

Corruption and industrial dualism in less developed countries

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Abstract

This paper provides an explanation for the observation that developing countries tend to have a higher degree of dualism in the size distribution of firms and a relatively smaller proportion of large firms than do developed countries. This paper builds a model where large ‘formal’ firms attract rent seeking activities from the government while small firms do not. In the model, there exists a ‘competitive fringe’ of small firms and a formal market consisting of Cournot competitors. The number of formal firms is made endogenous and is a function of the degree to which the government can extract rents. This ability to extract rents is itself posited as a function of the degree of corruption in a country’s government. Thus, it is the high degree of corruption in developing country governments that contributes to the dual nature of their industrial structure. The model predicts that the higher the degree of corruption, the fewer (and larger) are the formal firms, the lower is social welfare and the greater is dead-weight loss, and the higher are government rents. An examination of the size distribution of 16 countries and their degree of corruption shows that the degree of corruption is a good predictor of the percentage of large firms in an economy.

Keywords

Corruption, rent seeking, firm size, developing countries, Cournot.

1. INTRODUCTION

There is a large and growing amount of evidence to suggest that industrial structure in less developed countries (LDCs) is characterized by dualism between formal, large-scale industries and informal, small-enterprises.¹ Tybout (2000, p. 15), states:

... [there are] several distinctive features of LDC manufacturing sectors. Perhaps the most striking of these is their dualism. In many industries, large numbers of microenterprises and a handful of modern, large-scale factories produce similar products side by side.

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This presents economists with a bit of a puzzle: why do we see widespread dualism in the industrial structure of LDCs and very little in more developed economies, such as the United States? Others have suggested that the answer lies in capital constraints or in the regulatory structure of the LDC. This paper suggests that the answer lies in the amount of rent-seeking in LDC governments as compared with more developed country governments. This rent-seeking is related to the degree of corruption as, the more corruption there is, the easier these rents are to extract and the more easily they are directed into individual pockets rather than state coffers. The idea that LDC governments play a larger role in the industrial sector than do developed country governments is not a new one, Basu (1995, p. 62) states, '... in many developing countries a firm's interaction with the government is the central feature of industrial organization'. What I argue in this paper is that this government interaction in LDCs is usually costly and directed principally at the large-scale firms in the country. Tybout (2000, p. 16) states, '... small producers frequently operate outside the realm of government regulation ...' and, '... regulations and taxes ... are enforced only among the large, formal sector firms'. In India, for example, the Industrial Disputes Act of 1947 contains special rules for firms that employ over 50 workers and for firms that use power in their production processes.² This paper expands on this observation to build a model where this type of selective government intervention promotes the dualism evident in LDCs. This paper shows that interaction with more corrupt or rent-seeking governments can lead to a domestic industrial structure that is dual in nature.

That levels of governmental corruption are higher in LDCs is well documented. For example, in the 1999 Transparency International *Corruption Perceptions Index*, of over 99 countries ranked by level of corruption (where ten is least corruption), countries such as Ecuador, Indonesia, Nigeria, Pakistan, Tanzania and Uganda fall in the bottom 20 while Great Britain, Singapore, the USA and all of Scandinavia are in the top 20 (see the Appendix for the entire list). This paper uses a simple Cournot-style analysis where the number of competing firms in the formal sector is made endogenous by the presence of governmental corruption that makes it costly to enter the formal industry (where the alternative is to remain small and exist in the perfectly competitive informal sector). It is found that this structure can lead to exactly the type of dualism common to LDC economies and that the continuation of this dualism is in the interest of both the corrupt government and the formal industrialists.

The paper continues as follows: the next section provides a background on both the dual industrial structure and corruption and cronyism common to LDCs. Section 3 presents a Cournot-type model that incorporates both elements and demonstrates how corruption can lead to dualism in the industrial structure of LDC economies. Section 4 presents some evidence of

the link between corruption and industrial structure. Section 5 concludes by discussing the impacts and implications of the results.

