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Abstract

We study the effect of international financial integration on economic development when the quality of governance may be compromised by corruption. Our analysis is based on a dynamic general equilibrium model of a small economy in which growth is driven by capital accumulation and public policy is administered by government-appointed bureaucrats. Corruption may arise due to the opportunity for bureaucrats to embezzle public funds, an opportunity that is made more attractive by financial liberalisation which, at the same time, raises efficiency in capital production. Our main results may be summarised as follows: (1) corruption is always bad for economic development, but its effect is worse if the economy is open than if it is closed; (2) the incidence of corruption may, itself, be affected by both the development and openness of the economy; (3) financial liberalisation is good for development when governance is good, but may be bad for development when governance is bad; and (4) corruption and poverty may co-exist as permanent, rather than just transitory, fixtures of an economy.

Keywords: Corruption, development, financial liberalisation.

JEL Classification: D73, F36, O11.

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1 Introduction

There is considerable debate about the merits of international financial integration.[1] To some observers, there can be little or no doubt that liberalising international capital markets leads to better economic outcomes. This view is often based on an analogy with trade liberalisation, the benefits of which are rarely disputed. A more globally integrated and competitive financial system is similarly argued to improve resource allocations. Such a system is presumed to offer greater opportunities for sharing and diversifying risks, and to provide greater incentives to enhance and maintain efficiency. From the perspective of an individual economy, dismantling barriers to cross-border financial transactions may be seen as a relatively swift and painless way of boosting investment through increased capital inflows. To other observers, there are strong reasons for believing why financial liberalisation may do more harm than good. In the presence of pre-existing distortions and weak institutional support mechanisms, de-regulating capital markets can exacerbate inefficiency and create instability. Countries that do de-regulate without appropriate safeguards are liable to increase their exposure to more intense, more frequent and more contagious bouts of adverse speculation that can fuel recurrent crises. Rather than attracting foreign savings, greater financial openness may induce a capital outflow from a country and leave it bereft of resources available for investment.

Empirical investigations have produced inconclusive evidence about which of the above views is closer to reality.[2] Whether international financial integration is good or bad for economic performance appears to be contingent on a number of context-specific factors. Not least of these is the extent to which financial markets, both at home and abroad, work smoothly and efficiently.[3] This is largely a matter of the quality and stability of institutional structures that govern the functioning of financial systems. The implication is that the effects of financial liberalisation are more likely to be beneficial for more developed economies in which these structures are more mature, more advanced and more robust. With this in mind, it is possible to understand the sobering experiences of many less developed and emerging-market economies that embarked on large-scale financial liberalisation programmes

[1] For recent surveys of the literature, see Edison *et al.* (2002a) and Eichengreen (2002).

[2] See, for example, Edison *et al.* (2002b) and Eichengreen and Leblang (2003), and the references contained therein.

[3] According to Eichengreen and Leblang (2003), the effect of financial liberalisation on growth is more likely to be positive when the domestic financial system is well developed and the international financial environment is stable, and is more likely to be negative when the converse is true.

during the 1990s (following the precedent set by industrialised nations in the previous decade). The Asian crisis is widely regarded as a prime example of what such programmes can lead to when domestic financial markets are not well developed and not well supervised. The extensive capital outflows endured by other transition economies (e.g., the former Soviet republics) can be interpreted in much the same way. And the massive capital flight suffered by a number of African countries (especially those in the sub-Saharan region) may be seen in the same vein as well.[4]

In spite of all that has been written on the subject, it is not very often that one finds discussions of international financial integration which dwell on the role of governance and, with this, the issue of corruption.[5] Significantly, this issue has become one of the leading concerns (if not the leading concern) amongst all major international development agencies.[6] The World Bank, for example, has identified corruption as the single greatest obstacle to economic and social development, and has given priority to anti-corruption initiatives in its strategies for improving the quality of governance. There are good reasons for believing why the issue may be important for understanding the consequences of financial liberalisation. Perpertrators of corrupt practices will endeavour to escape detection by trying to conceal their behaviour as much as they can. Several ways for them to do this are by hiding their illegal income, by investing this income differently from legal income and by altering their patterns of expenditure. Financial liberalisation may be seen as expanding these opportunities by allowing funds to be taken more freely across borders where they can be concealed more easily if necessary. With fewer controls on financial transactions, it is much easier to launder money that has been obtained unlawfully. The incentive for individuals to take this money abroad (rather than to keep it in their own country) is that it is less

[4]There are many detailed accounts of these events and we refer to just a few. For discussions of the Asian crisis, see Goldstein (1998), Ito and Kruger (1996) and Lukauskas and Rivera-Batiz (2001). For evidence of Russian capital flight, see Cooper and Hardt (2000) and Abalkin and Whalley (1999). And for details of the African experience, see Ajayi and Khan (2001), Boyce and Ndikumana (2001) and Collier *et al.* (1999).

[5]By corruption is generally meant the abuse of power by public officials to make personal gains. The concept of governance is broader than that of corruption, though the two are intimately connected: just as bad governance fosters corruption, so corruption undermines good governance.

[6]See the World Bank and IMF web-sites, www.worldbank.org/publicsector/anticorrupt and www.imf.org/external/np/exp/facts/gov. Various surveys of corruption can be found in Bardhan (1997), Jain (2001), Rose-Ackerman (1999) and Tanzi (1998). As is clear from these, the vast majority of the literature is microeconomic in nature, using partial equilibrium models to study specific aspects and issues arising from the principal-agent type relationship between superiors and subordinates in public office.

likely to be discovered and retrieved by the authorities. In this way, financial liberalisation may well result in more corruption and lower growth if it is not backed up by appropriate policies designed to improve the quality of governance.[7]

The precise extent to which capital controls serve to limit the laundering of illegal income is likely to depend on how such income is distributed across the public sector's hierarchical structure. For individuals at the top of the hierarchy, there is probably little effect as the power and influence wielded at this level make it possible to flout almost any official rules and regulations. Prime examples of this are various corrupt former leaders and high-ranking civil servants who, at one time or another, have succeeded in amassing vast personal fortunes abroad irrespective of how open or how closed their countries' capital accounts were meant to be.[8] Similarly, but for different reasons, individuals at the bottom of the hierarchy are also unlikely to be affected much by the absence or presence of capital controls. Especially in less developed countries, the petty bribes that low-ranking officials receive are more liable to be used to supplement their low salaries for immediate consumption purposes rather than being saved and hidden abroad. This leaves individuals in the mid-tier of the hierarchy for whom the degree of financial openness is likely to be important. These middle-ranking officials are sophisticated enough to extract large amounts of illegal income, but lack the power and influence to circumvent restrictions on the transfer of their wealth overseas - an obstacle that disappears when these restrictions are dismantled. This may well account for several notable episodes of capital flight, such as the $68 billion that Russian residents managed to accumulate abroad during the

[7] Corruption may tempt even honest individuals to take their funds abroad if they are able to do so: to the extent that corrupt practices limit the scope for profitable investments at home, individuals may exploit the opportunity to invest elsewhwere were this to be made available to them.

