\lambda}] \tag{3}$$

Next we compute the equilibrium behaviour of the strategic investors, which is somewhat more complicated.

We arrive at the equilibrium behaviour of the foreign investors in three distinct steps. First, we start with an arbitrary belief $\tilde{s}$ of a strategic investor which takes the following form: a strategic investor believes that all other a strategic investors will invest in A if and only if they observe a signal $s \geq \tilde{s}$.

Secondly, given this belief, a foreign investor calculates her best response $\hat{s}(\tilde{s})$. The best response involves the following: given that local investors of A are investing if and only if they get a signal $s \geq \underline{\lambda}$, and other foreign investors are investing if and only if they receive a signal $s \geq \tilde{s}$, it is optimal for the representative foreign investor to invest in A if and only if she receives a signal $s \geq \hat{s}$.

Thirdly, the symmetric Nash equilibrium signal for all foreign investors is one where $\hat{s} = \tilde{s}$, which we denote by s^*.

Our representative investor calculates that when the actual state of investment in A is λ, the proportion of them receiving signal at least as large as $\tilde{s}$ and hence investing in A is

$$n_F P(s \geq \tilde{s}) = n_F \int_{\tilde{s}}^{\lambda+\epsilon} \frac{1}{2\epsilon} ds = \frac{n_F(\lambda + \epsilon - \tilde{s})}{2\epsilon}$$

.

Hence she perceives that total size of global investors investing in A is

$$b(\lambda) = n_F P(s \geq \tilde{s}) = \frac{n_F(\lambda + \epsilon - \tilde{s})}{2\epsilon} \tag{4}$$

She knows that the return in A will get generated only if the total size of investment crosses the pre-fixed limit $\underline{I}$. This requirement boils down to

$$a(n_L, \lambda) + b(\lambda) \geq \underline{I}$$

which, using 3 and 4, reduces to

$$\frac{n_L}{2\epsilon}[\lambda + \epsilon - \underline{\lambda}] + \frac{n_F}{2\epsilon}[\lambda + \epsilon - \tilde{s}] \geq \underline{I} \tag{5}$$

It should be clear to the reader that the decision making of the foreign investors are taken simultaneously along with the local investors, with the foreign investors having full knowledge about the behaviour and threshold signal of the local investors. Unlike the local investors, the foreign investors do not have any pre-set threshold signal, and they solve their best response signal by taking into account all other investors' expected behaviour.

Let $\hat{\lambda}$ be that value of λ for which this condition 5 is satisfied with equality. Clearly for $\lambda > \hat{\lambda}$, investment in A gets profitable. Given $\hat{\lambda}$, her next job is to compare the expected benefit from investing in A with the opportunity cost, i.e. with the return from B. Hence for any signal s investing in A will be profitable with probability

$$P(\lambda \geq \hat{\lambda}) = \frac{1}{2\epsilon}\int_{\hat{\lambda}}^{s+\epsilon} d\lambda = \frac{s + \epsilon - \hat{\lambda}}{2\epsilon} \tag{6}$$

Consequently, using 6, the net benefit for a foreign firm from investing in A is greater than the return from B if the following inequality holds:

$$\frac{\pi_A(s + \epsilon - \hat{\lambda})}{2\epsilon} > \pi_B \tag{7}$$

Let $\hat{s}$ be the signal for which the inequality 7 is satisfied with equality. So, when the foreign investor gets the signal $\hat{s}$, she gets indifferent between investing in A and B. But she invests in A for all signal $s \geq \hat{s}$. In other words, given the belief $\tilde{s}$, the best response of the foreign investor is $\hat{s}$. Substituting $\hat{\lambda}$ for the value of λ and solving for the best-response $\hat{s}$ to $\tilde{s}$, we get

$$\hat{s} = \hat{\lambda} + (\frac{2\pi_B}{\pi_A} - 1)\epsilon \tag{8}$$

It is important to understand that the best-response $\hat{s}$ is implicitly a function of $\tilde{s}$.

The third step in arriving at the equilibrium is to put $\hat{s} = \tilde{s} = s^*$, which gives us a symmetric Nash Equilibrium.

Let us define the equilibrium value of $\hat{\lambda}$ corresponding to s^* by λ^*. Substituting $\hat{\lambda}$ in 8 we solve

$$s^* = \underline{\lambda} + 2\epsilon[\frac{1}{n_L}(\underline{I} - \frac{n_L}{2}) - n_F(1 - \frac{\pi_B}{\pi_A}) - \frac{1}{2} + \frac{\pi_B}{\pi_A}] \tag{9}$$

Substituting the value of s^* in the above condition, we can solve for final expression of λ^* as

$$\lambda^* = \underline{\lambda} + \frac{2\epsilon}{n_L}[(\underline{I} - \frac{n_L}{2}) - n_F(1 - \frac{\pi_B}{\pi_A})] \tag{10}$$

Here, λ^* is the crucial variable which determines chances of investment in A, both from the local and global investors. Note that $\lambda^* < \underline{\lambda}$ makes the case uninteresting when only global investors and none of the local investors will invest. Hence, we assume $\lambda^* > \underline{\lambda}$, for which it's sufficient to assume

$$\underline{I} \geq \frac{n_L}{2} + n_F(1 - \frac{\pi_B}{\pi_A}) \tag{11}$$

Let's denote the R.H.S. of 11 by I'.

This assumption simultaneously ensures s^*, the best response threshold signal of foreign investors to be higher than that of the local investors, i.e. $s^* > underline\lambda$. The implication of this assumption is that generating a higher profit from investing in A than B requires sufficiently high total investment in A. Higher the R.H.S. of 11, more difficult it is for the foreign investor to get the benefits of investment externalities due to increasing return from investments in A. A higher $\underline{I}$ may be interpreted as *higher investment un-competitiveness* of A for the global investors, compatible with its economic backwardness. Therefore, poorer the region A is, more difficult it is for A to attract foreign investments.