2. BACKGROUND AND DISCUSSION

The image of the dictatorial ruler of a developing country who directs the economy in order to direct resources and rents for his or her personal gain to the detriment of the country is not a new one. Economists have, in recent years, begun to address the impacts of such behaviour on economies.³ In general, the view of such rent-seeking activities has been thought to be akin to taxation and the inefficiencies that result. However, as Shleifer and Vishny (1993) show, the inefficiencies from activities that stem from corruption can be worse than those from straight taxation. Others, for example Anant *et al.* (1995) and Basu *et al.* (1997), have pointed out the impacts of government intervention in the industrial sector of economies. Olson (1993) has discussed the incentive for autocrats to both extract rents while, at the same time, maintaining a source of those rents (e.g. a formal industrial sector). Bardhan (1997), in a survey paper, presents an excellent discussion of the relationship between development and corruption. There is, however, still much to be learned about the implications of rent seeking and other corrupt activities on particular aspects of corrupt country economies. As corruption is rampant in the developing world, and often cited as a prime cause of the inability of many countries to sustain healthy growth, it is imperative that more be learned about these impacts.

Rent seeking leads to inefficiencies. This is well known and a paper that once again showed this to be true would be of no real value. However, the impact of rent seeking activity on the industrial structure is not well known. Capital constraints, slow technology transfer and capital intensive modern technology, and particularly high rates of taxation and regulation, have all been blamed for the lack of modern industrial sectors in many developing countries. These, however, do not do a particularly good job of explaining why we tend to see a very dual structure in LDC industrial sectors. Capital constraints explain this somewhat, but if there is capital that allows a few formal large-scale concerns, why does it stop there, why do we not see a continual growth in large-scale firms, and why are there not medium-scale firms springing up? The same critiques can be made of the technology explanation. Taxation and regulation should not necessarily have a differential effect based on the size of firms unless the degree of regulation depends on firm size. But then, there is no reason, *prima facie*, for governments to want a dual structure and one would therefore ask what a country gains that would cause them to design a regulatory structure that created one.

In the next section, I present a model where government corruption, as seen by rent-seeking activities, creates this dual structure in the industrial

sector. It is in the government's best interest to create this structure and, not surprisingly, social welfare is hurt by this activity.

3. THE MODEL

Consider a country in which industrialists must pay graft, endure costly regulation or face some kind of rent-seeking behaviour if they wish to develop a large-scale enterprise and compete in a 'formal' market. If they do not, their only option is to remain a small-scale industry and compete in a competitive 'informal' market (a 'competitive fringe' à la Basu, 1997; Murphy *et al.*, 1989). In other words, the government demands rents from industrial concerns that are of a certain size and above. The government does not pay attention to firms that are small as these are too difficult to monitor and thus force payments of some kind (this can be because the regulatory infrastructure is not sophisticated enough).

If large-sized firms must pay a fee for entry then there must be a benefit from doing so. The benefit here is that this barrier to entry creates a formal market that is not perfectly competitive and, therefore, positive economic profits are realized. The formal market is modelled as a Cournot-type market but, because of the existence of the informal competitive market, or competitive fringe, and the necessity of paying graft to enter, the number of firms in the formal market will be endogenous to the model. This endogeneity of the number of Cournot competitors will be a function of the level of graft that must be paid to enter and is the main insight of this model.

The informal market is assumed to consist of m identical, price-taking, small-scale firms. In equilibrium, free-entry and exit in the informal sector will ensure that these informal firms make no economic profits, or

$$\Pi^I = 0 \quad (1)$$

These informal firms face no government intervention in the form of taxation or rent seeking behaviour as long as they remain small. Each small firm has a supply curve that is determined by its marginal cost curve, which is assumed to be upward sloping. The aggregate supply curve for the competitive fringe is defined as $S = S(p)$, where $S'(p) > 0$.⁴ Therefore, each informal firm's individual supply curve is $S(P)/m$.