[8] Thus it was reported that, by the mid-1980s, Mobutu Sese Seko of former Zaire (now Congo) had accumulated up to $4 billion in illegal income, much of which was held in foreign bank accounts. Likewise, during the 1990s, Sani Abacha and his family of Nigeria were discovered to have assets in London, New York and Switzerland that gave them an equally illegitimate multi-millionaire status. The amount of embezzled public funds held in overseas locations by Moussa Traore of Mali is currently thought to be around $2 billion (equivalent to the value of the country's foreign debt), whilst conservative estimates put the amount of illicit money syphoned out of the Philippines by Ferdinand Marcos at around $5 billion (the sum of money that he allegedly offered to repatriate in the late 1980s in exchange for being allowed to return to his country without prosecution). Finally, Gustavo Noboa of Ecuador, Alfonso Portillo of Guatemala and Arnoldo Aleman of Nicaragua have recently been the subject of investigation for holding bank acounts in the US that are thought to contain millions of dollars in looted public funds (the last of these persons is now serving a 20 year prison sentence for his crimes).

mid-1990s, a period of progressive financial liberalisation for that country: according to some estimates, as much as 33 percent of this wealth was of illegal origin, and 37 percent of semi-legal origin (e.g., Abalkin and Whalley 1999).[9]

The connection between corruption and financial liberalisation is evidenced in some recent empirical studies based on more formal (econometric) investigations. Graeff and Mehlkop (2003) re-examine the relationship between corruption and economic freedom, as studied by several other authors whose findings support the typical presumption that the relationship is negative (e.g., Chafuen and Guzman 2000; Paldam 2002).[10] The innovation of the analysis is the decomposition of the index of freedom into its constituent parts, each of which is then allowed to have a separate influence on the index of corruption. For developing countries, the factor that stands out from all others is the freedom to own foreign currency bank accounts at home and abroad, the effect of which on corruption is shown not only to be the strongest and most robust of all others, but also to be positive, not negative. In other words, corruption tends to rise, rather than fall, with fewer financial market restrictions. This lends compelling support to the argument that, at least in less developed economies, corruption is more likely to be fostered, rather than alleviated, by international financial integration. Another notable finding is reported by Neeman *et al.* (2006) who re-examine the relationship between corruption and development which has previously been shown to be strongly negative, with a significant proportion of the variations in corruption indices being explained by variations in per-capita income levels (e.g., Ades and Di Tella 1999; Fisman and Gatti 2002; Paldam 2002; Treisman 2000). The innovation in this case is the classification of countries in terms of their degree of openness.[11] Using a variety of empirical specifications, it is found that the

[9] As regards the significance of corruption within the mid-tier of public service, some revealing studies have been conducted. For example, Hunt and Laszlo (2005) report that judges in Peru, whilst being involved in only 12 per cent of total bribe cases, obtained more than 42 per cent of total bribe payments.

[10] Reliable measures of both variables are now widely available in the form of several indices constructed by various organisations. The most commonly-used indices are the Corruption Perception Index of Transparency International and the Economic Freedom Index of the Fraser Institute. The former assesses the extent to which public officials are believed to engage in various types of corrupt practice, such as bribery, fraud and embezzlement. The latter evaluates various aspects of economic freedom, such as freedom of personal choice, freedom of exchange and freedom to enforce private property rights. Further details can be found on the appropriate web-sites, www.transparency.org/surveys/index.html♯cpi and www.fraserinstitute.ca/economicfreedom/index.asp?snav=ef.

[11] The degree of openness of an economy is measured with reference to such factors as the average level of tariffs, the extent of non-tariff barriers to trade and the value of the black market exchange rate relative to the official rate. For further details, see Sachs and

negative correlation between corruption and development is confined almost entirely to open economies and that it is the openness of financial markets, rather than goods markets, that accounts for this. Again, this lends strong support to the view that financial liberalisation is more, not less, likely to foster corruption.

The foregoing observations provide the motivation for the analysis that follows. Our objective is to explore the dynamic general equilibrium interactions between economic development, public sector corruption and international financial integration. The analysis is based on a simple model economy in which bureaucrats, or civil servants, are delegated the task of administering public policy on behalf of the government. This task entails the provision of productive public goods and services using the revenues from taxation of households. Corruption may arise because of the opportunity for bureaucrats to further their own interests by abusing their positions of authority. Specifically, bureaucrats have the potential to enrich themselves illegally by embezzling public funds.[12] An individual who does this faces a probability of being caught, in which case he loses everything, being fined the full amount of his legal and illegal earnings. The engine of growth in the economy is capital accumulation, where capital is produced by entrepreneurs using loans from all public and private agents. These loans are paid back at a rate of interest specified in the terms and conditions of mutually-agreeable financial contracts.

The model is used to study various scenarios which differ according to whether corruption is absent or present, and whether financial markets are closed or open. Our analysis reveals that the extent to which corruption affects growth depends on the extent to which the economy is open, and the extent to which openness affects growth depends on the extent to which the economy is corrupt. Corruption is always bad for growth as the amount of resources available for capital production is reduced by bureaucrats' attempts to conceal their illegal income and the government's attempts to detect this income. This is made worse by financial liberalisation because of the extra

Warner (1995) and Wacziarg and Welch (2003).

[12]Embezzlement - the theft by an individual of resources that he is supposed to administer - is an especially difficult offence to deal with when it entails the misappropriation of public funds. While everyone in society may be affected, the fact that no private property is stolen or exchanged means that individuals have no legal rights by which to protest and seek compensation. This type of non-collusive corruption may pose just as many problems as more collusive forms, where benefits accrue to all parties involved. It is further worth noting that corruption in public procurement may be associated with not only a misappropriation of public funds, but also a misallocation of these funds (e.g., Mauro 1997; Tanzi and Davoodi 1997).

opportunity to launder money abroad.[13] At the same time, financial liberalisation gives an impetus to growth by raising the efficiency of capital producers in response to a higher world interest rate on loans. This effect survives intact when the economy is free from corruption, but may be overshadowed by the leakage of illegal funds overseas when corruption exists. The upshot is that, in terms of both the short-run and long-run performance of an economy, financial integration is unambiguously good when governance is good, but ambiguously good or bad when governance is bad.

In addition to the above, our analysis demonstrates how the incidence of corruption may be influenced by both the degree of financial openness and the level of economic development. The incentive for a bureaucrat to engage in corrupt practices depends on the expected gains from behaving in this way. *Ceteris paribus*, these gains are higher when financial markets are liberalised (because a bureaucrat can reduce his chances of being apprehended by sending his illegal income abroad) and when the economy is at a low stage of development (because a bureaucrat loses less in legal income if he is caught). Accordingly, corruption is more attractive in economies that are open, rather than closed, and in economies that are poor, rather than rich. The former result implies that liberalisation may lead to any of the following outcomes: an equal or greater number of bureaucrats who are corrupt, a fewer number of such bureaucrats who are caught and a greater amount of public funds that each one of them steals. The latter result implies that the relationship between corruption and development is two-way causal: bureaucratic malfeasance not only influences, but is also influenced by, economic prosperity. A consequence of this is the existence of threshold effects and multiple development regimes. Specifically, there is a critical level of capital, below which corruption is widespread and above which corruption is absent. This critical turning point is different for closed and open economies, the limiting outcomes of which depend on the feasibility of transition between development regimes. In the absence of transition there are multiple (history-dependent) long-run equilibria, including a poverty trap equilibrium in which corruption remains permanently high.

The implications of our analysis are consistent with a number of empirical observations. That corruption has adverse effects on growth and development is now well-established as a major stylised fact (e.g., Gyimah-Brempong 2002; Keefer and Knack 1997; Li *et al.* 2000; Mauro 1995).[14] That these ef-

[13] As indicated earlier, liberalisation may motivate even honest agents to take their money abroad if corruption restricts investment opportunities at home. Our analysis abstracts from this partly for simplicity and partly in order to highlight the effect of liberalisation on the very incentives that give rise to corrupt behaviour.