Observe that a violation of 11 implies $\lambda^* < \underline{\lambda}$, which in turn implies that it is *sufficient* for the Government to attract *only* foreign investors in the equilibrium to spree investments, without needing local investors. On the other hand, $\lambda^* > \underline{\lambda}$ implies local investments are *necessary* for global investments, and the Govt has to try for attracting both. As our argument from the beginning is centred around complementarity and positive externality, for which to generate, investments from both local and foreign investors are needed, we assume 11 to hold true through out our analysis.

The critical variable for attracting investments is λ^*. The chances of investment now reduces to $P(\lambda \geq \lambda^*)$ using 10. We denote this investment chances by $\pi(e, \lambda^*)$ as a function of the choice variable e and parameter λ^*. From the assumption 11, targeting λ^* ensures inviting both local and foreign investors, which makes the case meaningful and interesting. The Government of region A's problem is to choose an e so as to maximize this probability. It's *objective function* is given by

$$P(\lambda \geq \lambda^*) - c(e) \tag{12}$$

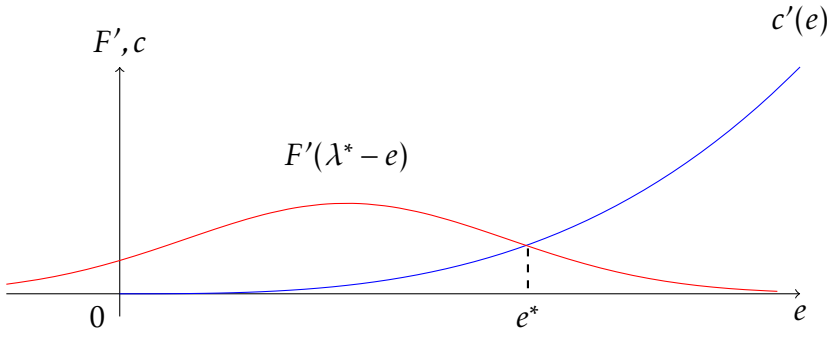
where $c(e)$ is assumed to be convex, i.e. $c'(e) > 0$ and $c''(e) > 0$. Using 1 we derive

$$P(\lambda \geq \lambda^*) = 1 - F(\lambda^* - e)$$

which gives the first order condition as the following:

$$f(\lambda^* - e) = c'(e) \tag{13}$$

where $f = F'$. Note that the S.O.C. is satisfied for $-f' - c'' < 0$ and for the uniqueness of equilibrium, we assume $f' < 0$. From here we can solve for the Government's equilibrium choice of effort e^* implicitly.



Optimal Choice of Effort e^*

3.2 Results

Studying the investment dynamics is the focus of this paper. First, we look at the Government's effort for investment with respect to the investors. From our above calculations, it follows that $\frac{de^*}{dn_F} = \frac{f'}{f'+c''}\frac{d\lambda^*}{dn_F}$ and $\frac{de^*}{dn_L} = \frac{f'}{f'+c''}\frac{d\lambda^*}{dn_L}$. Hence, under our assumptions of $f' < 0$ and $| c'' | > | f' |$, we get $\frac{de^*}{dn_F} > 0$ and $\frac{de^*}{dn_L} > 0$, where $\frac{d\lambda^*}{dn_F} < 0$ and $\frac{d\lambda^*}{dn_L} < 0$ are easily verifiable. We formalize this finding as our first result in the following.

Proposition 3.1 *An increase in the size of local (n_L) and foreign (n_F) investors increase the threshold business climate (θ^*) required to spur investments in the backward region.*
Hence an increase in the size of local (n_L) and foreign (n_F) investors increase the effort for investments (e^*) chosen by the Government in equilibrium.

Now we try to look at the relationship between the Government's effort for investment and the roles played by the local and foreign investors in equilibrium. Total local investment in equilibrium can be obtained from $n_L P(\lambda \geq \underline{\lambda})$, where as total foreign investment in equilibrium can be obtained from $n_F P(\lambda \geq \lambda^*)$. We find the signs of both $\frac{\partial}{\partial n_F} n_L P(\lambda \geq \underline{\lambda})$ and $\frac{\partial}{\partial n_L} n_F P(\lambda \geq \lambda^*)$ to be positive under our assumptions of $f' < 0$ and $| c'' | > | f' |$, which brings us to the following result.

Proposition 3.2 *An increase in the size of local (foreign) investors increases foreign (local) investments and vice versa. Thus, local and foreign investors act as complements in attracting investments to a backward region.*

This is the main and most interesting result from our benchmark model.

Now we look at the change in composition of the investors, keeping their total size n unchanged. This means that now an increase in n_L (n_F) will result in a decrease in n_F (n_L) and vice versa, which wasn't the case until before. Proceeding with the total local investment in equilibrium $n_L P(\lambda \geq \underline{\lambda})$ and total foreign investment in equilibrium $n_F P(\lambda \geq \lambda^*)$, its easy to check that

$$\frac{\partial \lambda^*}{\partial n_L} \geq 0 \text{ and } \frac{\partial \lambda^*}{\partial n_F} \leq 0 \text{ for } n(1 - \frac{\pi_B}{\pi_A}) \geq \underline{I} \tag{14}$$

and

$$\frac{\partial \lambda^*}{\partial n_L} \leq 0 \text{ and } \frac{\partial \lambda^*}{\partial n_F} \geq 0 \text{ for } n(1 - \frac{\pi_B}{\pi_A}) < \underline{I} \tag{15}$$

Let's rename

$$n(1 - \frac{\pi_B}{\pi_A}) = I_0 \tag{16}$$

From the above, it follows that

$$\frac{\partial}{\partial n_F} n_L P(\lambda \geq \underline{\lambda}) < 0 \text{ and } \frac{\partial}{\partial n_L} n_F P(\lambda \geq \lambda^*) < 0 \text{ for } \underline{I} \leq I_0 \tag{17}$$

For $\underline{I} \geq I_0$, the signs of $\frac{\partial}{\partial n_F} n_L P(\lambda \geq \underline{\lambda})$ and $\frac{\partial}{\partial n_L} n_F P(\lambda \geq \lambda^*)$ are ambiguous.