The total market demand is defined as $D = D(p)$, where $D'(p) < 0$. Therefore, firms that wish to enter the formal market face the residual demand curve that is given by $D(p) - S(p) \equiv Q(p)$. This residual demand curve is given by

$$Q = \frac{a - p}{b} \quad (2)$$

where a and b are positive constants. Inverting this yields the inverse demand function faced by formal firms:

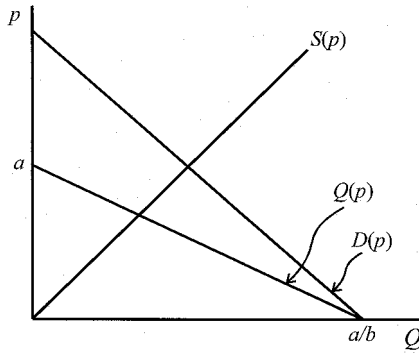


Figure 1 Supply, demand and the residual demand curve

$$p = a - bQ \quad (3)$$

The two demand curves and the competitive fringe supply curve can be illustrated by a simple diagram, as shown in Figure 1.⁵

Q is equal to the total output of all firms in the formal industry and so

$$Q = \sum_{i=1}^n q_i \quad (4)$$

where n is the number of Cournot competitors in the market and q_i is firm i 's output. Each firm confronts this demand function and has a per-period cost function

$$Z = cq_i, \quad c > 0 \quad (5)$$

In addition, in each period the government extracts a rent K , which is a function of the degree of corruption or government influence in the industrial sector, k . Thus, the firms face another cost

$$K(k), \quad \text{where } K'(k) > 0 \text{ and } K(0) = 0 \quad (6)$$

which is the entry cost or per period rent that the firm must pay to the government. It is important to note that K itself is not a choice variable for governments. In general, neither is the degree of corruption, k , for in most cases there are some limits to the amount of corruption that can occur. Exceptional states do exist, however, for example the Mobutu reign in Zaïre and the Kabila reign that has followed. The case of these types of predatory states will be addressed below.

Formal firm per-period profits are a function of their output decisions, q_i , and those of their competitors, and the degree of government corruption or involvement in the industrial sector, k . Combining equations (3)–(6) yields,

$$\Pi_i^F(q_i, k) = (a - bQ - c)q_i - K(k) \quad (7)$$

and the resulting optimal amount of output per period for each firm is

$$q^C = \frac{a - c}{(n + 1)b} \quad (8)$$

which is the standard Cournot solution. The degree of corruption, k , does not affect each firm's optimal output decision because it is a fixed payment each period and firms will try and operate as profitably as possible.

Equilibrium in this model is a price at which the n formal firms' output and the competitive fringe output, given by $S(p)$, equal total demand, $D(p)$. It is easy to see that the equilibrium price is exactly the Cournot equilibrium price from the formal sector:

$$p^C = \frac{a + nc}{1 + n} \quad (9)$$

Note that the aggregate supply for the competitive fringe is a function of p^C , given by $S(p^C)$, and since $S'(p) > 0$, it can be seen immediately that as the price rises, so does competitive fringe productive activity. Note also that, as long as $a - c > 0$ (which it must be for the existence of an industry), $\partial p^C / \partial n < 0$. Thus as K increases, the number of formal firms (n) falls, the price (p^C) rises and, as a result, the competitive fringe becomes larger (as measured by output).⁶

In addition to this equilibrium price, it is necessary to find the equilibrium number of firms in the formal sector. This can be determined by the fact that there exists a type of incentive compatibility constraint for each individual firm: firm i will only compete in the formal market if doing so yields at least as much profit as available to it in the informal market or, combining (1) and (7),

$$\Pi_i^F(q_i, k) = (a - bQ - c)q_i - K(k) \geq 0 = \Pi_i^I \quad (10)$$

This, of course, will bind at the solution as, in the long-run, firms will enter the formal market as long as there are economic profits being made, and there will be no entrants if not. Equation (8), along with equation (7), allows me to find $n^*(k)$, or the equilibrium number of firms in the formal market given a degree of corruption of the government:

$$n^*(k) = \frac{(a - c)}{\sqrt{bK(k)}} - 1 \quad (11)$$

Since $K'(k) > 0$, we know that $\partial n^*(k) / \partial k < 0$. This relationship can be seen most easily in a graph of formal firm profits before government intervention, or Cournot profits, as a function of n . This is done in Figure 2.