[14] These and other studies also provide evidence on various ways in which corruption

fects are much stronger in financially-open economies than financially-closed economies accords with the recent findings of Neeman *et al.* (2006). That corruption, itself, is influenced by economic development is another well-established emprical regularity (e.g., Ades and Di Tella 1999; Fisman and Gatti 2002; Montinola and Jackman 1999; Paldam 2002; Treisman 2000). That corruption is also influenced by financial openness concurs with the recent evidence of Graeff and Mehlkop (2003). That financial liberalisation may be either good or bad for economic performance is what experience suggests (e.g., Edison *et al.* 2002b; Eichengreen and Leblang 2003). And that corruption and poverty may co-exist as persistent, rather than transient, phenomena is a possibility that has been realised in many developing countries (e.g., Bardhan 1997; Sah 1988).

Theoretical research on the macroeconomics of misgovernance (especially from a development perpective) is much less extensive than empirical work on the subject, though the balance is gradually being redressed.[15] Two of the earliest contributions are credited to Ehrlich and Lui (1999) and Sarte (2000), the former of whom demonstrate how corruption can lead to a diversion of resources away from growth-promoting activities (investments in human capital) towards power-seeking activities (investments in political capital), whilst the latter of whom shows how corruption may cause resources to be diverted away from the formal (more efficient) sectors of the economy towards the informal (less efficient) sectors. More recently, Blackburn *et al.* (2006) reveal how corruption and development may interact with each other to produce threshold effects and multiple (history-dependent) long-run equilibria, including a poverty trap equilibrium. Similar results are established in Blackburn and Forgues-Puccio (2007) who also show how corruption can foster inequality by compromising the effectiveness of redistributive policy, and in Blackburn and Sarmah (2008) who show how corruption can influence demographic outcomes (life expectancy in particular) through its impact on the provision of public health expenditures. None of these investigations, which are all based on closed economy models, address the types of issue that may arise when considering corruption in an open economy context. One analysis

might take hold, such as lowering rates of investment (e.g., Mauro 1995), creating obstacles to doing business (e.g., World Bank 2002), reducing inflows of foreign investment (e.g., Wei 2000) and causing misallocations of public expenditures (e.g., Mauro 1997; Tanzi and Davoodi 1997). In contrast, there is very little evidence to support the view that corruption might actually be good for growth by helping to circumvent cumbersome regulations (red tape) in the bureacratic process. This is true even for countries that are reportedly mired with such regulations (e.g., Mauro 1995).

[15] In a purely static context, Acemoglu and Verdier (1998, 2000) conduct a general equilibrium analysis of how corruption may form part of an optimal allocation in which market failure is traded off against government failure.

to do so (the only one we know of) is that of Rivera-Batiz (2001) who demonstrates, as we do, that financial liberalisation may be either good or bad for economic development depending on the extent to which the quality of governance is good or bad. This result is established in a model that is quite different from ours in a number of respects. First, corruption takes the form of bribery, whereby bureaucrats receive kickbacks from agents in return for granting licenses to develop and produce new goods: in our case corruption manifests as the embezzlement of public funds by bureaucrats. Second, corruption lowers growth by acting as a tax on innovation, making innovation less profitable and so reducing technological progress: in our case corruption undermines growth by decreasing the amount of resources available for productive investments. Third, financial liberalisation in the presence of corruption may induce a capital outflow because the domestic return to capital is lower than the world return: in our case liberalisation with corruption can lead to capital flight because of greater opportunities to conceal corrupt behaviour by laundering illegal income abroad. Fourth, corruption is exogenous to both the state of development and financial regime of the economy: in our case corruption can change endogenously as development proceeds and financial markets are liberalised. Fifth, equilibirum growth takes place perpetually at a constant rate which is either raised or lowered permanently by financial liberalisation: in our case there are transitional dynamics with the possibility of multiple (history-dependent) equilibria and a distinction between the short-run and long-run effects of liberalisation.[16]

The remainder of the paper is organised as follows. In Section 2 we present a generic framework of analysis, describing the basic features of our model economy that allows for the possibility of corruption. In Section 3 we consider the case in which the economy is completely closed to international financial transactions. In Section 4 we turn to the alternative, where the economy is fully open to such transactions. In Section 5 we study in detail how financial liberalisation might affect the development of the economy. In Section 6 we make a few concluding remarks.

[16]These differences do not imply any rivalry between the present analysis and that of Rivera-Batiz (2001). Rather, they serve to highlight alternative corruption mechanisms (of which there are many others) that one may generally think of as co-existing in practice. Thus, as mentioned earlier, the embezzlement of public funds (on which our own analysis focuses) can be as equally pervasive as bribery, and has certainly been so in many countries. Likewise, the direct (deadweight) loss of physical resources arising from corruption (on which we also focus) can be just as destructive as other costs (such as the distortion of incentives), and the evidence of capital flight suggests that many countries have been severely afflicted by this.

2 A Generic Framework

Time is discrete and indexed by $t = 0, .., \infty$. There is a constant population of two-period-lived agents belonging to overlapping generations of dynastic families. Agents of each generation are divided into three groups of citizens - households (or workers), entrepreneurs (or producers) and bureaucrats (or civil servants).[17] To save on notation, we normalise the size of each group to be a measure of unit mass. All agents derive utility from their old-age consumption of output. Households work for entrepreneurs, supplying a fixed amount of labour, $\lambda > 1$, in return for a wage. Entrepreneurs work for themselves, producing both capital and output. Bureaucrats work for the government, administering public policy in return for a salary. Public policy consists of a programme of taxes and expenditures designed to make available public goods and services that contribute to the efficiency of output production. Corruption arises from the incentive of a bureaucrat to appropriate public funds for himself. We assume that a fraction, $\mu \in (0, 1)$, of bureaucrats are corruptible in this way, while the remaining fraction, $1 - \mu$, are non-corruptible, with the identity of a bureaucrat being unobservable by the government.[18]

2.1 The Government

We envisage the government as providing public goods and services which function as inputs to private production (e.g., Barro 1990). Expenditure on these services, g_t, is assumed to be a fixed proportion, $\gamma \in (0, 1)$, of output. The government also incurs expenditures on bureaucrats' salaries

[17] We assume that agents are differentiated at birth according to their abilities, skills and opportunities. Entrepreneurs are individuals who have access to production technologies that are unavailable to others. Households are individuals who, like entrepreneurs, lack the skills necessary to become bureaucrats. Bureaucrats are individuals who possess these skills and who are induced to take up public office by an allocation of talent condition established below. Thus, as in other analyses (e.g., Blackburn *et al.* 2006; Rivera-Batiz 2001; Sarte 2000), we abstract from issues relating to occupational choice. In doing so we are able to simplify the analysis by not having to consider possible changes in the size of the bureaucracy and possible changes in the level of corruption that may result from this.