This clearly shows the role of local and foreign investors to be substitutes for $\underline{I} \geq I_0$. Note that this condition doesn't contradict with our earlier assumption of $\underline{I} \geq I'$.

The condition $\underline{I} \geq I_0$ can be interpreted as the situation when the minimum investments required for foreign investments to be competitive is sufficiently high, at least above I_0. This requirement for the threshold level to be sufficiently high indicates more backwardness of region A for which generating positive externalities get more difficult. For a lesser backward region, i.e. when externalities can be generated for a not so high threshold $\underline{I} \geq I_0$, this substitutive role among the local and foreign investors cannot be ensured. We formalise these findings below.

Proposition 3.3 *For an extreme backward region where generating positive externalities from investments is more difficult ($\underline{I} \geq I_0$) for a foreign firm, an increase in the size of local (foreign) investors, keeping the total size of investors fixed, decreases foreign (local) investments and vice versa. Thus, local and foreign investors act as substitutes for developing investments in a very poor region, when their relative composition changes without any change in the total size of investors.*

Recall that the investment decision of the foreign investors is dependent on that of the local investors in terms of generating the positive externalities. But this dependence is not biting for a high threshold, i.e. for ($\underline{I} < I_0$), which can only occur for an industrially backward region.

This finding has important implications for the development of a poor region. A region that is historically backward may only have to depend on say local investments, as this dependence itself may hinder foreign investments. The reverse is also true for foreign investments. Thus for its economic development, a very poor region may have to depend only on either of the two for investments, which may make its transition process restrictive and slower. Thus poorer regions may see a differential pattern of investments in terms of local and foreign investments.

The implication of the earlier result is interesting because it shows that for those regions which see high local investments will not get high foreign investments and vice versa. Hence some regions may have to perpetually depend on local business while some regions may predominant;y have to depend on foreign investments, with an asymmetry in investments existing in each. This may have far reaching effects and may impose various kinds of challenges for the economic development of those regions.

The literature on the relationship between foreign direct investment and domestic investments present mixed findings and continue to pose itself as a

matter of debate among the policymakers. A group of scholars like Leahy et. al. (2000) and Lipsey (2004) have claimed that part of the fear regarding the FDI comes from its crowding out effect on domestic investment. Buffie (1993) argues that local firms suffer when foreign investment is not a complement for domestic investment and hence FDI may crowd out domestic investment. Another strand of literature (Misun et. al. 2002, Agosin et. al. 2005, De Backer et. al. 2003 etc.) agrees that foreign investments cause crowding out effects on domestic investments. Another strand of literature contradicts this claim, arguing that if foreign investments are supplied by domestic firms, they have complementary effect on domestic investments (Morrissey et. al. 2012, Wang M. 2010, Ramirez M. 2011 etc.). There is also a third view among scholars who found neutral effects of FDI on domestic investment if it leads one-to-one increase in total investment in the host market. Our results can be placed to fit more generally in the literature- in the sense that it accommodates all these arguments by explicitly solving out the theoretical conditions under which each scenario emerges over the other. We believe the strength of our results lie in these conditions of generality here.

We present other relevant comparative statics below.

Proposition 3.4 *An increase in the profit from increasing returns (π_A) increases the chances of investments in a poor region A where as an increase in the profit (π_B) in the foreign land (B) decreases the chances of investment in A.*

Its straightforward to check that $\frac{\partial \lambda^*}{\partial \pi_A} < 0$ and $\frac{\partial \lambda^*}{\partial \pi_B} > 0$. From here, it follows $\frac{\partial P(\lambda \geq \lambda^*)}{\partial \pi_A} = -f(\lambda^* - e)\frac{\partial \lambda^*}{\partial \pi_A}\frac{c''}{f'+c''} > 0$ and $\frac{\partial P(\lambda \geq \lambda^*)}{\partial \pi_B} = -f(\lambda^* - e)\frac{\partial \lambda^*}{\partial \pi_B}\frac{c''}{f'+c''} < 0$ directly. This finding is reasonable and intuitive.

Now we move on to see in the following section how these results change under electoral constraints, i.e how does political constraints in a democracy affect the Government's choices and development of a backward region.

3.3 Discussion of Baseline Model

The assumption of a one shot interaction in an investment setting with informational differences provide the basic character of the investment phenomenon in our baseline framework.

We argue that investment itself is a one shot action that cannot be reversed easily once the investment has been done. This feature builds the basic characteristics of the investors's behaviour in our framework. We focus on the feature that investors wait and watch other investors' decisions to

decide their own investment decisions. Our argument can be better understood with an analogy to the feature of hold-out. Investors wait for others to invest in a similar manner analogous to the hold out. This feature generally remains unchanged at any and every period, irrespective of usual fluctuations in a typical scenario. This investment behaviour is the sole source of the investment externality feature, which is the crux of our model.