In Figure 2, what is shown in equation (11) is easily seen: that an increase in the rents and other costs associated with operating a formal firm causes the number of firms in the formal market to fall. Note also that as n falls, the per firm output, q^C rises. So not only does corruption depress the number

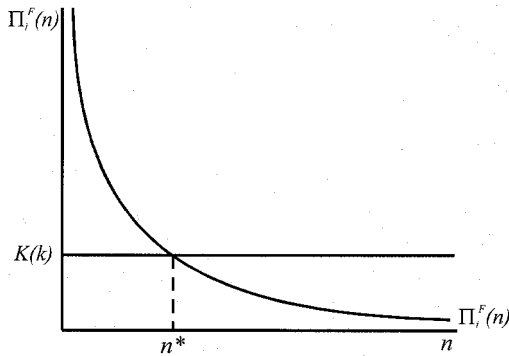


Figure 2 Cournot profits as a function of the number of firms

of formal firms, but those formal firms that remain become larger (in terms of output).

It is a well-known result of the Cournot market that total profits are maximized at the monopoly level of output. Thus, a country that can simply demand any arbitrary amount of rents, an absolute dictatorship for example (e.g. Mobutu and Kabila in Congo, *née* Zaïre), would be able to set K at will and will do so where $n^* = 1$. This ensures the government of the maximum revenue possible.

As far as social welfare is concerned, it is quite easy to see that the larger is n , the larger is the gain to society. This is because, as the formal market approaches perfect competition, the price will approach c , or the formal firm marginal cost. In Figure 3, the total output as the number of firms approaches infinity is given as Q^* , and the total output in the economy equals the total demand at c , which is G . Here, there is no dead-weight loss and consumer surplus is maximized.

With government rent seeking, the number of formal firms falls and consumer surplus falls with it. For an n^* as shown in Figure 3, the Cournot price is p^C and the total output in the formal sector is $(n^*)q^C$. At this price, the informal sector output is given by the informal firms' net supply curve, which is simply the difference between total demand and the residual demand curve faced by the formal firms. Thus, total output is F . In this case the government extracts a rent equal to the area $cfep^C$. The dead-weight loss is equal to the area efg .

Government rents are maximized when $Q = q^M$ (note that, in Figure 3, the line $a(n^*)q^C$ is a formal sector monopolist's marginal revenue curve), because the government will extract all the economic profit, and profit is maximized in Cournot markets when the number of firms equals one. If k were a choice variable (as perhaps in predatory states, as mentioned above), then the state would choose to extract as much rent as possible and would

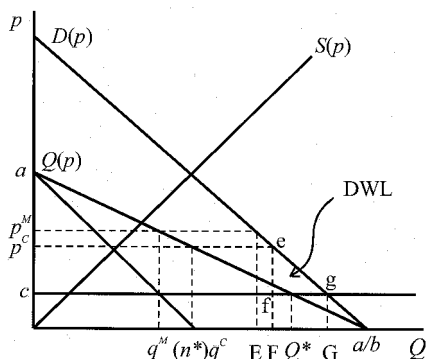


Figure 3 Social welfare in the dual industrial system

force the monopoly outcome. Even when government revenues are included in the social welfare calculations (although it is not clear they should be in the case of predatory states) total surplus is not maximized when markets are imperfectly competitive. So social welfare is maximized when $k = 0$, or when there is no corruption and thus no costly rent seeking on the part of the government.