[18] This assumption may be thought of as capturing differences in the propensities of bureaucrats to engage in corruption, whether due to differences in proficiencies at being corrupt or differences in moral attitudes towards being corrupt (e.g., Acemoglu and Verdier 2000; Blackburn *et al.* 2006). The main purpose of the assumption is to allow us to determine the wages of bureaucrats in a relatively straightforward way that does not demand additional assumptions about how public sector pay is determined. In fact, all we need for this purpose is that there be at least one bureaucrat who is non-corruptible - all other bureaucrats may well be potential transgressors.

which are determined as follows. Any bureaucrat (whether corruptible or non-corruptible) can work for an entrepreneur to receive an income equal to the wage paid to households. Any bureaucrat who is willing to accept a salary less than this wage must be expecting to receive compensation through some form of malpractice and is therefore immediately identified as being corrupt. As in other analyses (e.g., Acemoglu and Verdier 1998; Blackburn *et al.* 2006), we assume that a bureaucrat who is discovered to be corrupt is subject to the maximum fine of having all of his income confiscated (i.e., he is dismissed without pay). Given this, then no corruptible bureaucrat would ever reveal himself in the way described above. As such, the government can minimise its labour costs, while ensuring complete bureaucratic participation, by setting the salaries of all bureaucrats equal to the wage paid by entrepreneurs to households.[19]

The government finances its expenditures each period by running a continuously balanced budget. Its revenues consist of taxes collected from households, plus any fines imposed on bureaucrats who are caught engaging in corruption. We denote by τ_t the lump-sum tax levied on each household. Since the government knows how much tax revenue is due in the absence of corruption (since it knows the number of households and since it is responsible for setting taxes), any shortfall of public funds below this amount reveals that some funds are being misappropriated. Under such circumstances, the government investigates the behaviour of bureaucrats using a coslty and imprecise monitoring technology. This technology entails d units of additional expenditure and implies that a bureaucrat who is corrupt faces a probability, $p \in (0,1)$, of avoiding detection, and a probability, $1-p$, of being found out.[20]

[19] This has the usual interpretation of an allocation of talent condition. The government cannot force any of the potential bureaucrats to actually take up public office, but it induces all of them to do so by paying what they would earn elsewhere.

[20] One may wish to formalise this technology more explicitly - for example, by modelling p as a (decreasing) function of d, and determining the latter from some choice problem of the government. To the extent that lower levels of d would be chosen at lower levels of development (because of lower government revenues), the implications of our analysis would be strengthened. For simplicity, however, we follow the approach of others by treating monitoring activity as exogenous (e.g., Acemoglu and Verdier 1998, 2000; Blackburn *et al.* 2006). This approach is not unreasonable in the context of developing economies, where the will and wherewithal to combat corruption are generally perceived to be weak, fragile and fragmented.

2.2 Entrepreneurs

Each entrepeneur begins life with zero resources, but has an opportunity to undertake an investment project from which capital is produced. To exploit such an opportunity, an entrepreneur must acquire external finance from other agents (of the same generation). A project is summarised by a production technology that dictates how output and effort at time t are converted into capital at time $t+1$. To be precise, we assume that l_t units of loans and e_t units of entrepreneurial time may be combined to produce x_{t+1} units of capital according to

$$x_{t+1} = Ae_t l_t, \quad A > 0. \tag{1}$$

The ultimate activity of entrepreneurs is the manufacture of final output in the second period of their lives. The inputs to manufacturing are labour (hired from young households of the next generation) and capital (acquired from investment projects undertaken previously by entrepreneurs of the current generation). A mature entrepreneur employing n_{t+1} units of labour and k_{t+1} units of capital is able to produce y_{t+1} units of output according to

$$y_{t+1} = Bn_{t+1}^{\beta} k_{t+1}^{1-\beta} g_{t+1}^{\beta}, \quad B > 0,\ \beta \in (0,1), \tag{2}$$

Labour is hired at the competitively-determined wage rate w_{t+1}, while capital is rented at the competitively-determined rental rate r_{t+1}. If an entrepreneur produced x_{t+1} units of capital when young, then he is a net borrower of capital if $k_{t+1} - x_{t+1} > 0$ and a net lender of capital if $k_{t+1} - x_{t+1} < 0$. His income (or profit) from manufacturing is therefore $z_{t+1} = Bn_{t+1}^{\beta} k_{t+1}^{1-\beta} g_{t+1}^{\beta} - w_{t+1}n_{t+1} - r_{t+1}(k_{t+1} - x_{t+1})$ which is maximised by choosing n_{t+1} and k_{t+1} so as to satisfy $w_{t+1} = \beta B n_{t+1}^{\beta-1} k_{t+1}^{1-\beta} g_{t+1}^{\beta}$ and $r_{t+1} = (1-\beta) B n_{t+1}^{\beta} k_{t+1}^{-\beta} g_{t+1}^{\beta}$. Given that $g_{t+1} = \gamma y_{t+1}$, together with the fact that $n_{t+1} = \lambda$ (the fixed supply of labour) in equilibrium, we may write these conditions as

$$\lambda w_{t+1} = \beta b k_{t+1}, \tag{3}$$

$$r_{t+1} = r \equiv (1-\beta) b, \tag{4}$$

where $b = (B\gamma^{\beta}\lambda^{\beta})^{\frac{1}{1-\beta}}$. Correspondingly, $z_{t+1} = r x_{t+1} = rAe_t l_t$.

Out of his income, an entrepreneur must repay the loans that were used to finance his capital production. Let i_{t+1} denote the rate of interest on loans. Then the entrepreneur enjoys $z_{t+1} - (1 + i_{t+1}) l_t$ units of consumption during old-age. His lifetime utility is assumed to be given by $\log[z_{t+1} - (1 + i_{t+1}) l_t] - \epsilon e_t$, where the last term denotes the disutiliy of effort spent on producing capital. Evidently, the entrepreneur will ensure that he obtains the maximum income from output production, in which case his utility

is $\log[rAe_t l_t - (1 + i_{t+1})l_t] - \epsilon e_t$. Loans are acquired from households and bureaucrats who also have access to an alternative means of savings which yields a fixed rate of return of ρ.[21] The terms and conditions of borrowing and lending are stipulated in a financial contract which requires that a borrower's utility be maximised, subject to a lender's individual rationality (or participation) constraint. This constraint is simply $i_{t+1} \geq \rho$. It is straightforward to deduce that the optimal loan contract sets $i_{t+1} = \rho$ and $e_t = e$, where

$$e = \frac{rA + \epsilon(1 + \rho)}{\epsilon rA} \equiv e(\rho), \qquad (5)$$
$$e_\rho(\cdot) > 0.$$

The fact that the participation constraint binds means that the contractual interest rate is equal to the lender's reservation rate of return. The surplus from the contract accrues to the borrower whose optimal choice of effort in capital production is an increasing function of the lending rate.[22]

2.3 Households

Each young household supplies inelastically λ units of labour to old entrepreneurs in return for a wage of w_t. Each household also receives an inheritance of q_t and is liable to pay lump-sum taxes of τ_t. A household saves its entire net income, $\lambda w_t - \tau_t + q_t$, in order to finance retirement consumption and bequests to its own offspring. Given the above, it does this by lending to entrepreneurs at the rate of interest ρ.

For simplicity, we assume that the household derives linear utility from consumption and makes bequests according to the 'warm-glow' or 'joy-of-giving' motive.[23] Its lifetime utility is therefore given by $(1 + \rho)(\lambda w_t - \tau_t + q_t) - q_{t+1} + u(q_{t+1})$, where $u(\cdot)$ is a strictly concave function that satisfies the usual Inada conditions. Evidently, utility is maximised by setting $u_q(\cdot) = 1$, implying an optimal fixed size of bequest from one generation to the next: that is $q_{t+1} = q$ for all t. Changes in household incomes are therefore governed by changes in wages and changes in taxes.[24]

[21] The interpretation of this alternative savings opportunity is given later, being dependent on whether the economy is closed or open.

[22] Observe that issues of bankruptcy never arise since borrowers are always able to repay their loans (i.e., $rAe(\cdot) - (1 + \rho) = \frac{rA}{\epsilon} > 0$).