Moreover, in a multi-period framework, it is realistic to assume that investment value depreciates over each period. In that case, the rational decision making considerations boil down to the same mechanism like our present single period model. Each period will see a repetition of the same cost benefit exercise like we have computed. Thus it takes us to the same problem of a fresh investment decision at each period that we have considered in our present framework.

One shot interaction gives rise to more scope of informational asymmetry than a multi-period model as in the latter the investors get the scope to learn from the past history at earlier periods unlike a single period model. In our model, the investment decisions of foreign investors are dependent on the decision of all other investors' decisions, which is a typical benchmark case commonly assumed as a standard in the economic literature. Moreover, as far as the herd behaviour of foreign investors in our model is concerned, our result arrives at the same direction of conclusions with those of the seminal papers of herd behaviour of investments like Banerjee (1992), Bikhachandani (1992) etc. Hence a multi-period model won't change the basic essence and character of our finding but may rather make the algebra a more tedious task without much value addition.

A dynamic extension only when the past and the present investments can be convincingly argued to be connected in a realistic manner. Our conjecture for that case is to possibly arrive at a finding which may tend towards an investment cascade. Two possible avenues of such an extension that may immediately come to the reader's mind are *one*, where the investors' behaviour mimic and give rise to the 'hold-out' problem as discussed above, and *second*, when the profit per unit of investment increases with the past investment, i.e. a *profit externality* arising from the past investment decisions. The authors will like to examine each of these extensions afresh as a separate exercise in some future work.

4 Extension: Democracy

Here we extend our baseline model to the main focus of this paper- investment dynamics under political constraints in a democracy. We model the political constraint as an electoral constraint for the incumbent party currently holding office. The Government of region A now cares for office in addition to the investments. So far the office motive of the Government was dormant. We here assume the incumbent party in office will have to face an election at some later periodic time, as is regular in any political democracy. Now the Government of region A is constrained by its re-election probabilities for the task of industrialization. Hence the objective of the Govt becomes maximising a weighted average of the benefit from remaining in office and the gain from investments. The cost function of the Government considered in the earlier case now gets effectively replaced by the implied political cost of re-election.

Let us normalize the benefit from investments to unity like before, and define the relative benefit from office by γ. Let G be the total budget available to the Government which it can spend either on its effort e to attract investors or on various transfers to the voters. The effort e, like spending on infrastructure etc. are standardized into monetary terms here. The transfers can be collectively understood to be any kind of welfare measure which is private and exclusive, and can be targeted individually. Let t be the minimum transfer needed to ensure the vote of an individual, where N is the total size of the electorate in A. We assume each unit of investment employs one unit of labor and the labour wage to be high enough than t. Laborers and voters are assumed to be same agents in the economy. Therefore, each employment in the industrial sector ensures a vote for the incumbent in A in return of its effort for industrialization. All other features and sequence of events remain same like before, which we state below.

1. In the beginning, the Government of region A chooses an effort level e to attract investment in A from its own local investors and the global investors. Consequently, from the budget constraint G and vote buying cost t, the total size of transfer gets determined.

2. The e is now chosen such as to maximize the probability of industrialization in A as well as its re-election chances. The choice of e depends on parameters like the distribution function of ξ etc.

3. The random shock ξ is realized.

4. Given ξ, the actual investment climate in A, i.e. λ is realized.

5. Consequently, all the investors observe the signal s for λ, with some noise ϵ.

6. A local investor in A invests if $E(\lambda|s) \geq \underline{\lambda}$.

7. A global investor gets a return π_A from investing when at least $\underline{I}$ or more investors invest in A. She also has an opportunity cost of π_B if she invests in B. She invests in A if her expected gain from investing in A is at least equal to her opportunity cost of investing in B.

8. Finally, investments take place in A and B. Employments are generated.

9. Those who do not get employment in the industrial sector get the transfer from Govt.

10. In the end, elections take place. Pay-offs are realized. The game ends.

The computation of equilibrium is similar, but the Government's objective function has changed. We work this out in the next section.

4.1 The Government's Problem

We derive the objective function of the incumbent party in Government here, as per its motivation discussed above. There are two components in its objective function now: one, benefit from the office and the other from industrialization. Let's derive the political objective first. In deriving this, the ruling party will internalise its political constraint of re-election to the office. The incumbent party has two sources for political gains in the following election- one from industrialization and the other from transfers. In line with the assumptions stated earlier, the total vote the incumbent can expect in equilibrium is $I^* + \frac{G-e}{t}$ where $I^* = n_L P(s \geq \underline{\lambda}) + n_F P(s \geq s^*)$ is the total investment in equilibrium. In equilibrium, all foreign investors will decide according to their best response threshold signal s^* which was derived in the earlier section and remains unchanged here. The I^* is equivalent to the total number of jobs generated from the investments and there by total votes for the incumbent by the job gainers. The latter part $\frac{G-e}{t}$ follows from the budget constraint of the Government. For the total fund G available to the Government, after spending e for the investment drive, the Government can ensure $\frac{G-e}{t}$ votes for itself through the transfers. Hence, the political constraint under a system of majority rule reduces to

$$I^* + \frac{G-e}{t} \geq \frac{N}{2} \tag{18}$$

The objective function for industrialization remains same like earlier. Thus the new objective function of the Government here becomes

$$P(\lambda \geq \lambda^*) + \gamma P(I^* + \frac{G-e}{t} \geq \frac{N}{2}) \tag{19}$$

which it maximizes w.r.t. e to solve e^{**}.