The intuition here is that corrupt states can act to restrict the number of formal firms so that they can extract the economic profits as rents. This is done at the expense of societal welfare. This story also makes sense when one thinks of the crony capitalism that has arisen in the eastern block. In Russia, for example, many of the large state-owned enterprises were handed to cronies of the government and allowed to continue operating as monopolists, where massive profits and huge graft became a way of life.

4. THE EVIDENCE

There is, unfortunately, only a small amount of data available on the degree of dualism in LDCs, but there is enough to allow a simple analysis of the correlation between the degree of corruption of the government and both the size of the formal market (defined as firms that employ more than 50 workers) and degree of dualism in the industrial structure in each LDC. Corruption here is taken as a proxy for how much rent is extracted from formal industrial markets. The idea being that the more corrupt governments have the ability to extract more rents.

The degree of corruption data is from the 1999 Transparency International *Corruption Perceptions Index*. This is a ranking of over 99 countries based on survey data from various sources (e.g. the Economist Intelligence Unit, Gallup International, Institute for Management and Development, Lausanne, etc) about the corruption in each country's government. Each

Table 1 Distribution of employment shares across plant sizes

Country, Year	Number of Employees		
	1-9	10-49	50+
Colombia, 1973	52	13	35
Ghana, 1970	84	1	15
Honduras, 1979	68	8	24
India, 1971	42	20	38
Indonesia, 1977	77	7	16
Jamaica, 1978	35	16	49
Kenya, 1969	49	10	41
Mexico, 1993	18.3	13.6	68.1
Nigeria, 1972	59	26	15
Philippines, 1974	66	5	29
S Korea, 1973			70.1
Sierra Leone, 1974	90	5	5
Taiwan, 1986			70.8
Tanzania, 1967	56	7	37
Thailand, 1978	58	11	31
USA, 1992	3.9	15	81
Zambia, 1985	83	1	16

Note: This table is a partial reproduction of Table 1 in Tybout (2000)

country is given a score, a 'Corruption Perceptions Index' number (CPI), and these scores are included in the regressions. The data on the industrial structure of each country are from different time periods for different countries, which is problematic as the data on the degree of corruption are quite recent. These data are given in Table 1 and are from various sources and compiled by Tybout (2000). This data give the percentage of each country's industrial concerns that employ fewer than 10 workers, between 10 and 49, and 50 and above. The coincidence among the two data sets allow for only 16 observations, thus one must be cautious in making broad inferences from the results below. In addition, the GNP per capita data are taken from the World Bank's 1982 *World Development Indicators*. Again, as the industrial data are from different time periods for different countries, I chose a middling year from which to collect GNP data.

From the model, the relationship between the ability to extract rents and the number of firms in the formal market is clear: more corruption leads to fewer formal firms. I look for evidence of this relationship by testing the relationship between the degree of corruption and the percentage of firms in each country that employ at least 50 workers, using a standard linear OLS specification.

Figure 4 illustrates the relationship between the degree of corruption and the percentage of firms in each country that are large (employ 50 or more workers). To evaluate the relationship between corruption and industrial