[23] We introduce bequests into the model merely as a technical device for ensuring the existence of non-degenerate steady state equilibria. For this reason, we choose the simplest bequest motive.

[24] We assume appropriate restrictions on parameter values to ensure that the after-tax income of a household is always positive.

2.4 Bureaucrats

Each young bureaucrat supplies inelastically one unit of labour to the government to earn a salary of w_t. For convenience, we assume that a bureaucrat has no other source of legal income (i.e., is non-altruistic) and is exempt from paying any taxes.[25] Like all households, all bureaucrats save their entire income at the rate of interest ρ in order to finance retirement consumption from which they derive linear utility. The precise role of a bureaucrat is to act as an agent for the government in the administration of public policy. In performing this role, a bureaucrat is charged with the responsibility for controlling public funds. It is because of this delegation of authority that corruption might arise as a bureaucrat may be tempted to appropriate some of these funds for himself. As indicated earlier, we assume that there are some public officials who are corruptible in this way, and others who are non-corruptible.

By definition, a bureaucrat who is non-corruptible always abides fully by the government's instructions for implementing public policy. The income of such a bureaucrat is simply w_t, implying a lifetime utility of $(1+\rho)w_t$. In contrast, a bureaucrat who is corruptible may or may not conform to the rules of public office. If he does, then his income is w_t, as before. If he does not, then his income is uncertain and depends on the scale of his transgression, the chances that he will be caught, and the penalties incurred if he is exposed. Let f_t denote the amount of public funds embezzled by a corrupt individual. With probability p, the individual escapes detection and manages to save the amount $w_t + f_t$. With probability $1-p$, the individual is apprehended and left with nothing. We assume that the act of being corrupt is not entirely costless, but entails some disutility for an agent. For example, a bureaucrat may need to spend effort on executing and concealing his illegal activities, and may also experience some moral shame, or social stigma, from abusing his privelaged position. It is plausible to imagine that these costs are higher the larger is the scale of the offence. We capture this conveniently in terms of a convex cost (disutility) function that is increasing in the amount of stolen funds.[26] Denoting this function by $v(f_t)$, we may then write the expected lifetime utility of a corrupt bureaucrat as $p(1+\rho)(w_t+f_t) - v(f_t)$. This is maximised by setting $v_f(\cdot) = p(1+\rho)$, implying $f_t = f$, where

[25] Both assumptions are inconsequential for our analysis. The latter of them may be justified on the basis that bureaucrats have a lower labour endowment than households.

[26] Following footnote 20, one may think of non-corruptible bureaucrats as incurring prohibitively high levels of disutility from corruption.

$$f = f(\rho, p), \tag{6}$$
$$f_\rho(\cdot) > 0,\ f_p(\cdot) > 0.$$

In words, the bureaucrat embezzles an optimal fixed amount of public funds, and does so on a larger scale the higher is the return on his total savings and the higher is the probability that he will not be caught.

2.5 The Incentive to be Corrupt

A bureaucrat will engage in corruption if his expected utility from doing so is no less than his utility from not doing so. From the preceding analysis, we may state this condition as $p(1+\rho)[w_t + f(\cdot)] - v[f(\cdot)] \geq (1+\rho)w_t$, or $p(1+\rho)f(\cdot) - v[f(\cdot)] \geq (1-p)(1+\rho)w_t$. Intutively, a bureaucrat is more likely to be corrupt the more he stands to gain in illegal income if he is not caught, the less he expects to lose in legal income if he is caught and the less is his disutility whichever event transpires. By virtue of (3), the condition may be re-written as $k_t \leq \kappa$, where

$$\kappa = \frac{\lambda\left\{p(1+\rho)f(\rho,p) - v[f(\rho,p)]\right\}}{(1-p)(1+\rho)\beta b} \equiv \kappa(\rho, p), \tag{7}$$
$$\kappa_\rho(\cdot) > 0,\ \kappa_p(\cdot) > 0.$$

This expression defines a critical (threshold) level of capital, below which corruption occurs and above which corruption does not occur. The reason for this is that higher levels of capital, associated with higher wages of all agents, imply higher costs to bureaucrats if they are caught transgressing. At sufficently large values of k_t, these costs are prohibitive and the incentive to transgress disappears. Accordingly, the model predicts that the incidence of corruption depends negatively on the level of development. We also note that the critical level of capital is an increasing function of the interest rate on loans and the probability that corruption is not detected, both of which strengthen the incentives to engage in corrupt practices.

2.6 Aggregate Outcomes

The final component in our description of the economy is the process by which development takes place. This process is summarised by the dynamic path of capital accumulation, obtained from (1) and (5), together with the equilibrium conditions that the total demand for capital, k_{t+1}, is equal to the total supply of capital, x_{t+1}, and that the total demand for loans, l_t, is equal to the total supply of loans, s_t. That is,

$$k_{t+1} = Ae(\rho)s_t \tag{8}$$

A precise expression for the supply of loanable funds is derived in our subsequent analysis. For now, we note that, to the extent that these funds include the savings of households, it is necessary to consider how corruption affects public finances since the state of the government's balance sheet dictates the level of household taxation required to maintain budget balance. To begin with, recall that μ $(1-\mu)$ is the fraction of bureaucrats who are corruptible (non-corruptible) and that p $(1-p)$ is the fraction of corrupt bureaucrats who succeed (fail) in evading detection. In a non-corrupt environment the government needs to cover its expenditures on bureaucrats' salaries, w_t, and public goods, g_t. The level of taxes in this case is therefore

$$\widehat{\tau}_t = w_t + g_t. \tag{9}$$

In a corrupt environment the government incurs the same expenditures as above, but recoups $(1-p)\mu w_t$ in the salaries of corrupt bureaucrats who are caught, whilst losing $p\mu f(\cdot)$ in public funds to corrupt bureaucrat who are not caught and whilst also making an additional d units of outlay on monitoring.[27] The level of taxes in this case is therefore

$$\widetilde{\tau}_t = [1-(1-p)\mu]w_t + g_t + p\mu f(\rho, p) + d. \tag{10}$$

A comparison of (9) and (10) reveals that, for any given w_t and g_t, $\widetilde{\tau}_t > \widehat{\tau}_t$: taxes are higher in a corrupt environment than in a non-corrupt environment.[28] This follows from the fact that corruption entails both a loss of public funds and an increase in expenditures for the government. In spite of the extra revenue from fines, taxes must be raised in order for the government to balance its budget.

When embezzlement takes place, the total amount of stolen public funds, $p\mu f(\cdot)$, provides a natural measure of the aggregate incidence of corruption. This measure comprises the proportion of bureaucrats who are corrupt, μ, the fraction of these bureaucrats who evade detection, p, and the amount of funds that each bureaucrat steals, f. *Ceteris paribus*, an increase in the value of any of these components puts the economy on a higher corruption rating.[29]

[27] The loss in public funds, $p\mu f(\cdot)$, comprises the total amount of embezzled resources, $\mu f(\cdot)$, less the amount that is seized back from those culprits who are caught, $(1-p)\mu f(\cdot)$.

[28] This result is established by noting that $\widetilde{\tau}_t = \widehat{\tau}_t + \mu[pf(\cdot) - (1-p)w_t] + d$ and observing that $[pf(\cdot) - (1-p)w_t] > 0$ as an implication of the condition for corruption to occur.