Now using , the inequality $I^* + \frac{G-e}{t} \geq \frac{N}{2}$ reduces to $1 - F_\xi(\epsilon(\frac{N}{n} - 1) - \frac{2\epsilon}{n}\frac{G}{t} + \frac{n_L}{n}\underline{\lambda} + \frac{n_F}{n}s^* - e(1 - \frac{2\epsilon}{nt}))$. Hence the objective function of the Government reduces to

$$1 - F_\xi(\lambda^* - e) + \gamma[1 - F_\xi(\epsilon(\frac{N}{n} - 1) - \frac{2\epsilon}{n}\frac{G}{t} + \frac{n_L}{n}\underline{\lambda} + \frac{n_F}{n}s^* - e(1 - \frac{2\epsilon}{nt}))] \tag{20}$$

The F.O.C. of this maximization exercise becomes

$$f(\lambda^* - e) + \gamma f(\epsilon(\frac{N}{n} - 1) - \frac{2\epsilon}{n}\frac{G}{t} + \frac{n_L}{n}\underline{\lambda} + \frac{n_F}{n}s^* - e(1 - \frac{2\epsilon}{nt})) = c'(e) \tag{21}$$

from where we can solve the e^{**}

The negativity of S.O.C. can be verified easily.

4.2 Results: Democracy

The main interest of this section lies in looking at how the effort of the Government for investments changes from the benchmark case under an electoral constraint.

Firstly note that a direct comparison of the e^{**} with e^* from the F.O.C.s reveal that $e^{**} > e^*$ for $t > \frac{2\epsilon}{n}$ and $e^{**} < e^*$ for $t < \frac{2\epsilon}{n}$ under all the earlier assumptions prevailing. Let's define $t_0 = \frac{2\epsilon}{n}$. Also, differentiating F.O.C. 21 w.r.t. t we can straight away find $\frac{de^{**}}{dt} > 0$ for $t > \frac{2\epsilon}{n}$ under all earlier assumptions from section 1. This finding means that in the presence of political constraint, the incumbent party's effort for industrialization will increase when ensuring votes from transfers is very costly, i.e. $t > t_0$, and vice versa.

This is an interesting finding which we formalize in the following result.

Proposition 4.1 *In a democracy, when ensuring each vote for re-election via welfare transfers is very costly ($t > t_0$), the ruling party in the Government's office will put more effort for investments in the equilibrium, than it would have done in the absence of any political constraint ($e^{**} > e^*$).*

When transfer gets cheaper ($t < t_0$), it's easier to ensure votes of more voters per unit of transfer and hence the party finds allocating transfers instead of investment efforts to be more beneficial ($e^{**} < e^*$).

The intuition behind this finding will be clear from looking at the re-election chances $P(I^* + \frac{G-e}{t} \geq \frac{N}{2})$ which always decreases with t. But the re-election chance is affected both by e^{**} and t, and decreasing t increases the Government's effort for investments from the budget. Investments have two benefits for the party in office- firstly, the party is intrinsically and ideologically motivated for development via investments; additionally, it can also reap in political benefits from it as each unit of investment generates an unit employment which there by ensures the labourer's vote for the incumbent party. This latter effect dominates the former effect of increasing t on the re-election chances alone. So when it maximizes a weighted average of re-election probability and industrialization, and ensuring votes via transfers gets very costly, i.e. $t > t_0$ where $t_0 = \frac{2\epsilon}{n}$, the Government will find it more difficult to ensure its re-election by satisfying sufficient number of voters through welfare transfers alone and there by chooses the alternate path of development through capital investments.

A direct implication of this result can be thought for a poor region, which is a suitable scenario for this model. A high enough t ($t > t_0$) can be thought to be more suitable for a poor and economically under-developed region where the people are more dependent on the Government's welfare transfers. The benchmark example of our model has always been such an under developed region from the beginning. A high t can be interpreted as an indication of citizen's dependence on the Government's help, complementing with absence of alternate market opportunities and social infrastructure. The minimum level of sustenance for a decent livelihood has to be provided by the Government which makes the transfers costlier, and such scenarios are likely for a very economically backward region. For such extremely poor regions, this result predicts to witness higher investment initiatives by the elected Governments compared to the ones from less poor regions. This higher effort may

One can counter argue that a higher t may not necessarily always indicate poverty. It is defined to be the minimum threshold transfer to ensure a vote for the ruling party, and this political support may not necessarily

imply welfare necessity always. For example, a high political competition in presence of rival political parties may witness higher electoral promises of future transfers by the rivals. Assuming the promises to be credible, the incumbent facing competition will have to provide at least higher transfers to earn those voters. Such political competition may drive t up as well which may not necessarily be linked to poverty. But counter arguably, a competition of electoral promises over higher welfare transfers is itself indicative of an undeveloped economy. Preferences of economically well off voters change from government;s transfers to long term job prospects in the industrial sectors. But with a deeper look, here is an indirect structural mechanism at play also.

We have assumed the wage from the job generated by each unit of investment is higher than whatever the t be, so that beneficiaries from investment always support the incumbent. The voting decision is dependent on the two alternate choices of transfer and industrial wage only. Any voter who has to depend on t can be assumed to have not got or unskilled to secure a job in the industrial sector. It is more likely that the jobs from industrial sector will employ skilled labour and with higher investments, chances of absorption of the skilled population will increase. One possibility for higher dependence on transfers can be the presence of large unskilled population who may not avail the opportunities in the industrial sector and has to remain dependent on transfers, which is a characteristic feature of a backward economy. Even if a skilled labour does not secure a job in the modern sector, this itself indicates low investment and there by a backward state of the region's economy. Each of the possible cases arising from this condition can be directly or indirectly linked to under-development of the region to a higher or lower extent.

