

Confronting Competition

Investment Response and Constraints in Uganda

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While macroeconomic reforms are necessary, firms' investment response is likely to remain limited without an accompanying improvement in public sector performance.



Summary findings

Investment rates in Uganda are similar to others in Africa — averaging slightly more than 10 percent annually, with a median value of just under 1 percent. But the country's profit rates are considerably lower.

These results are consistent with the view that Ugandan firms display more confidence in the economy than their counterparts in other African countries. Thus, for given profit rates, Ugandan firms invest more. At the same time, increased competition (because of economic liberalization) has exerted pressure on firms to cut costs. Many of those costs are not under the firms' control, however, so their profits have suffered.

Using firm-level data, Reinikka and Svensson identify and quantify a number of cost factors, including those

associated with transport, corruption, and utility services. Several factors — including crime, erratic infrastructure services, and arbitrary tax administration — not only increase firms' operating costs but affect their perceptions of the risks of investing in (partly) irreversible capital.

The empirical analysis suggests that firms — especially small firms — are liquidity-constrained in the sense that they invest only when sufficient internal funds are available. But given the firms' profit-capital ratio, it is hard to argue that the liquidity constraint is binding in most cases, even though the cost of capital is perceived as a problem.

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The findings reported in this paper are based on data from the 1998 Uganda Enterprise Survey which was carried out by the Uganda Manufacturers Association Consultancy and Information Service (UMACIS) on behalf of the Ugandan Private Sector Foundation and the World Bank, and was managed by William Kalema and Frances Nzonsi. The survey design benefited from the Regional Program on Enterprise Development (RPED) and contributions from Andrew Stone. Alex Bilson-Darku and Mimi Klutstein-Meyer assisted in data analysis. Useful comments were received from participants in the annual seminar on the Ugandan economy organized by the Economic Policy Research Centre (Kampala) in May 1999, Catherine Pattillo, and Francis Teal. Generous financial support from the Governments of Austria and Sweden is gratefully acknowledged.

I. Introduction

Despite major improvements in the policy environment, investment rates in Uganda are relatively similar to others in Africa—on average slightly over 10 percent annually, with a median value just under 1 percent. However, its profit rates are considerably lower. These results are consistent with the view that Ugandan firms are more confident about the economy than their counterparts in many other African countries. Thus, for a given expected return on capital, Ugandan firms invest more. At the same time increased competition, due to economic liberalization, has put pressure on firms to cut costs. Since many of these costs are not under their control, firms have not been able fully to meet the challenge of increased competition by reducing costs, with adverse consequences for profits as a result. Using firm-level data this paper identifies and quantifies a number of these cost factors, including those related to utility services, transport, and corruption. Apart from increasing the operating costs of firms, several of these factors—including erratic infrastructure services, arbitrary tax administration, and crime—also affect the firms' perceptions of the risks of investing in partly irreversible capital.

The firm survey data reveal that during the first part of 1998, when the survey was carried out, most firms had experienced positive demand and value-added changes and the private sector in Uganda was fairly confident that good macroeconomic management would continue in the future. The empirical analysis suggests that firms, in particular small firms, are liquidity constrained in that they can only invest when sufficient internal funds are available. However, given the relatively high profit-capital ratio, it is hard to argue that in most cases the liquidity constraint is binding.¹ Other factors than finance must therefore explain the low levels of investment at the firm level.

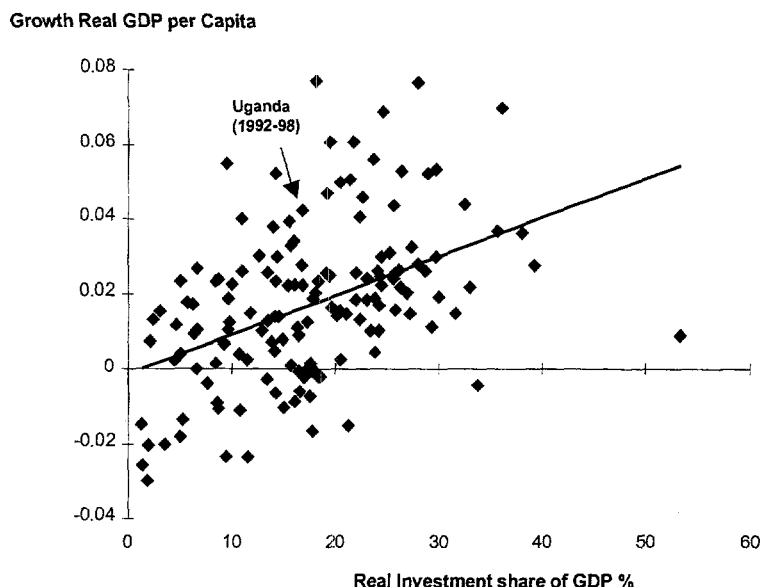
Investment or physical capital accumulation has played a central role in the literature on economic growth and development for a long time. It is fair to say that few economic ideas are as intuitive as the notion that increasing investment is a good way to raise output and income. Recent empirical research also provides supporting evidence for this view—the rate of investment is robustly and positively correlated with the rate of economic growth in cross-country, long-run growth regressions (Figure 1).²

Early research on growth and investment took a rather mechanical approach to this relationship: growth was constrained by a lack of investment which, in turn, was constrained by a lack of finance (see Easterly 1997). Consequently, if financing was made available, it was argued, physical capital investment and ultimately growth would follow.

¹ Although profit rates are low relative to several other African countries, they are high compared to the rest of the world.

² Recent research based on data for a cross-section of countries during 1970-97 show that public investment has not been correlated with growth in Africa (Devarajan, Easterly, and Pack 1999). Similarly, private investment has not been correlated with growth, unless Botswana is included in the sample. This result is not surprising, given the poor policy and institutional environment in most of these countries during most of the sample period.

Figure 1: Cross-Country Relationship between Investment and Growth, 1970–92



Note: The Ugandan data for 1992–98 was added for comparison.

Source: Penn World Tables 5.6.

The underlying assumption for this study is broader. We assume that both investment and growth, and innovation and technical change are driven by the prevailing policies and economic, social, and legal institutions. While some of these policies, in particular macroeconomic policies, can be measured directly, the effect and efficiency of other policy areas are much more difficult to assess. By studying the determinants of private investment at the firm level, we can study a larger set of institutional and policy issues that affect firms.

The basic idea in the initial wave of the so-called endogenous growth theory is that growth differences could be sustained indefinitely because the return to capital would not diminish as economies develop (Romer 1986; Lucas 1988; Rebelo 1991). Unlike the growth theory of the 1960s, recent research reflects closer attention to the relationship between theory and data. In fact, a large empirical literature has developed in the 1990s in which virtually every possible variable has been invoked and used to explain this divergence in growth over time within the cross-country framework (Barro 1991; and see Barro and Sala-i-Martin 1995 for a review). Most of this work explains cross-country differences in growth, but a few studies have also attempted to explain the poor performance of Africa (Easterly and Levine 1997; Sachs and Warner 1995, 1996; and see Collier and Gunning 1999 for a review). While the explanatory power of many of the proposed variables has been shown to depend on specification, sample or measurement, a few variables appear to be robustly correlated with growth (see Levine and Renelt 1992, for a critical review). These variables include investment rate (Mankiw, Romer, and Weil 1992; DeLong and Summers 1991), level of initial income, human capital stock, openness to trade, financial depth, and fiscal stance. The African growth “tragedy” has been explained by additional factors, including high volatility (high incidence of shocks originating from external terms of trade, climate or policy), deficient public infrastructure, and ethnic fragmentation.