Corruption and the Size of the Formal Market

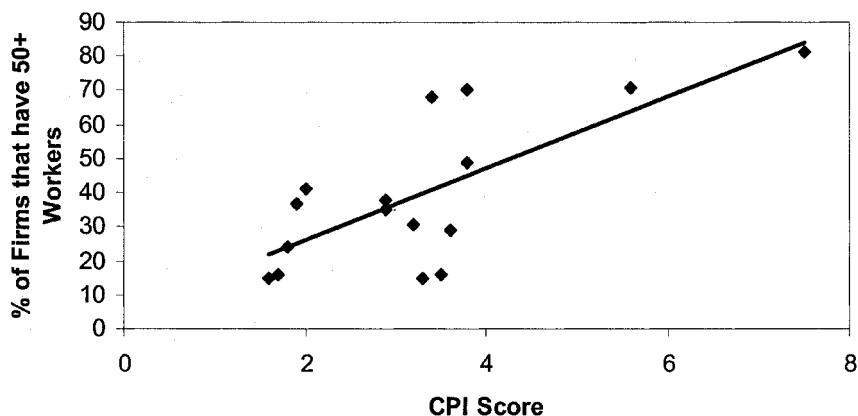


Figure 4 Corruption and the percentage of large firms in an economy

structure, three models were estimated. This first model hypothesizes that there is a linear relationship between corruption and industrial structure. The second model includes GNP per capita to capture any effect that GNP has on the proportion of large firms in the economy. As the degree of corruption and GNP per capita are likely related (the correlation coefficient is -0.6), a third model was estimated that includes an interactive term that multiplies GNP per capita and the CPI. The formal regression results are listed in Table 2. The degree of corruption coefficient is positive and significant in all three specifications, while GNP per capita is not significant in the second

Table 2 OLS regression coefficients. Dependent variable is: percentage of firms in a country that employ 50 or more employees (standard errors in parentheses)

Independent Variables	1	2	3
Constant	5.42 (9.52)	7.68 (12.31)	-7.97 (13.78)
CPI Score	10.46** (2.64)	9.43* (4.34)	10.61** (3.99)
GNP per capita		0.0001 (0.002)	0.03* (0.01)
(GNP/cap)*(CPI Score)			-0.004 (0.002)
R^2	0.53	0.53	0.64
Observations	16	16	16

* Indicates significance at the 5% level. ** Indicates significance at the 1% level.

specification but positive and significant in the third. The interactive term in the third specification is not significant at the 5 per cent level. This is clearly a very rough analysis, but it provides some support for the hypothesis from the model that corruption has a limiting influence on the number of large scale, formal sector firms.

5. DISCUSSION AND CONCLUSIONS

This model offers a possible explanation for the degree of dualism in a developing country's industry by presenting a model of Cournot oligopolists, where the number of firms is made endogenous by introducing the presence of a corrupt government and an informal, competitive fringe of producers. This is neither the only explanation nor a complete explanation, yet it does a reasonable job in helping to explain many of the main stylized facts about industrial dualism in developing countries: that many small firms tend to coexist with a few large enterprises and that there exist very few medium sized firms; that this is more pronounced in more corrupt states; that in many developing countries the government plays a much larger role in industrial relations than in their developed counterparts; and that societies are hurt by corruption in government.

APPENDIX

Transparency International 1999 Corruption Perceptions Index

<i>Country Rank</i>	<i>Country</i>	<i>1999 CPI Score</i>
1	Denmark	10.0
2	Finland	9.8
3	New Zealand	9.4
	Sweden	9.4
5	Canada	9.2
	Iceland	9.2
7	Singapore	9.1
8	Netherlands	9.0
9	Norway	8.9
	Switzerland	8.9
11	Luxembourg	8.8
12	Australia	8.7
13	United Kingdom	8.6
14	Germany	8.0
15	Hong Kong	7.7
	Ireland	7.7
17	Austria	7.6
18	USA	7.5
19	Chile	6.9
20	Israel	6.8
21	Portugal	6.7

22	France	6.6
	Spain	6.6
24	Botswana	6.1
25	Japan	6.0
	Slovenia	6.0
27	Estonia	5.7
28	Taiwan	5.6
29	Belgium	5.3
	Namibia	5.3
31	Hungary	5.2
32	Costa Rica	5.1
	Malaysia	5.1
34	South Africa	5.0
	Tunisia	5.0
36	Greece	4.9
	Mauritius	4.9
38	Italy	4.7
39	Czech Republic	4.6
40	Peru	4.5
41	Jordan	4.4
	Uruguay	4.4
43	Mongolia	4.3
44	Poland	4.2
45	Brazil	4.1
	Malawi	4.1
	Morocco	4.1
	Zimbabwe	4.1
49	El Salvador	3.9
50	Jamaica	3.8
	Lithuania	3.8
	South Korea	3.8
53	Slovak Republic	3.7
54	Philippines	3.6
	Turkey	3.6
56	Mozambique	3.5
	Zambia	3.5
58	Belarus	3.4
	China	3.4
	Latvia	3.4
	Mexico	3.4
	Senegal	3.4
63	Bulgaria	3.3
	Egypt	3.3
	Ghana	3.3
	Macedonia	3.3
	Romania	3.3
68	Guatemala	3.2
	Thailand	3.2
70	Nicaragua	3.1
71	Argentina	3.0
72	Colombia	2.9
	India	2.9