Therefore, from this result, we get that an extremely poor region may see greater push for investment from the elected Government of that region but a less or semi-poor region may not necessarily witness that. This has two very important qualitative consequences. Firstly, a mid level poor region may remain in a poverty trap for longer than an extremely poor region which will see greater effects for investments in presence of political constraints. Secondly, democracy works more efficiently for extremely under developed countries in terms of faster capitalist development. We present this in the following corollary.

Corollary 4.1 *Democracy is more efficient for capitalist development in an extremely poor region. Political compulsions of a democratically elected Government can pull out a high-poverty region out of economic backwardness faster than that*

of a medium or low poverty region.

This is the primary and most important implication of the findings of this paper. This result agrees with the findings of Acemoglu et al. (2019) that democracy increases GDP by encouraging investments along with other factors, and find little support for the view that democracy is a constraint on economic growth for less developed economies.

We move on to present our next results in this section, summarizing from all the comparative statics' findings.

Proposition 4.2

1. When the relative benefits from holding the Government's office (γ) increases, the incumbent's effort for investment (e^{**}) increases in equilibrium when ensuring political support via transfers are costly ($t > t_0$). But when securing votes via welfare transfers are cheaper ($t < t_0$), it will be optimal to allocate more resources for transfers for an increasing γ resulting in a reduced effort for investment.

2. With an increasing size of the electorate (N), the Government will increase effort for investments (e^{**}) for costly transfers ($t > t_0$) but will decrease for cheaper transfers ($t < t_0$).

It's interesting to see how the ruling party's effort changes with a change in it's priorities, i.e. with a change in the composition of its' objective function γ. Like before, from the F.O.C. 21 we can derive $\frac{de^{**}}{d\gamma} > 0$ for $t > t_0$ and negative otherwise. Also, its easy to check that the re-election chances of the incumbent $P(I^* + \frac{G-e}{t} \geq \frac{N}{2})$ always decreases with t. These two together clearly indicate that when the party in Government gives more weight to the gains from office, it will push for more investments when ensuring votes via transfers is costly but will allocate more resource for transfers when its cheaper to ensure support through them.

Large populations are characteristic features of poor countries. For $t > t_0$, $\frac{de^{**}}{dN} > 0$ and negative otherwise. Recall that $P(I^* + \frac{G-e}{t} \geq \frac{N}{2})$ decreases with t, but this can be compensated by increasing e^{**} as it will increase I^*. Observing that the re-election chances $P(I^* + \frac{G-e}{t} \geq \frac{N}{2})$ decreases with rising N, the investment objective of the Government dominates here for the resulting choice of e^{**}. Thus for a large $t > t_0$, increasing N will push the Government's effort more towards investments away from providing more transfers when it will be less costlier to garner support via investments. For cheaper transfers

$t < t_0$, increasing electoral size makes ensuring votes via transfers easier for the Government.

To relate our findings with the existing evidence in the literature, we see that Marin et. al. (2021) had found a positive effect of political competition on local investments including the larger fiscal policy. Chamon et. al. (2009) study Brazilian municipal elections to find that political competition increases investments and even larger when incumbents run for reelection. Based on F.D.I. level studies, Quan et al. (2018) find 'robust evidence' in favour of 'political constraints', and against 'domestic political risk' on studying the mechanism why democracies attract more or less FDI. But based on FDI share studies, they find 'relatively robust evidence' in favour of domestic political risk and little evidence for 'political constraints'. Misra (2021) finds that persistent re-election does not seem to lead to better development outcomes in fourteen states of India between 1952-2015, and that the historical institutions in the lagging states if India could be driving such result. These empirical findings in the literature support our findings and resonate with our model's mechanism, thereby strengthening our results. We have explicitly derived the theoretical conditions under which such evidences hold, rigorously analysing the mechanism leading to each of such conditions. the strength of our theoretical results lie in its generality of clearly showing the conditions when each of the possible outcomes can arise.

5 Aggregate and Local Signals

Our basic model suggests that local and foreign investors are strategic substitutes for the economic development of poor regions. These backward regions were identified as those where generation of positive externalities for new investors from the past investments are relatively more difficult. Of course, this happens in those regions for historical reasons.

So far we had assumed that investors of both types observe and care only about the overall state of investment as revealed by an economy wide aggregate signal. Now we relax this assumption.

We consider a country consisting of k regions. In each region there are some local investors. In the i^{th} region, the proportion of local investors is n_L^i. Each local investor has a unit capital like before which she can either invest in the i^{th} region or not invest at all. The total share of foreign investors in the whole economy remain n_F like before, such that the total size of investors now has become $N = n_F + \sum_{i=1}^{k} n_L^i$. Each foreign investor has k units of capital

and it can invest one unit of capital in each region. Her choice for each of the regions is either to invest an unit capital or not. At max she can invest her total k units of capital with each unit in each of the regions.

There is a single government ruling the entire country which decides how much effort to expend in each region. Let e_i be the effort put in the i^{th} region. The local state of investment of the i^{th} region is given by

$$\lambda_i = e_i + \xi_i \tag{22}$$

where the i.i.d. random variables ξ_i's are defined over the support of real axis $(-\infty, +\infty)$ and follows a bell shaped distribution $F(\xi)$ with mean normalised at 0 and variance σ^2. We further assume that the government can expend a maximum of $\bar{e}$ of effort, so that $\sum_{i=1}^{k} e_i = \bar{e}$. Clearly, apart from effort, e_i can be interpreted as any resource which is scarce and which can be distributed between the regions for attracting investments. It essentially captures the Government's total budget constraint in spending resources for investments.