This paper has two objectives. First, using new microeconomic data from Uganda, we examine the extent to which the profound macroeconomic and structural reforms implemented in the late 1980s and in the 1990s are translating into higher private investment. We believe that a strong private investment response following the reforms is essential for sustaining the rapid growth that Uganda has experienced over the past decade. Second, while households are, at present, important economic agents in agriculture and a number of other sectors, growth of firms is important as households cannot achieve significant economies of scale necessary for sustaining high growth. Using quantitative and qualitative survey data, the paper analyzes factors that constrain investment and the growth of Ugandan firms.

II. Macroeconomic Evidence on Investment

Uganda has been growing rapidly during the past decade, with an average growth rate of 7 percent over the past 12 years and close to 8 percent in the last 5 years, with particularly strong growth in the industrial sector. Thanks to prudent fiscal policy, inflation has been in single digits since 1993/94. The exchange rate has been market-determined since 1993, with the central bank smoothing fluctuations; current and capital account are completely liberalized. As shown in Table 1, price and real exchange volatility has been relatively limited since 1993/94. Despite financial liberalization, lending rates and particularly the spread between the lending and saving rates remain high, reflecting inefficiencies and bad loan portfolios in the banking sector. Trade liberalization has been extensive, including a complete removal of quantitative restrictions and reduction of import duties gradually over time (World Bank 1996). As a result, Uganda's tariffs are now among the lowest in Africa, the highest official rate being 15 percent on consumer goods. Raw materials carry a rate of 7 percent and capital goods are zero-rated. Regional tariffs are even lower. Hence, compared to many other African countries, Uganda's macroeconomic policy environment is good. According to cross-country evidence, this should attract increased private investment and economic growth.³

One obvious explanation for the high growth rates in Uganda is the preceding economic contraction, which resulted from a long period of mismanagement of the economy during 1972–85 when the capital stock shrunk. Hence, much of the subsequent growth has resulted from increased use of capacity, improved allocation of existing resources, and return of both human and financial flight capital. As such opportunities become increasingly scarce, significant private investment is required to stimulate the economy.

³ See Bigsten et al. (1999) for growth rates and macroeconomic indicators in Cameroon, Ghana, Kenya, and Zimbabwe.

Table 1: Selected Macroeconomic Indicators for Uganda

<i>Fiscal years</i>	<i>GDP growth</i>	<i>Inflation</i>	<i>Real effective exchange rate</i>	<i>Real lending rate</i>
1987–90	6.3	140.1	163.8	-40.5
1991–93	5.8	32.3	71.5	0.6
1994–95	8.9	6.3	88.9	10.2
1996–98	6.8	7.0	88.4	13.4

Note: Fiscal year July 1 – June 30.

Source: World Bank and International Financial Statistics (IMF).

What is the macroeconomic evidence on investment to date? According to the national accounts, private investment increased, on average, by 13 percent per annum in the past decade. The coffee boom in fiscal years 1994 and 1995 created a peak during which private investment (in constant prices) grew by almost 40 percent, while its share of the gross domestic product (GDP) increased from 9.9 to 12.4 percent (Table 2). The largest increase was in machinery and equipment investment. Since then, growth in private investment has slowed, but the level of investment achieved during the coffee boom has been maintained and even surpassed in 1997/98. Following the initial rehabilitation phase of the late 1980s, the share of public investment in GDP has fallen to about 6–7 percent, while the share of total fixed investment has ranged between 15 and 20 percent of GDP. For comparison, until recently the share of investment was about 30 percent of GDP in the fast growing East Asian economies. Such high levels were maintained for more than two decades.

Table 2: Investment as a Share of GDP at Market Prices, Fiscal Year 1986/87–1997/98

	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	96/96	96/97	97/98
<i>Current Prices</i>												
Fixed investment	9.7	10.8	11.1	12.7	15.2	15.9	15.2	14.6	15.4	16.6	15.5	15.5
Public	4.3	5.6	5.4	6.2	7.4	7.4	6.7	5.4	5.4	6.3	5.6	5.6
Private	5.4	5.2	5.7	6.5	7.8	8.5	8.5	9.1	10.0	10.3	9.9	9.9
Machinery & vehicles	3.8	4.5	4.4	5.2	6.1	6.0	5.3	4.7	5.6	5.4	3.7	3.4
Construction	5.9	6.3	6.7	7.5	9.0	9.9	9.9	9.9	9.8	11.2	11.8	12.0
<i>Constant Prices</i>												
Fixed investment	17.8	20.2	18.1	17.2	16.8	15.5	15.1	15.5	19.5	20.2	18.8	19.3
Public	10.2	12.4	10.4	9.3	8.3	6.9	6.3	5.7	7.1	8.0	6.8	5.9
Private	7.6	7.8	7.6	7.9	8.5	8.6	8.8	9.9	12.4	12.2	12.0	13.5
Machinery & vehicles	8.5	9.6	8.1	7.4	6.8	5.6	5.0	4.9	7.6	7.1	5.1	4.8
Construction	9.3	10.6	10.0	9.9	10.0	9.9	10.1	10.7	11.9	13.1	13.7	14.6

Source: Statistics Department, Ministry of Finance, Planning and Economic Development.

The high GDP growth rates in the past decade and the relatively modest (although increasing) share of investment in GDP place Uganda well above the long-term cross-country regression line depicted in Figure 1. Given that considerable reallocation and rehabilitation of the existing capacity has already taken place, it is unlikely that growth rates can be sustained in the future without a higher share of investment. Thus, a challenge for Uganda's future economic growth is to implement policies that are conducive to technological change and private investment, while at the same time ensuring that both private and public capital are efficiently employed.

III. Firm-Level Evidence

Firm surveys have proven a useful tool to explore private-sector responses to macroeconomic reforms and to increase our understanding of microeconomic constraints to investment. Such surveys can also help policymakers prioritize policies and interventions to improve the business environment. In Africa, the Regional Program on Enterprise Development (RPED), initiated by the World Bank, has produced valuable quantitative data on manufacturing firms over time for Burundi, Cameroon, Côte d'Ivoire, Ghana, Kenya, Tanzania, Zambia, and Zimbabwe (Biggs and Srivastava 1996).

Enterprise Survey in Uganda

A private-sector enterprise survey for Uganda was carried out between February and July 1998 jointly by the World Bank and the Ugandan Private Sector Foundation. The survey design benefits from the RPED model, particularly the Ghana and Zimbabwe surveys, but it is more limited in scope, focusing mostly on physical investment, exports, infrastructure services, taxation, policy credibility, regulation, and corruption. However, the survey in Uganda covered a wider range of industrial sectors than the RPED. Apart from manufacturing, which was divided into agro-processing and other manufacturing, the survey included firms representing tourism, commercial agriculture, and construction, as these sectors are expected to have substantial growth potential. Data were collected for 1995–97. Given that the survey required confidential information—such as the firm's costs, sales, and tax payments—interviews were carried out by the Uganda Manufacturers Association to obtain maximum cooperation of the firms. Enumerator training was emphasized, and a questionnaire was carefully piloted beforehand. In addition to quantitative data, the survey also collected information on firms' perceptions on various constraints to investment. The latter component was modeled on a similar survey carried out in 1994 by the World Bank, allowing an examination of dynamics of the business environment and constraints, as perceived by the private sector.