[29] More generally, the incidence of corruption can be thought of as $p\phi\mu f$, where ϕ is the number of corrupt corruptible bureaucrats. Our analysis implies that either $\phi = 0$ or $\phi = 1$, with f being fixed and the same for all bureaucrats. These features are instilled into the model for convenience and are inconsequential for our main results. Smoother,

3 A Closed Economy

In the analysis that follows we consider our model economy as being isolated from international financial markets, access to which by agents is completely closed. Under such circumstances, lenders have a reservation rate of return on savings equal to ρ^c, while bureaucrats face a probability of succeeding in corruption equal to p^c. Correspondingly, $e^c = e(\rho^c)$ from (5), $f^c = f(\rho^c, p^c)$ from (6) and $\kappa^c = \kappa(\rho^c, p^c)$ from (7). The interpretation of ρ^c is that it represents the rate of return which households and bureaucrats are able to earn by accessing a storage technology as an alternative to making loans to entrepreneurs.

The supply of loanable funds, s_t^c, is equal to the total savings of households plus the total savings of bureaucrats, both of which depend on whether or not corruption exists.[30] In the absence of corruption, each household saves $\lambda w_t - \widehat{\tau}_t + q$ and each bureaucrat saves w_t, implying a total loan supply of $\widehat{s}_t^c = (1+\lambda)w_t - \widehat{\tau}_t + q$. In the presence of corruption, each household saves $\lambda w_t - \widetilde{\tau}_t + q$, each non-corruptible bureaucrat saves w_t and each corruptible bureaucrat saves either $w_t + f^c$ with probability p^c or nothing with probability $1-p^c$, implying a total loan supply of $\widetilde{s}_t^c = [1+\lambda-(1-p^c)\mu]w_t - \widetilde{\tau}_t + q + p^c\mu f^c$. These results, in conjunction with others, may now be used to derive two alternative paths of capital accumulation. Thus, we recall the expressions for w_t, $\widehat{\tau}_t$ and $\widetilde{\tau}_t$ in (3), (9) and (10), and note that $g_t = \gamma b k_t$. It then follows from (8) that capital accumulation in the absence of corruption is described by

$$\widehat{k}_{t+1}^c = Ae^c[(\beta-\gamma)bk_t + q] \equiv \widehat{T}^c(k_t), \tag{11}$$

while capital accumulation in the presence of corruption is described by

$$\widetilde{k}_{t+1}^c = Ae^c[(\beta-\gamma)bk_t - d + q] \equiv \widetilde{T}^c(k_t). \tag{12}$$

Assuming that $Ae^c(\beta-\gamma)b \in (0,1)$ and $q > d$, both of the transition paths in (11) and (12) exhibit stationary points associated with the steady state levels of capital $\widehat{k}^{c*} = \frac{Ae^c q}{1-Ae^c(\beta-\gamma)b}$ and $\widetilde{k}^{c*} = \frac{Ae^c(q-d)}{1-Ae^c(\beta-\gamma)b}$, respectively.[31] Evidently, $\widetilde{k}^{c*} < \widehat{k}^{c*}$ which follows from the fact that, for any given k_t,

more gradual variations in the level of corruption can be incorporated by allowing for such variations in ϕ and/or f (e.g., through some form of heterogeneity among bureaucrats, or through the mechanism modelled in Blackburn *et al.* (2006)).

[30] Since the rate of interest on loans is equal to the rate of return on storage, households and bureaucrats are indifferent between lending and not lending to entrepreneurs. We assume the usual tie-breaking convention that they opt for the former.

[31] A necessary condition for the first parameter restriction is that $\beta > \gamma$. Since β (γ) is the share of labour (government expenditure) in national income, this condition is satisfied empirically.

$\widetilde{T}^c(\cdot) < \widehat{T}^c(\cdot)$. Accordingly, capital accumulation is lower under corruption than under non-corruption, which is to say that corruption has an adverse effect on economic development. This is due to the costly monitoring of bureaucratic behaviour (the term d in (12)) which leads to a loss of resources available for productive investments.[32]

Combining the above results with those obtained earlier, we arrive at the conclusion that corruption and development are linked in a relationship that is both negative and two-way causal: just as bad quality governance fosters a lack of prosperity, so a lack of prosperity fosters bad quality governance. This implies the existence of multiple development regimes and the possibility of multiple, history-dependent long-run equilibria. Recall that corruption occurs (does not occur) for any level of capital, k_t, below (above) the critical level, κ^c. Under such circumstances, the economy is in a low (high) development regime, evolving along the low (high) transition path $\widetilde{T}^c(\cdot)$ ($\widehat{T}^c(\cdot)$). For a given initial capital stock of $k_0 < \kappa^c$, the final outcome of the economy depends crucially on whether $\kappa^c < \widetilde{k}^{c*}$ or $\kappa^c > \widetilde{k}^{c*}$. We illustrate this in Figure 1. Suppose that $\kappa^c < \widetilde{k}^{c*}$. Then the economy evolves along $\widetilde{T}^c(\cdot)$ until it reaches κ^c, at which point it jumps to $\widehat{T}^c(\cdot)$ and subsequently converges to $\widehat{k}^{c*}$. This chain of events describes a process of transition from the low development regime with high corruption to the high development with low corruption. Now suppose that $\kappa^c > \widetilde{k}^{c*}$. Then the economy is locked forever on $\widetilde{T}^c(\cdot)$, converging irrevocably to $\widetilde{k}^{c*}$. In this case there is no transition and the economy remains permanently poor and corrupt. To the extent that $\widehat{k}^{c*}$ could be achieved if $k_0 > \kappa^c$, the model now presents a situation in which limiting outcomes depend fundamentally on initial conditions, with one such outcome being a poverty trap equilibrium.

4 An Open Economy

We now consider the scenario in which our model economy is integrated into world financial markets, having opened its borders to international borrowing

[32] Of course, monitoring is essential if the government is to stand any chance of recouping stolen funds (which would serve to reduce the tax burden on households). Note that, as matters stand at present, d is the only cost to growth associated with corruption. It is easy to imagine how a similar cost might arise from the subterfuge of bureaucrats as resources are diverted away from savings towards the concealment of corrupt behaviour (e.g., Blackburn *et al.* 2006). A key aspect of our analysis is to show why this type of deadweight loss is likely to be greater in an open economy than in a closed economy. The most direct way of doing this is to simply assume, as we do, that there is no such loss in the case of the latter as all income (both legal and illegal) is invested in domestic capital production.

and lending. In this case the minimum rate of interest on loans acceptable to lenders is given by ρ^o and the probability that a corrupt bureaucrat will evade detection is given by p^o. Correspondingly, $e^o = e(\rho^o)$ from (5), $f^o = f(\rho^o, p^o)$ from (6) and $\kappa^o = \kappa(\rho^o, p^o)$ from (7). Treating the economy as small, ρ^o is understood to be the exogenously-given world rate of interest which we assume to be greater than the domestic rate of return on storage, ρ^c, implying that storage is redundant. This assumption is made because, *ceteris paribus*, the converse situation would put the economy in a position of attracting all of the worlds' capital, which would not only contradict the economy's small country status, but which would also be at odds with much of the empirical evidence on the effects of financial liberalisation.[33] As regards p^o, we also assume that this is greater than p^c, implying that corrupt public officials stand a better chance of evading detection when the economy is open than when it is closed. This assumption is meant to capture the idea that illegally-obtained income is less likely to be discovered and reclaimed by the authorities if it can be laundered abroad than if it is confined at home.