74	Croatia	2.7
75	Cote d'Ivoire	2.6
	Moldova	2.6
	Ukraine	2.6
	Venezuela	2.6
	Vietnam	2.6
80	Armenia	2.5
	Bolivia	2.5
82	Ecuador	2.4
	Russia	2.4
84	Albania	2.3
	Georgia	2.3
	Kazakhstan	2.3
87	Kyrgyz Republic	2.2
	Pakistan	2.2
	Uganda	2.2
90	Kenya	2.0
	Paraguay	2.0
	Yugoslavia	2.0
93	Tanzania	1.9
94	Honduras	1.8
	Uzbekistan	1.8
96	Azerbaijan	1.7
	Indonesia	1.7
98	Nigeria	1.6
99	Cameroon	1.5

NOTES

For thoughtful comments and advice, the author thanks Kaushik Basu and two anonymous referees of this journal.

- 1 See Table 1 for some evidence of this phenomenon.
- 2 I thank Kaushik Basu for bringing this to my attention.
- 3 The dictator is, of course, a polar example, but the existence of a dictator is not necessary for rent seeking to take place. Corruption exists to varying degrees in all types of countries, even strongly democratic ones such as India.
- 4 This model is closely related to the model presented in Encaoua and Jacquemin (1980) and re-stated in Basu (1993).
- 5 This is similar to Figure 3.3 in Basu (1993, p. 34)
- 6 I thank a referee of this journal for drawing my attention to this relationship.

REFERENCES

- Anant, T. C. A., Basu, K. and Mukherji, B. (1995) 'A model of monopoly with strategic government intervention'. *Journal of Public Economics* 57, 25–43.
- Bardhan, P. (1997) 'Corruption and development: a review of the issues'. *Journal of Economic Literature* 35(3), 1320–46.
- Basu, K. (1993) *Lectures in Industrial Organization Theory*. Cambridge, MA: Blackwell Publishers.

- Basu, K. (1995) 'Industrial organization theory and development economics'. In Mookherjee, D. (ed) *Indian Industry: Policies and Performance*. Delhi: Oxford University Press, 44–70.
- Basu, K. (1997) *Analytical Development Economics*. Cambridge, MA: MIT Press.
- Basu, K., Ghosh, A. and Ray, T. (1997) 'The Babu and the Boxwallah: managerial incentives and governmental intervention in a developing economy'. *Review of Development Studies* 1(1), 71–80.
- Encaoua, D., and Jacquemin, A. (1980) 'Degree of monopoly, indices of concentration and threat of entry'. *International Economic Review* 21(1), 87–105
- Murphy, K. M., Shleifer, A. and Vishny, R. W. (1989) 'Industrialization and the big push'. *Journal of Political Economy* 97(5), 1003–26.
- Olson, M. (1993) 'Dictatorship, democracy, and development'. *American Political Science Review* 87(3), 567–76.
- Shleifer, A. and Vishny, R. W. (1993) 'Corruption'. *The Quarterly Journal of Economics* 104(3), 537–64
- Transparency International (1999) *Transparency International 1999 Corruption Perceptions Index*.
- Tybout, J. R. (2000) 'Manufacturing firms in developing countries: how well do they do, and why?' *Journal of Economic Literature* 38(1), 11–44.