The latest complete industrial census in Uganda dates back to 1989. An updated industrial census was carried out in 1996 but it included only eight (out of 45) districts. Despite its limited geographical coverage, the districts included in the 1996 update actually represent 80 percent of value added in the private industrial sector and 70 percent of employment, based on the 1989 census. It was thus decided to base the sampling frame of the survey on the 1996 update instead of the complete but much older census, particularly as the number of new enterprises has increased dramatically in the past decade. Based on the 1996 update, 37 percent of the firms active today were established since 1990. Although the district of Mbarara was not included in the census update, it was added to the survey because of its importance as a regional business center today.

The firm survey was confined to five sectors—commercial agriculture (includes fishing), agro-processing, other manufacturing, construction, and tourism. Table 3 shows the distribution of establishments and employment by firm size and sector in the 1996 updated industrial census. Firm size is defined by employment. Neither the update nor the 1989 census includes firms with less than five employees, so the initial size breakdown was small (5–20 employees), medium (21–100 employees), large (101–500 employees) and very large (over 500 employees). Subsequently, large and very large firms were treated as one group. The five sectors selected for the survey comprise 52 percent of all enterprises included in the census update and almost 80 percent of employment.

Table 3: Private Sector Enterprises Based on the 1996 Updated Industrial Census

	<i>Enterprises</i>		<i>Employment</i>	
	<i>Number</i>	<i>Share (percent)</i>	<i>Number</i>	<i>Share (percent)</i>
<i>By firm size</i>				
Small (5–20)	1,957	79.8	16,893	24.9
Medium (21–100)	405	16.5	16,980	25.0
Large (> 100)	89	3.6	34,048	50.1
Total	2,451	100.0	67,921	100.0
<i>By sector</i>				
Five chosen sectors	1,282	52.3	52,535	77.3
Mining	17	0.7	1,024	1.5
Wholesale and Retail	753	30.7	9,565	14.1
Transport	94	3.8	1,796	2.6
Financial Intermediation	23	0.9	344	0.5
Business activities	98	4.0	1,861	2.7
Other	184	7.5	796	1.2
Total	2,451	100.0	67,921	100.0

Source: Statistics Department, Ministry of Finance, Planning and Economic Development.

Table A1 in the Annex shows the distribution of establishments and employment within the five selected industrial sectors by firm size and sector. The within-sector distribution of employment shows large variations across sectors. Most of the employment within commercial agriculture and construction is concentrated in two to three very large firms, while most of the employment in tourism is in the small firms. Employment in agro-processing and other manufacturing is relatively evenly distributed across firm size.

The following criteria were taken into account when we constructed a stratified random sample for the survey:

- The sample should be reasonably representative of the population of establishments in the five specified industrial categories.
- The establishments surveyed should account for a substantial share of national output in each of the industrial categories.
- The sample should be sufficiently diverse in terms of firm size.
- There should be enough representation outside Kampala to draw conclusions about industrial activity in Uganda as a whole.

The final sample consisted of 243 surveyed firms and was similar in size and regional distribution to the stratified sample constructed initially (see Reinikka and Svensson 1998). The characteristics of the sampled firms are set out in Table A2 in the annex by firm size, sector, location, and ownership. Over 80 percent of large firms, about 30 percent of medium-sized firms and about 10 percent of small firms in the five sectors were surveyed. Five different geographical areas were covered: Kampala, Jinja-Iganga, Mbale-Tororo, Mukono, and Mbarara. The first four make up 98 percent of total employment in the five selected sectors reported in the 1996 census update. In terms of ownership—which was not a criterion for sample selection—70 percent of firms were Ugandan-owned, 16 percent foreign-owned and 14 percent jointly owned. Table A3 in the Annex presents the distribution of establishments and employment in the final sample by sector and size of the firm.

The survey typically consisted of at least two visits to each firm by one or two enumerators. While the manager's perceptions were relatively easy to obtain during a single interview, quantitative data on costs, sales and taxation, which were collected for three years, usually required another visit to consult the accountant. During the course of the survey it was found that a number of firms had changed business activity since 1996, for example, by shifting to trading instead of manufacturing. Similarly, a number of firms were difficult to locate; either they had gone out of business since 1996 or moved to another address, or the 1996 industrial census update may have contained firms from the 1989 census which had gone out of business before 1996. A few firms refused to participate in the survey. For all these reasons, 39 percent of the firms in the final sample were randomly chosen alternates to the initially drawn random sample.

Investment Data

Before analyzing the regression results, it is useful to examine the Ugandan investment data and compare them to similar data for four other African countries: Cameroon, Ghana, Kenya and Zimbabwe. We have data on employment, capital stock, investment, sales, and value added for 192 Ugandan firms for a three-year period (1995–97). Since we use changes in some of the variables, we lose one year of observations in levels (1995). Thus, data permitting, each firm has two observations, and the total number of observations is 367. Initial inspection of the data led us to discard 14 of these observations as outliers, leaving a sample size of 353.⁴

As shown in Table 4, about half of the Ugandan firms made an investment in machinery and equipment in both 1996 and 1997. This is similar to the African country average listed in the table. For individual countries where comparable information exists, the percentage of Ugandan firms that invested is somewhat higher than that in Cameroon, Ghana, and Kenya, but lower than in Zimbabwe (Bigsten et al. 1999). While large firms are more likely to invest (77 percent of large and 45 percent of small firms in Uganda), they invest less relative to their capital stock than smaller firms. For the Ugandan firms that invested, the value of investment relative to the capital stock (investment rate) was, on average, 11 percent for large firms and 30 percent for small firms. For all Ugandan firms, the investment rate was 13 percent in 1996 and 11 percent for 1997. Again, this pattern is quite similar to the African comparator country average. With respect to individual comparator countries, the investment rate for the firms that invested in Uganda is lower than that in Cameroon and Ghana, about the same as in Kenya, and higher than in Zimbabwe.

Averages, however, can be misleading when the underlying distribution is skewed. At the median firm, the Ugandan investment rate is very low: it is less than 1 percent for all firms and 4.7 percent for those firms that invest. The picture is similar in the four comparator countries; that is, median investment rates for all firms range from zero in Cameroon and Kenya, less than 1 percent in Ghana, to 3 percent in Zimbabwe.

⁴ We dropped observations with reported value added-to-capital above 1,000 percent or below -100 percent. A closer inspection of the data revealed that misreported or erroneous recording of capital stock data was the source of these extreme values.