Given the above, we may identify four immediate effects of financial liberalisation. The first is that capital production is undertaken more efficiently ($e^o > e^c$) as entrepreneurs respond to the higher world interest rate on loans by raising their input of effort. The second is that a bureaucrat who is corrupt embezzles more in public funds ($f^o > f^c$) as both legal and illegal savings earn a higher rate of return, and as the latter is less likely to be detected. The third is that, under such circumstances, the aggregate incidence of corruption increases ($p^o \mu f^o > p^c \mu f^c$) not only because each corrupt bureaucrat steals more, but also because more of them avoid being caught. And the fourth is that the critical level of capital increases ($\kappa^o > \kappa^c$) as the incentive for bureaucrats to engage in corrupt practices is strengthened for reasons already given. These effects have a number of important implications, one of which is the following. For any given level of capital, three possible scenarios exist - namely, $k_t > \kappa^o > \kappa^c$, $k_t < \kappa^c < \kappa^o$ and $\kappa^c < k_t < \kappa^o$. Under none of these circumstances is the level of corruption lower in an open economy than in a closed economy: in the first instance corruption is absent in both types of economy; in the second instance corruption is present in both types of economy, but is higher in the former since $p^o \mu f^o > p^c \mu f^c$; and in the third instance corruption is present only in the former. These results accord with the recent empirical evidence of a positive correlation between the incidence of corruption and the degree of financial openness.

[33] In addition, it has been argued that interest rates in developing countries are inflated because of risk factors, and are often lower than world interest rates when these factors are removed (e.g., Lucas 1990). Our assumption is consistent with this, given that there is no risk in our model.

Like before, the supply of loanable funds to entrepreneurs, s_t^o, is determined from the savings of households and bureaucrats.[34] Unlike before, the amount of loans is not always equal to the amount of savings. Equality continues to hold in the absence of corruption, where each household saves $\lambda w_t - \widehat{\tau}_t + q$, each bureaucrat saves w_t and total loan supply is $\widehat{s}_t^o = (1+\lambda)w_t - \widehat{\tau}_t + q$. Equality does not hold in the presence of corruption: whilst each household saves and lends $\lambda w_t - \widetilde{\tau}_t + q$, and whilst each non-corrupt bureaucrat does the same with w_t, each corrupt bureaucrat saves and lends different amounts. This is because of the opportunity to invest abroad, an opportunity that a corrupt agent exploits in order to reduce his chances of being caught. To fix ideas, we assume that legal income is still lent in the usual way to entrepreneurs, but that illegal income is transferred out of the economy to be laundered overseas. Under such circumstances, each corrupt bureaucrat lends either w_t with probability p^o or nothing with probability $1 - p^o$. It follows that the total supply of loans in the case of corruption is $\widetilde{s}_t^o = [1 + \lambda - (1 - p^c)\mu]w_t - \widetilde{\tau}_t + q$. As in our previous analysis, we may now derive two capital accumulation paths using the expressions for w_t, $\widehat{\tau}_t$ and $\widetilde{\tau}_t$ in (3), (9) and (10), together with $g_t = \gamma b k_t$. Doing this gives capital accumulation in the absence of corruption as

$$\widehat{k}_{t+1}^o = Ae^o[(\beta - \gamma)bk_t + q] \equiv \widehat{T}^o(k_t), \tag{13}$$

and capital accumulation in the presence of corruption as

$$\widetilde{k}_{t+1}^o = Ae^o[(\beta - \gamma)bk_t - d - p^o\mu f^o + q] \equiv \widetilde{T}^o(k_t). \tag{14}$$

Under the parameter restrictions $Ae^o(\beta - \gamma)b \in (0, 1)$ and $q > d + p^o\mu f^o$, both of the transition functions in (13) and (14) imply convergence to fixed point outcomes corresponding to the steady state levels of capital $\widehat{k}^{o*} = \frac{Ae^o q}{1 - Ae^o(\beta-\gamma)b}$ and $\widetilde{k}^{o*} = \frac{Ae^o(q-d-p^o\mu f^o)}{1-Ae^o(\beta-\gamma)b}$, respectively. Like the case in which the economy is closed, $\widetilde{k}^{o*} < \widehat{k}^{o*}$ since $\widetilde{T}^o(\cdot) < \widehat{T}^o(\cdot)$ for any given k_t. Thus

[34] As in the closed economy case, there is a single rate of interest at which households and bureaucrats can save, making them indifferent between lending and not lending to entrepreneurs. Applying the same tie-breaking convention as before, we assume that they choose the former, unless other considerations dictate differently. This assumption is also consistent with the well-known home bias phenemonon, meaning the tendency of individuals to invest domestically even when they could benefit by diversifying abroad (e.g., French and Poterba 1991). Since there is also no reason in our model why savings should be attracted from overseas, we may proceed on the basis that, *ceteris paribus*, financial liberalisation is neutral with respect to influencing net (official) capital flows. This serves as a useful benchmark, especially given the conflicting empirical evidence on the issue, some of the most recent of which suggests that neutrality is, indeed, a good description of events (e.g., Aizenman *et al.* 2005).

corruption continues to depress capital accumulation and growth. Observe, however, that the effect of corruption is greater under present circumstances when the economy is open. In addition to the costs of monitoring (the term d in (14)), there is a further loss of resources due to the leakage of illegal income abroad (the term $p^o \mu f^o$ in (14)) as a consequence of the subterfuge of corrupt public officials. This leakage does not occur in a closed economy, where all savings (whether legal or illegal) find their way into the financing of domestic capital production. Our result is consistent with the recent empirical finding that the adverse effect of corruption on development is much stronger in financially-open economies than financially-closed economies.[35]

Evidently, the relationship between corruption and development remains negative and two-way causal when the economy is open. As such, the evolution of the economy and its final destination depend on the same considerations as applied when financial markets were closed. In particular, there are multiple development regimes with the possibility of multiple, long-run equilibria. For any capital stock, k_t, below (above) the critical level, κ^o, the economy is in a low (high) development regime, being located on the low (high) transition path $\widetilde{T}^o(\cdot)$ ($\widehat{T}^o(\cdot)$) and displaying a high (low) incidence of corruption. Transition between regimes may or may not be feasible depending on whether $\kappa^o < \widetilde{k}^{o*}$ or $\kappa^o > \widetilde{k}^{o*}$. In the event of the latter, initial conditions determine limiting outcomes, one of which is a poverty trap equilibrium. These implications can be illustrated diagrammatically by a simple re-labelling of Figure 1.

5 Governance, Globalisation and Growth: An Evaluation

The results obtained so far indicate how the corruptness and openness of an economy might be important factors in determining various outcomes. The results also suggest that these factors may interact with each other such that the effects of corruption depend on whether or not the economy is open, while the effects of openness depend on whether or not the economy is corrupt. In addition, we have seen how corruption and development may display a similar mutual dependence, each one both influencing and being influenced by the other. These features imply that an analysis of the consquences of financial liberalisation can be quite complicated. In what follows we seek to identify these consequences, establishing conditions under which liberalisation is most

[35] Indeed, absent monitoring costs and there would be no effect of corruption in our closed economy, which is what the evidence more-or-less suggests.

likely to either foster or impede economic performance.