Let $\pi_i(e_i; \lambda_i^*)$ be the probability of investments in the i^{th} region. As above, this probability is a function of the effort e_i put in by the government in the i^{th}region and λ_i^*, the minimum realized value of the state in region i such that investments happen. Now the incumbent's problem is to choose e_i to

$$Max \sum_{i=1}^{k} \pi_i(e_i; \lambda_i^*) \, s.t. \sum_{i=1}^{k} e_i = \bar{e} \tag{23}$$

The above problem can be solved provided we know λ_i^* which is to be determined, as before, from voters' behaviour. We presently devote our attention to that determination.

Consider any region i. We consider in this situation that foreign investors observe two types of signals, one *aggregate* and *local* where as the local investors observe only *local* signals. Both the local and foreign investors observe a local signal s_i about the local state λ_i. In addition, the foreign investors observe an aggregate signal s about the overall state of the economy of the country denoted by λ like before. While λ depends on broad investment policies like tax incentives, profit and cost subsidies, monetary incentives etc., λ_i refers to the local investment climate of the i^{th} region and reflects local investment infrastructures helpful for investments like roads, electricity, local markets of any good to be produced etc. This λ_i depends upon the effort put in by the incumbent for developing such local resources to facilitate investments in region i. Local investors, in contrast to the foreign

investors, observe only local signals s_i about the local resources suitable for new investments. We further assume that the signals are observed with error and are uniformly distributed along the true values of the respective states of investments. More specifically we assume that s_i is uniformly distributed over $[\lambda_i - \epsilon, \lambda_i + \epsilon]$ and s is uniformly distributed over $[\lambda - \eta, \lambda + \eta]$.

We start with the behaviour of local investors. We assume that a local investor has a minimum standard for the local state of investment. More specifically, a local investor of i^{th} region invests in region i if the following condition is satisfied:

$$s_i \geq \bar{\lambda}_i \tag{24}$$

Thus in any region i, number of local investors deciding to invest in region i based on their local signal is given by

$$n_L^i P(s_i \geq \bar{\lambda}_i) = n_L^i (\frac{\lambda_i + \epsilon - \bar{\lambda}_i}{2\epsilon}) \tag{25}$$

Let us now consider the foreign investors. We now start with two beliefs of the representative foreign investor, viz. $\tilde{s_i}$ and $\tilde{s}$ about the local and overall investment climate above which other foreign investors will invest in the i^{th} region. The formulation implies that when each foreign investor receives a satisfactorily high signal about *both* the local and overall state *each*, *then only* she will invest in the i^{th} region. Thus the size of foreign investors investing in region i will be given by

$$n_F P(s_i \geq \tilde{s_i}) P(s \geq \tilde{s}) = n_F (\frac{\lambda_i + \epsilon - \tilde{s_i}}{2\epsilon})(\frac{\lambda + \eta - \tilde{s}}{2\eta}) \tag{26}$$

Proceeding like before, defining $\hat{\lambda_i}$ and $\hat{\lambda}$ as that local state and overall states λ_i and λ respectively above which foreign investors invest in region i, we can solve them from the equation

$$n_L^i (\frac{\hat{\lambda_i} + \epsilon - \bar{\lambda}_i}{2\epsilon}) + n_F (\frac{\hat{\lambda_i} + \epsilon - \tilde{s_i}}{2\epsilon})(\frac{\hat{\lambda} + \eta - \tilde{s}}{2\eta}) = \underline{I} \tag{27}$$

In what follows, we shall keep the aggregate state of the economy in the background to the extent possible and focus on the regional allocation of efforts. We assume that the true overall state of investment in the country is

$$\lambda = \tilde{\lambda} \tag{28}$$

and the representative foreign investor's belief $\tilde{s}$ about other foreign investors investing in country A above this signal coincides with the true state $\tilde{\lambda}$. This means that for any given overall state of investment in the country $\tilde{\lambda}$, if local investment climate in region i seems sufficiently favorable to the foreign investor, she will invest in region i irrespective of the overall climate prevailing in other parts of the country. However, in spite of this assumption, we will eventually show that the mere existence of the overall signal will have interesting implications for regional effort choices of the Government.

This assumption readjusts the size of foreign investments in region i, which is obtained by replacing $\tilde{s}$ by $\tilde{\lambda}$ in 5, to arrive at the reduced form of 5 as

$$n_L^i\left(\frac{\hat{\lambda}_i+\epsilon-\bar{\lambda}_i}{2\epsilon}\right)+n_F\left(\frac{\hat{\lambda}_i+\epsilon-\tilde{s}_i}{4\epsilon}\right)=\underline{I} \tag{29}$$

Each foreign investor will solve her *best-response* signal $\hat{s_i}$ for region i from

$$\frac{\pi_A(\hat{s_i}+\epsilon-\hat{\lambda}_i)}{2\epsilon}=\pi_B \tag{30}$$

where $P(\lambda_i \geq \hat{\lambda}_i)=\frac{(s_i+\epsilon-\hat{\lambda}_i)}{2\epsilon}$ gives the chances of investments' success in region i.

Denoting the foreign investor's best-response cut-off signal for region i by ${s_i}^*$ in equilibrium, which is obtained by ${s_i}^*=\hat{s_i}=\tilde{s_i}$, we solve it to get

$${s_i}^*=\bar{\lambda}_i-2\epsilon[1-\{\frac{1}{{n_L}^i}\left(\underline{I}-\frac{n_F}{2}(1-\frac{\pi_B}{\pi_A})\right)+\frac{\pi_B}{\pi_A}\}] \tag{31}$$

and the corresponding critical state of region i for investments to happen as

$${\lambda_i}^*=\bar{\lambda}_i-[1-\frac{2}{{n_L}^i}\{\bar{I}-\frac{n_F}{2}(1-\frac{\pi_B}{\pi_A})\}]\epsilon \tag{32}$$

It is easy to check that

$$\frac{\partial {\lambda_i}^*}{\partial {n_L}^i}<0\Leftrightarrow \underline{I}\geq\frac{n_F}{2}(1-\frac{\pi_B}{\pi_A}) \tag{33}$$

.