Table 4: Investment in Machinery and Equipment by African Firms (Means)

	<i>Proportion of firms investing</i>	<i>Investment-capital stock for all firms</i>	<i>Investment-capital stock if firms invest</i>
<i>Cameroon</i>			
1993–94	0.125	0.059	0.479
1994–95	0.347	0.132	0.382
<i>Ghana</i>			
1992	0.363	0.090	0.428
1993	0.536	0.136	0.254
<i>Kenya</i>			
1993	0.357	0.072	0.202
1994	0.459	0.127	0.277
<i>Zimbabwe</i>			
1993	0.621	0.069	0.111
1994	0.738	0.142	0.193
<i>Comparator average</i>			
All firms	0.535	0.128	0.239
Large firms	0.738	0.113	0.152
Small firms	0.458	0.134	0.291
<i>Uganda</i>			
1996	0.506	0.134	0.263
1997	0.529	0.111	0.208
Large firms	0.765	0.083	0.109
Small firms	0.445	0.133	0.300

Note: Large firms have more than 100 employees, while small firms have 100 or less employees.

Source: Bigsten et al. (1999) and the Ugandan survey data.

By and large, the survey data seem to be consistent with the trend depicted by Uganda's macroeconomic data. As shown in Table 2, private investment was relatively stable during the survey period of 1995–97, while the overall share of investment in machinery and equipment in GDP fell somewhat after the 1994–95 coffee boom.

As shown in Table 5, there are obvious differences between firms that invest and those that do not invest. Investing firms, on average, have higher profits, tend to experience positive changes in demand and value added, are larger in terms of value added and employment, and are somewhat more recently established. Uganda and Ghana are the only countries that experience a positive change in value added (and gross sales for Uganda) at the median, reflecting a growing economy and relatively good economic policies. For Ugandan firms that invest the sales-to-capital stock ratio increased by 42 percent, on average (9 percent at the median), while for firms that did not invest, the change in sales was negative (zero at the median).

Another notable characteristic of African firms is that the mean and median profit rates are very high, that is, profit as a share of the installed capital stock is high. These are gross profits that are calculated as the firm's value added less wages and interest payments. Compared to the rest of the world, the high profit-to-capital ratios are likely to be driven by the very low level of installed machinery and equipment.

Table 5: Summary Statistics for Uganda, Pooled Data for 1996–97

Variable	Firms that invest	Firms that do not invest	All firms
	mean [median]	mean [median]	mean [median]
Profit rate	0.914 [0.306]	0.565 [0.177]	0.747 [0.256]
Change in sales-to-capital stock	0.418 [0.090]	-0.023 [0.001]	0.207 [0.028]
Change in value added-to-capital stock	0.214 [0.027]	0.012 [-0.001]	0.117 [0.007]
Value added-to-capital stock	1.39 [0.501]	0.890 [0.330]	1.149 [0.414]
Size (employment)	150 [50]	51 [19]	103 [28]
Age	12 [9]	14 [11]	13 [10]
Investment rate	0.234 [0.047]		0.122 [0.002]

Note: There were 184 observations with positive investment and 169 with zero investment. Mean values with median values are in square brackets. Variables expressed as ratio of lagged capital stock, except for size and age.

For the four comparator countries, Bigsten et al. (1999) report an average profit rate of 198 percent and a median of 40 percent for all firms. While the Ugandan investment rates do not differ much from the African average, its average profit rates are clearly lower. They are also lower than in any individual comparator country. In fact, profit rates in Uganda, both at the median and the mean, are only about one-half of those reported for the pooled African sample: for those Ugandan firms that invested, the mean profit rate was 91 percent (31 percent at the median), while for all firms the mean was 75 percent (26 percent at the median). We will return to these stylized facts in the next section.

Flexible Accelerator Model

To what extent is investment across Ugandan firms driven by changes in demand? Are firms in general constrained by liquidity? Does age and size matter? Are there any clear geographical or sectoral differences in investment behavior?

To answer these questions we estimate a simple flexible accelerator model. In this model, fluctuations in demand are assumed to motivate investment. Given the weaknesses of the financial sector in African economies, we adopt a model where firms do not have access to credit and simply allocate current profits to investment (for details see Tybout 1983). A similar approach has been applied to four other African countries, namely Cameroon, Ghana, Kenya, and Zimbabwe (Bigsten et al. 1999). By replicating their specification, we can explore whether Uganda, with its better macroeconomic record, differs in any way from the other countries in terms of firms' investment response. As in the case of the comparator countries, we use data on investment in machinery and equipment.

The flexible accelerator model of investment for a profit maximizing firm i , which is liquidity constrained, can be written as follows.⁵

⁵ See annex A4.

$$I_i(t) = \alpha_{oi} + \alpha_Q \Delta Q_i(t) + \alpha_\pi \pi_i(t) + \alpha_l I_i(t-1) + \alpha_x \mathbf{X}_i + d_t + \varepsilon_i \quad (1)$$

where $I_i(t)$ is the level of investment for firm i at time t , α_{oi} is the constant for firm i , ΔQ_i denotes the change in sales, π_i is the level of profits, \mathbf{X}_i denotes firm-specific characteristics (age, size), d_t is a time dummy, and ε_i is the error term. To avoid the heteroskedasticity problem with respect to size in the estimation, the variables are expressed in rates, that is, scaled by the inverse of capital stock at the end of the previous period, $K(t-1)$.

The empirical model set out in equation (1) treats investment as a continuous variable. However, capital investment is typically lumpy, which constrains the firm's investment behavior. In a given year the firm may not be able to invest the desired amount, and therefore chooses not to invest at all. In other words, the observable data on firms' investment rates are incidentally truncated, and thus equation (1) is estimated in two stages.⁶ The two-stage procedure involves, first, the estimation of a probit model of the decision to invest and, second, an estimation of the investment rate equation for the firms that invested, accounting for the selection of firms with only positive investment

Regression Results

In this section, we explore how well the flexible accelerator model, as expressed in equation (1), can explain the decision to invest by Ugandan firms and the amount of investment. Table 6 reports the basic results, including the two-stage estimation and the tobit regression. Apart from the variables defined above, each regression includes a vector of industrial category and location-specific dummies. Column 1 shows the result of the first-stage probit model concerning the decision to invest. At the 90 percent confidence level, we find that both the accelerator (change in sales) and the liquidity constraint (profit) are important in the decision to invest. Thus, according to the prediction of the accelerator model, Ugandan firms invest to meet increases in demand, given that they have sufficient funds to do so. If they do not have adequate profits, they cannot invest, even if demand for their product is increasing.⁷

⁶ Heckman's (1979) two-step procedure. If the factors which determine the decision to invest and the amount of investment are the same, the correct specification is the tobit model.

⁷ The results are very similar when using the lagged profit-to-capital ratio instead of the profit-to-lagged-capital ratio.

Table 6: Investment Regressions for All Ugandan Firms

	(1) <i>Probit regression</i>	(2) <i>OLS regression</i>	(3) <i>Tobit regression</i>
Constant	-1.15*** (0.470)	0.992 (0.525)	-0.430** (0.232)
Change in sales-to-capital stock	0.164** (0.073)	-0.055 (0.042)	0.032 (0.028)
Profit rate	0.090* (0.054)	0.076** (0.035)	0.100*** (0.024)
Age (log)	-0.250*** (0.092)	-0.028 (0.054)	-0.147*** (0.045)
Size (log)	0.372*** (0.064)	-0.120 (0.075)	0.087*** (0.030)
Time dummy	0.060 (0.144)	-0.082 (0.084)	-0.005 (0.072)
District dummies significant	No	No	No
Industrial category dummies significant	Yes	No	Yes
Agro-processing	0.844*** (0.288)		0.258* (0.137)
Tourism	0.644** (0.320)		0.281* (0.158)
Predictability	0.70		
R2		0.15	
Observations	353	184	353

Note: (i) Dependent variable in equation (1) takes the value 1 if the firm invested and 0 otherwise; (ii) standard errors (in parenthesis) are adjusted for heteroskedasticity (White 1980); (iii) regressions (2)–(3) are adjusted for selectivity, the inverse Mills ratio is not reported. (iv) *** [**] (*) denotes significance at the 1 [5] (10) percent level.