Financial integration has a number of implications for how the economy might develop. First, by raising the efficiency of capital production ($e^o > e^c$), it causes the transition function to become steeper, irrespective of whether or not corruption exists (i.e., $\widehat{T}_k^o(\cdot) > \widehat{T}_k^c(\cdot)$ and $\widetilde{T}_k^o(\cdot) > \widetilde{T}_k^c(\cdot)$). This is conducive to development. Second, by inducing an outflow of illegal income ($p^o \mu f^o$), it exacerbates the effect of corruption in shifting the transition function downwards (i.e., $\widetilde{T}^o(0) < \widetilde{T}^c(0)$). This is not conducive to development. And third, by strengthening the incentives of individuals to engage in corrupt practices, it causes the critical level of capital to increase (i.e., $\kappa^o > \kappa^c$). This is also not conducive to development. These competing influences give rise to a number of possible outcomes that may be visualised using Figure 2. For illustrative purposes, we suppose that $\kappa^c < \widetilde{k}^{c*}$ (implying that transition between development regimes is feasible when the economy is initially closed) and that $\widetilde{k}^{o*} < \widetilde{k}^{c*}$ (meaning that the long-run equilibrium of a corrupt open economy is worse than the long-run equilibrium of a corrupt closed economy). Assuming otherwise may produce one or two other possible outcomes to which we refer later. We denote by k^L the level of capital, or stage of development, at which liberalisation takes place. From our earlier observations, there are three possible scenarios - $\kappa^c < \kappa^o < k^L$, $\kappa^c < k^L < \kappa^o$ and $k^L < \kappa^c < \kappa^o$. We consider each in turn.

For the case in which $\kappa^c < \kappa^o < k^L$, corruption is not really an issue since the incentive for bureaucrats to engage in corrupt behaviour vanishes before liberalisation takes place and remains that way afterwards. Under such circumstances, the sole effect of liberalisation is to improve the efficiency of capital production. Evolving initially along the transition path $\widetilde{T}^c(\cdot)$, the economy jumps to the higher path $\widehat{T}^c(\cdot)$ at κ^c and then makes a final jump to $\widehat{T}^o(\cdot)$ on opening its borders. Thereafter, it converges to the steady state equilibrium at $\widehat{k}^{o*}$. This result shows that financial liberalisation in the absence of corruption is unambiguously good for economic development.

For the case in which $\kappa^c < k^L < \kappa^o$, corruption is not an issue before liberalisation but becomes an issue after liberalisation as the incentives of bureaucrats change. This has effects which conflict with those arising from greater efficiency in capital production. As above, the economy is initially located on $\widetilde{T}^c(\cdot)$ before jumping to $\widehat{T}^c(\cdot)$ at κ^c, the point at which corruption disappears. But this is short-lived as the opening of financial markets lures bureaucrats back into corrupt behaviour, causing the economy to descend onto $\widetilde{T}^o(\cdot)$. The final destination depends on whether $\kappa^o < \widetilde{k}^{o*}$ or $\kappa^o > \widetilde{k}^{o*}$: if the former, then there is a further stage of transition which sees the incentives of bureaucrats change again such that the economy jumps back up to $\widehat{T}^o(\cdot)$

at κ^o, returning to a state of non-corruption and converging to $\widehat{k}^{o*}$; if the latter, then the economy remains on $\widetilde{T}^o(\cdot)$ and becomes saddled forever with a corrupt bureaucracy in the poverty trap equilibrium at $\widetilde{k}^{o*}$. These results demonstrate that financial liberalisation in the presence of corruption can be costly, perhaps very costly, for development. At best, any gains that accrue are realised only in the long-run after losses have been incurred. At worst, there are only losses since a poverty trap would not occur if the economy remained closed.

Finally, for the case in which $k^L < \kappa^c < \kappa^o$, corruption is an issue both before and after liberalisation as the incentive condition determining corrupt behaviour is satisfied at both times. The difference, of course, is that liberalisation allows illegal income to be taken abroad. As above, the effect of this competes with the effect of efficiency gains in capital production. Starting on $\widetilde{T}^c(\cdot)$ again, the economy jumps down to $\widetilde{T}^o(\cdot)$ at the point that liberalisation occurs, with subsequent events being dependent on whether $\kappa^o < \widetilde{k}^{o*}$or $\kappa^o > \widetilde{k}^{o*}$ in the manner described above: if the former, then there is a reversal of fortunes at κ^o as corruption dissappears and capital accumulation proceeds along $\widehat{T}^o(\cdot)$ towards $\widehat{k}^{o*}$; if the latter, then the economy remains on $\widetilde{T}^o(\cdot)$ and converges towards $\widetilde{k}^{o*}$, being mired permanently with corruption and poverty. These results, like those previously, show that financial liberalisation in the presence of corruption can be detrimental to development, with the worst outcome being the emergence of a poverty trap that would not otherwise exist.

For the sake of completeness, we comment briefly on other scenarios not captured in Figure 2. Suppose that $\widetilde{k}^{o*} > \widetilde{k}^{c*}$ (so that the poverty trap equilibrium with liberalisation lies above the poverty trap equilibrium without liberalisation). Then, *ceteris paribus*, the above results are unchanged: the final outcome for the economy is either $\widehat{k}^{o*}$ or $\widetilde{k}^{o*}$ depending on the circumstances described. Suppose, next, that $\kappa^c > \widetilde{k}^{c*}$ (so that transition between development regimes is never possible when the economy is closed). If $\kappa^o > \widetilde{k}^{o*}$ as well, then transition is also not possible when the economy is open and the limiting outcome is the poverty trap equilibrium at $\widetilde{k}^{o*}$. But if $\kappa^o < \widetilde{k}^{o*}$, then liberalisation makes transition feasible and the final destination is $\widehat{k}^{o*}$. This is really the only instance in which liberalisation produces such a radical turn of events that the quality of governance and development of the economy are so dramatically improved.

The foregoing analysis leads us to conclude that governance and corruption can be vital factors in determining the merits of international financial integration. Good quality governance provides assurance that the potential of integration to improve economic performance is fully realised. Bad quality

governance implies that this potential may be seriously compromised, if not completely undermined. Since the quality of governance is, itself, related to economic performance, then we can also understand how the effect of integration is liable to depend on the stage of development at which it takes place: richer, more developed economies are more likely to benefit from financial openness than poorer, less developed economies. Finally, the prediction that corruption may rise (at least initially) with financial liberalisation would find sympathy among many development experts: for example, it is frequently alleged that this has often been a feature of transition economies.

6 Final Remarks

Advocates of international financial integration would claim that dismantling barriers to cross-country capital flows can only be good for economic development: with fewer constraints on transactions and greater competition amongst agents, there are sure to be efficiency gains conducive to higher growth. Those of a more sceptical disposition would argue quite differently: in a second-best world of assorted imperfections, the removal of distortions from financial markets alone may actually do more harm than good. Similar caution may be expressed about the view that any increase in the degree of economic (and political) freedom is certain to improve the quality of governance by reducing the extent of corruption. A more refined argument would contend that this need not be the case as greater freedom brings with it new incentives and new opportunities for individuals to engage in corrupt practices.

The above considerations have provided the motivation for this paper. Our objective has been to analyse precisely how the liberalisation of financial markets might affect the long-run development of an economy in which the level of corruption may, itself, change endogenously with changes in the circumstances of individuals. Our principal findings may be summarised as follows: first, corruption is always detrimental to economic development, but its effect is worse when financial markets are liberalised than when they are not; second, the extent of corruption is more likely to be higher in financially-open economies than financially-closed economies, and in poor countries than rich countries; third, financial liberalisation is good for development if governance is good, but may be bad (perhaps very bad) for development if governance is bad; and fourth, corruption and poverty may co-exist as persistent features of an economy unless fundamental reforms take place. These results accord well with empirical observations and indicate the importance of taking into account the political economy aspects of financial liberalisation

when evaluating the consequences that liberalisation might have.

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