Recall that our earlier assumption in 11 ensures this condition in R.H.S. too. Hence, under prevailing assumption of 11,

$$\frac{\partial {\lambda_i}^*}{\partial {n_L}^i}<0\Leftrightarrow \underline{I}\geq I' \tag{34}$$

.

Now coming to the Government's problem, it allocates its' regionwise optimal effort ${e_i}^*$ as per 23, where we have $\pi_i(e_i;\lambda_i^*) = P(e_i + \xi_i \geq {\lambda_i}^*) = 1 - F({\lambda_i}^* - e_i)$. From where we get its F.O.C. $\forall i, j$ as

$$\frac{\partial \pi_i(e_i;\lambda_i^*)}{\partial e_i} = \frac{\partial \pi_j(e_j;\lambda_j^*)}{\partial e_j} \tag{35}$$

This, in turn, implies that e_i and e_j are chosen in such a way that $F'({\lambda_i}^* - e_i) = F'({\lambda_j}^* - e_j) \ \ \forall i, j$. As from the beginning we have restricted ourselves to that part of F where $F'({\lambda_i}^* - e)$ is strictly increasing in e, so in equilibrium we get ${\lambda_i}^* - e_i = {\lambda_j}^* - e_j$. What readily follows from here is that if ${\lambda_i}^* < {\lambda_j}^*$, then $e_i < e_j$ and vice versa.

This also concludes that $\pi_i(e_i;\lambda_i^*) = \pi_j(e_j;\lambda_j^*) \ \ \forall i, j$ in equilibrium.

Also, from 34 we already have seen that for a very backward region, i.e. $\underline{I} \geq I'$, if ${n_L}^i > {n_L}^j$, then $\lambda_i^* < \lambda_j^*$, there by implying $e_i < e_j$. The implication of this finding is summarized in the following proposition:

Proposition 5.1 *Among extremely backward regions ($\underline{I} \geq I'$) where generating ies is relatively difficult for a foreign firm, the Government prioritizes its effort on those regions where presence of local investors ${n_L}^i$ are relatively less. Hence, for any poor region i, presence of local investors* historically *is the primary determinant of the Government's effort for industrialization of that region.*

This result is very intuitive and a logical policy measure for any decision maker to follow, when it has the objective of developing all the regions under its jurisdiction equally. In a democracy, for any Government that's a normally expected presumption to begin with. In our framework, as the Government's objective was to maximise investments in all regions equally by optimal allocation of its effort, this result is intuitive in absence of any additional distortion. This result reinforces the findings of the stream of literature following Krugman (1991).

6 Discussion and Conclusion

We briefly discuss some basic features of our model and some possible future directions before concluding this paper.

For past history to shape current investments, imperfections in capital markets must be the key, but this alone may not be sufficient as the concavity of investment returns guarantee convergence. The production functions we

have taken in this paper are not concave, who's examples include investment activities with substantial fixed costs like business startups, nutritional or health investments, educational choices, migration decisions, crop adoptions etc. We consider the nonconvexities at the level of the country or the region as a whole, like Young's increasing returns on a grand scale, or economy-wide externalities described by Lucas-Azariadis-Drazen. This forms the basic tenet of our framework.

The need for foreign along with local investments for uplifting a backward economy is a settled debate among the policymakers now. In our framework, Foreign direct investment (FDI) plays a major role in the investment dynamics, along with the local investments. 1990s onwards, views among economists and Governments of developing countries considerably changed into believing that multinationals have important complementarities with local industry, stimulating growth and development in the host economies. There has been a rapid growth of foreign investments in developing and transition regions during the 1990s. The ratio of FDI inflows to GDP has increased from 0.8 percent in the late 1980s to 1.9 percent in the mid-1990s. FDI has linkage effects which can create complementarities and develop the local economy. Such a significant role of Foreign direct investment (FDI) arises because the host country, an underdeveloped one, has an investment opportunity that it cannot exploit by itself as its access to capital markets is restricted and it lacks the means and technical knowledge because of market incompleteness. This is in line with the idea pointed out by Kindleberger (1969). In such a scenario, a multinational corporation (MNC) is able to exploit such an opportunity because of owning the necessary capital, technology, and managerial skills.

An immediate extension can be to extend the model to explain the conditions under which a complementary role of local and foreign investments can be achieved. Other commonly observed political distortions can be added to the Government's motives and constraints to study their effects on investment and industrial policies. Our model also has an immediate scope to be further strengthened and extended by consideration of economy-wide externalities, both in physical and human capital (Romer (1986), Lucas (1988), Azariadis and Drazen (1990)), which we didn't attempt here due to the limitation of the size of the paper.

In spite of the intuitive results and explanations, the primary limitation of this paper remains in the absence of an empirical investigation to support the findings. But as it deals with political democracies of underdeveloped countries in particular, the difficulty to access such data is understandable,

especially when they contain various measures of Government's efforts. The indicators of such efforts may vary across countries also. For many countries or states within countries, the authors found any such data to be unavailable, which makes the task more practically challenging. This itself calls for a separate work altogether. The author intends to attempt these questions in a future work. (**?**)

7 Acknowledgement

The author sincerely thanks Soumen Sikdar, Samarjit Das, Nachiketa Chattopadhyay, Tarun Kabiraj, Mario Ferrero, Sattwik Santra and all the seminar participants of Indian Statistical Institute and European Public Choice Society Meeting 2021.

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