Age and size also enter significantly into the decision to invest. Bigsten et al. (1999) argue that size may proxy the likelihood that indivisibilities in investment constrain capital accumulation (the constraint is less likely to bind for large firms), and that older firms are likely to have better access to bank finance. The Ugandan data supports the first of these assumptions—size is positively correlated with the probability to invest, but rejects the second—age enters significantly, but with a negative sign. A possible explanation for the latter result is that older firms in the sample were first established in an environment with a very different incentive system. While many establishments in the 1996 census update began operating during the 1990s (37 percent), many of the older firms were endowed with a capital stock that, because of drastic changes in the policy environment, is no longer viable (for example, equipment to produce an import-substituting good). These firms are therefore less willing to invest. Two industrial category dummies are also significant. Holding changes in demand and profit constant, firms in agro-processing and tourism are more likely to invest.

Column 2 in Table 6 reports the second-stage regression, which examines the amount of investment for those firms that invested in machinery and equipment.⁸ Now only profit enters significantly. Thus, while demand changes play a role in determining whether or not to invest, profit is the only binding constraint for the level of investment. The results suggest

⁸ We also applied the flexible accelerator model to investment data on buildings and land. In the probit model, we find that only size and some district and industrial category dummies are significant (at the 10 percent level) for the decision to invest, while none of the variables are significant in the second-stage regression.

that most (but not all) firms can generate funds for some investment if demand is increasing, but they cannot realize their desired investment level if current profits are not sufficient. Interestingly, neither age nor size or any of the dummies enter significantly. Thus, while indivisibilities and sector-specific factors are important for the decision to invest, they do not influence the actual investment level. This interpretation is supported by the tobit regression reported in column 3. The profit rate is highly significant but the accelerator is insignificant at the conventionally accepted significance levels.

We also experimented with a dynamic specification of the model (that is, including a lagged dependent variable), and all qualitative results continue to hold. The main difference is that the size of the coefficient on the profit term is reduced, from 0.100 to 0.059 in the tobit model. Lagged investment is insignificant in all specifications, that is, the decision to invest, the investment level regression, and the tobit model. Given the lack of significance, and since we lose around a dozen observations by including the lagged dependent variable, we believe that the restricted model (reported in Table 6) is preferable.

Another objection to the results reported above is that it may be driven by unobservable firm-specific factors. To test this we ran a second-stage regression with fixed effects (using deviations from means). The results imply a lower but highly significant coefficient on the profit term (0.034 with a t -value 4.80). However, a test of the hypothesis that the fixed effects were all equal across firms indicated that the fixed effect specification was not efficient. In other words, the fixed effects are picking up important cross-firm differences in profits and demand, reducing the explanatory power of these variables in the regression.

In Table 7 the sample is partitioned into small firms (100 employees or less) and large firms (more than 100 employees). The results reveal some interesting trends. First, for the decision to invest (columns 1 and 3): for small firms only the profit term is significantly positive, while for large firms the important explanatory variable is changes in demand. The second-stage regressions (columns 2 and 4) show a similar pattern for small firms, while neither profit nor the accelerator is significant for large firms.⁹ As before, only the age of the firm appears significantly and negatively, for the large firms. The tobit regressions for small and large firms are reported in columns 5 and 6.¹⁰

⁹ While in both 1994 and 1998, interest rates were ranked as one of the leading constraints by firms of all sizes, firms' perceptions varied considerably regarding access to finance. As in the quantitative analysis, the perceptions of larger enterprises seem to be different from the smaller ones. For large enterprises that had not borrowed money recently, the leading reason after "high interest rates" was "no need to borrow." Nor did collateral requirements prevent large firms from borrowing; the smaller the firm, the more collateral was a problem. Liquidity constraints may be binding for start-ups, however.

¹⁰ The lack of clear results for large firms in the second-stage regression may be driven by the small sample size. By estimating a tobit regression, we save on the degrees of freedom.

Table 7: Investment Regressions for Small and Large Firms

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>Probit</i> [small firms]	<i>OLS</i> [small firms]	<i>Probit</i> [large firms]	<i>OLS</i> [large firms]	<i>Tobit</i> [small firms]	<i>Tobit</i> [large firms]
Constant	1.14** (0.582)	0.005 (0.216)	4.95** (2.33)	0.468* (0.227)	-0.727 (0.365)	0.169 (0.219)
Change in sales-to-capital stock	0.102 (0.076)	-0.040 (0.038)	0.94*** (0.342)	0.006 (0.026)	0.010 (0.036)	0.048* (0.028)
Profit rate	0.143** (0.065)	0.109*** (0.051)	-0.12 (0.139)	0.036 (0.026)	0.145*** (0.034)	0.011 (0.017)
Age (log)	-0.306*** (0.104)		-0.062 (0.333)	-0.065*** (0.031)	-0.193*** (0.064)	-0.064** (0.028)
Size (log)	0.395*** (0.105)		-0.828** (0.399)		0.154** (0.064)	0.014 (0.036)
Time dummy	0.019 (0.160)	-0.098 (0.111)	0.524 (0.411)	0.026 (0.049)	-0.042 (0.099)	0.066 (0.046)
District dummies significant	No	Yes	No	No	No	Yes
Mbale						-0.305** (0.141)
Kampala		0.218* (0.114)				
Mukono		0.389* (0.232)				
Industrial category dummies significant	Yes	No	Yes ^(v)	No	No	No
Agro-processing	0.708** (0.350)		2.06** (0.814)			
Predictability R2	0.67	0.16	0.80	0.27		
Observations	278	126	75	58	278	75

Note: (i) Dependent variable in equation (1) takes the value 1 if the firm invested and 0 otherwise; (ii) standard errors (in parenthesis) are adjusted for heteroskedasticity (White 1980); (iii) (2), (4)–(6) are adjusted for selectivity, the inverse Mills ratio is not reported. (iv) *** [**] [*] denotes significance at the 1 [5] (10) percent level; (v) the tourism dummy had to be dropped from regression 3 since all large firms in this sector invested.

The results reported above suggest that firms, in particular small firms, are liquidity constrained in the sense that they cannot invest (or invest only small amounts) when demand is increasing if they do not have sufficient funds available. However, given the reported high profit-to-capital ratio in Uganda (and in the four comparator countries), it is hard to argue that the liquidity constraint is binding in most cases.

It is interesting to compare the Ugandan results to the existing evidence on investment in other African countries.¹¹ First, regarding the decision to invest and using the same model specification, the Ugandan coefficient for profit is found to be somewhat larger. Also in levels the estimated coefficient for profit in Uganda is larger (0.076 versus 0.03 elsewhere). This holds for all firms and when we divide the firms into two groups according to size. Compared to the rest of the world, the estimated coefficient on profit (and accelerator) is smaller in Uganda, even though it is larger than in the African comparator countries.¹² Bigsten et al. (1999) find no robust correlation between the accelerator and investment,

¹¹ As Bigsten et al. (1999) does not report marginal effects, we compare the results at each stage.

¹² For example, Bond et al. (1997); Athey and Laumas (1994); Tybout (1983); and Bigsten et al. (1999).

although we find some evidence that demand plays a role in investment for large firms. Age and size of the firm behave similarly in Uganda as elsewhere.

In the next section we explore constraints to investment beyond demand and finance. The analysis is based on rich quantitative and qualitative data on the business environment obtained from the Ugandan firms, and begins with the observation that firms' profit rates appear to be lower in Uganda than elsewhere in Africa, while investment rates are at about the same (generally low) level.

IV. Constraints to Investment

Some Stylized Facts

So far we have examined determinants of private investment by different types of firms in the single country context. In general, the Ugandan results are strikingly similar to those obtained from several other African countries. In this section we take the viewpoint of a typical or average Ugandan firm and examine differences across countries. In particular, we attempt to explain the observation that firms' profit rates are lower in Uganda, while their investment rates are similar.

Table 8 reports a series of regression of profit rates on size and foreign ownership, using data from both the Ugandan firm survey and the four other surveys described in Bigsten et al. (1999). Column 1 illustrates the result when pooling all variables (altogether 1287 observations). As evident, size (logarithm of total employment) is significantly negatively correlated with the profit rate (profit-to-capital ratio). Foreign ownership is positively related with profit; however, the dummy variable enters only marginally significant (at the 10 percent level). In column 2 we add a dummy for Ugandan firms. The dummy enters with a large (in absolute terms) negative coefficient and is highly significant. Thus, controlling for size and ownership, Ugandan firms on average make significantly lower profits than firms in the four comparator countries.

Interestingly, there are significant differences across the four comparators. When adding (individually) country controls for the four comparators to column 1, we find that the country dummies for Cameroon, Kenya and Zimbabwe are insignificantly different from zero, while the Ghana dummy is significantly positive.

As reported in column 3, we obtain a similar result if we include all country controls (we need to drop one to estimate the regression). The Uganda dummy is significantly negative, while the Cameroon and Zimbabwe (and Kenya if we replace Zimbabwe with Kenya) controls are insignificant and Ghana is significantly positive.

Table 8: Profit Rate Regressions, Pooled Data for Cameroon, Ghana, Kenya, Uganda, and Zimbabwe

	(1)	(2)	(3)	(4)	(5)
	Profit rate	Profit rate	Profit rate	Profit rate	Profit rate
Constant	3.46*** (0.444)	3.99*** (0.510)	3.41*** (0.631)	2.02*** (0.172)	1.81*** (0.221)
Foreign	0.933 (0.493)	0.801 (0.480)	0.856 (0.481)	-0.014 (0.105)	-0.007 (0.105)
Size (log)	-0.631*** (0.128)	-0.623*** (0.109)	-0.523*** (0.104)	-0.267*** (0.035)	-0.238*** (0.037)
Uganda		-1.23*** (0.194)	-1.03*** (0.373)	-0.559*** (0.090)	-0.447*** (0.152)
Cameroon			-0.557 (0.476)		-0.005 (0.211)
Zimbabwe			-0.345 (0.363)		-0.018 (0.151)
Ghana			1.51*** (0.691)		0.452** (0.212)
R2	0.05	0.07	0.09	0.09	0.10
Observations	1,287	1,287	1,287	1,058	1,058

Note: (i) Dependent variable is profit rate (profit to capital ratio), foreign is a binary variable taking the value 1 if the firm is foreign owned, 0 otherwise; (ii) standard errors (in parenthesis) are adjusted for heteroskedasticity (White 1980); (iii) *** [**] (*) denotes significance at the 1 [5] (10) percent level; (iv) regressions (4)–(5) exclude outliers.

There are at least two possible objections to the pooled results in columns 1–3. First, while the Uganda sample includes both manufacturing firms and firms in commercial agriculture, tourism and construction, the sample of firms of the comparator countries only include manufacturing firms (including agro-processing firms). To control for this possibility we dropped all Ugandan firms in commercial agriculture, tourism, and construction. Second, in the Uganda sample a few firms with extreme value added were excluded (as reported in footnote 4), while the sample of firms of the comparator countries include a few firms with extreme profit rates (and value added) of more than 1,000 (up to almost 8,000 percent). While these observations may not necessarily be misreported, it would be of concern if the results were driven by them. To examine this possibility, we dropped all observations with profit rates larger than 1,000 percent and lower than -100 percent. The new results are depicted in columns 4–5.

As evident, the qualitative results are very similar to those reported above. The Uganda dummy is negative and highly significant, but with a smaller coefficient (in absolute terms). The result in column 4 implies that on average, controlling for size and ownership, the Ugandan firm's profit rate is 56 percentage points lower. Again, there are some differences across the four comparators. Repeating the procedure described above, we find that the country dummies for Cameroon, Kenya and Zimbabwe are again insignificantly different from zero, while the Ghana dummy is significantly positive. As shown in column (5), including all country controls simultaneously yields a similar result. The Uganda dummy is significantly negative, while the Cameroon and Kenya (and Zimbabwe if we replace Kenya with Zimbabwe) controls are insignificant and Ghana is significantly positive. Finally, note that the coefficient on size is now only one-third of that reported in column 1, suggesting that a few extreme observations significantly affect the size of the coefficient.¹³

¹³ In fact, when dropping all firms with profit rates larger than 300 percent, we find no significant statistical relationship between size and profit. The relationship between profit rates and size for Ugandan manufacturing

Conceptual Framework

How can Ugandan investment rates be similar when its profit rates are lower? In this section we construct a simple model suggesting one possible answer.

Consider a two-period model of a representative firm. A risk-neutral manager decides on the firm's level of investment in period one to maximize the present value of its cash flow $c_1 + \beta c_2$, where $\beta = 1/(1+\theta)$ is the discount factor. We can think of θ as capturing expectations about the future. We assume first that the firm can borrow in period one. The interest on the borrowed amount (b) is r . To avoid extreme solutions, we assume that $r \geq \theta$, implying that the firm will only borrow to finance investment. The budget constraint in period one is then:

$$c_1 + i \leq \pi_1 + b \quad (2)$$

where π_1 is the initial profit available to the firm, and i is the level of investment. The return to investment (or gross profit) is captured by the concave and strictly positive revenue function $\pi_2(i;x)$, where x is a vector of variables which affect the profit but which the firm cannot control (degree of competition, infrastructure, etc.). The budget constraint in period two can be expressed:

$$c_2 = \pi_2(i;x) - (1+r)b. \quad (3)$$

The model is easily solved by maximizing the firm's cash flow subject to the budget constraints. Provided that the firm has sufficient internal funds, it will not borrow. Then the first-order condition which defines the optimal level of investment i^* can be written as¹⁴

$$\pi'_2(i^*) - (1+\theta) = 0 \quad (4)$$

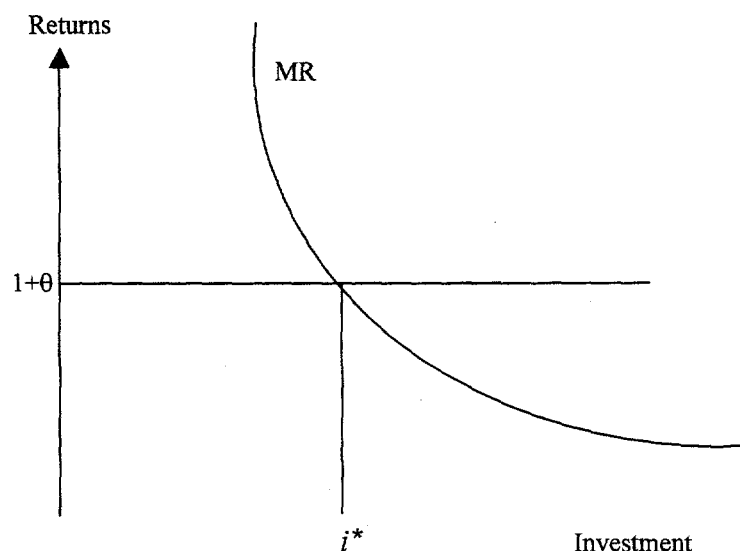
The first term in equation (4) is the marginal return curve (MR). The second term is the discounted opportunity cost. The equilibrium is illustrated in Figure 2. This simple model has a number of interesting implications. First, a policy change that, *ceteris paribus*, reduces profits (for example, increased competition from abroad resulting from trade liberalization) shifts the marginal return curve (MR) inwards, leading to a lower level of investment for a given r and θ for the existing firms.¹⁵ A lower discount rate θ (for example, better economic policies are expected in the future) would shift the horizontal curve down, leading to a higher investment level as future income becomes more valuable.

firms is also significantly negative (coefficient = 0.17).

¹⁴ If the firm does not have sufficient internal funds, that is, $\beta\pi'_2(\pi_1) - 1 > 0$, it will borrow. The first order condition then becomes $\pi'_2(\pi_1 + b) - (1+r) = 0$.

¹⁵ In this context, we disregard the fact that increased competition may have other effects, such as raising productivity, which would shift the MR-curve outwards.

Figure 2: Equilibrium Investment

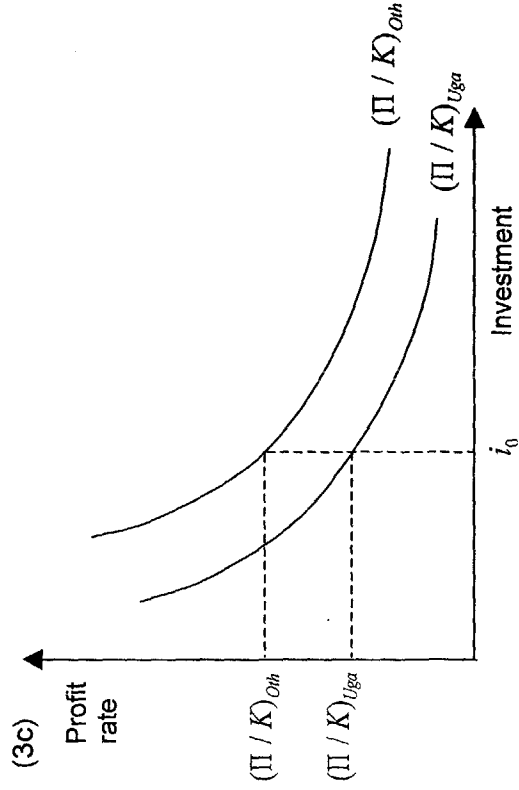
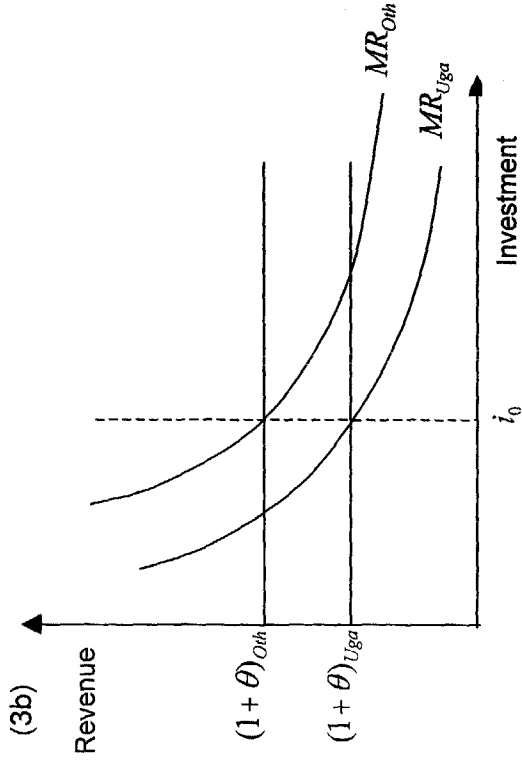
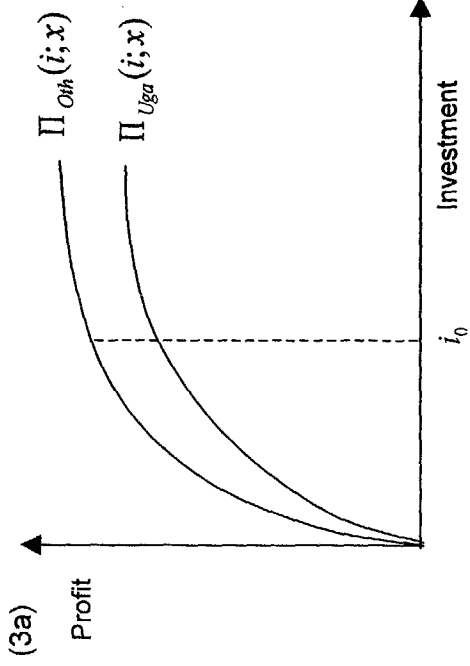


Note: MR denotes the marginal return; θ the discount rate; and i the level of investment.

Comparing Uganda with other African countries, the model helps us explain why investment rates can be similar, while profit rates are lower. Increased competition has reduced profits, and would, everything else being equal, have reduced investment rates as well. However, less uncertainty about future policies, resulting in a lower θ , counterbalances the negative effect of tougher competition on the level of capital accumulation. In equilibrium (Figure 3a,b,c), investment is the same, while profits and profit rates are lower.

While it would be interesting to test the above simple model statistically using the Ugandan survey data, endogeneity problems and lack of suitable instruments effectively prevent this. Instead we use the above conceptual framework to organize our discussion of the factors that are likely to shift the marginal return (MR) curve and the discount rate (θ) of an average Ugandan firm. We pose two hypothetical questions. First, why is the Ugandan marginal return curve likely to be to the left of that of other African countries? Second, why is the discount rate of Ugandan firms likely to be smaller than elsewhere in Africa? The diagnostics are based on both quantitative and qualitative survey data from Uganda and focus on constraints to investment, competitive environment, costs beyond firms control (infrastructure, corruption), risks, and policy credibility.

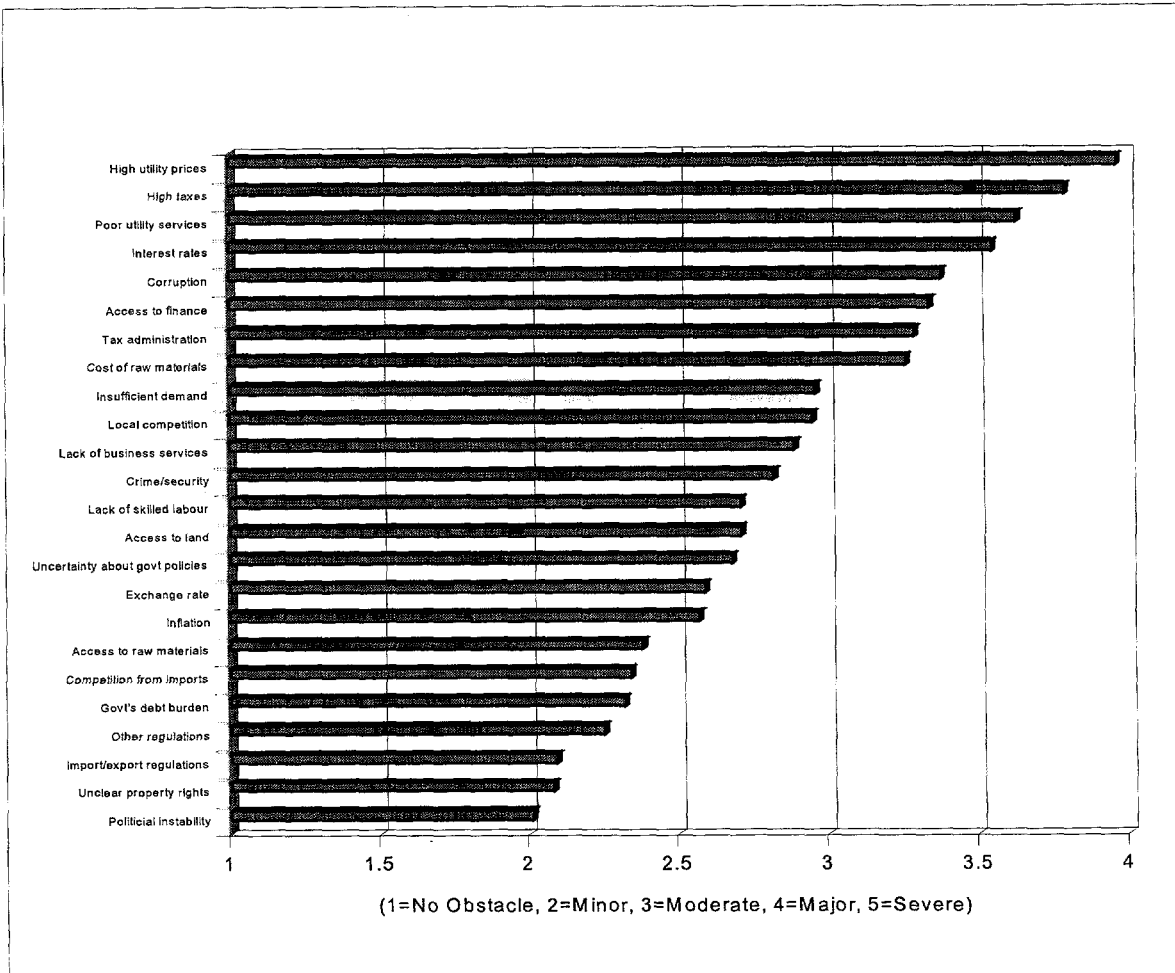
Figure 3 a,b,c: Investment and Profit in Uganda and Other African Countries



Perceptions of Constraints

In this section we examine qualitative data on constraints to investment. Rankings of constraints can give us a general idea of the factors that are likely to affect both the marginal return to investment and the discount rate. In the 1998 survey, Ugandan firms identified price and quality of utility services (electricity, telephones, water, etc.), high taxes and interest rates as “major” constraints to investment (Figure 4).

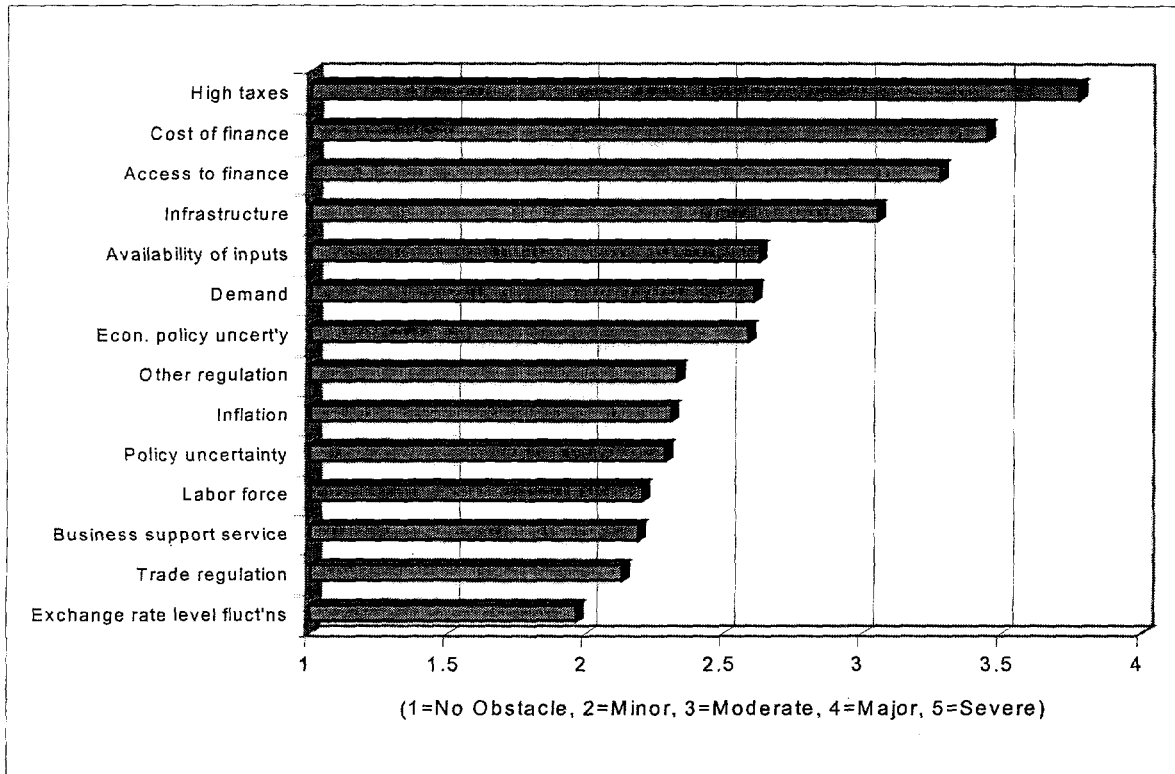
Figure 4: Ranking of Constraints to Investment in 1998



Corruption, access to finance, tax administration, and the cost of raw materials formed a second tier of leading constraints. Finally, the group of “moderate” constraints included the problems of local competition, lack of demand, lack of business support services, crime and security, lack of skilled labor, and uncertainty about government policies. The largest variance in responses between firms were in access to finance and access to raw materials.

A similar survey carried out in 1994 provides an interesting dynamic comparison (Figure 5).¹⁶ In the earlier survey, only high taxes were ranked a “major” constraint, while cost and access to finance and infrastructure formed a second tier of “moderate” constraints together with availability of inputs, lack of demand, and economic policy uncertainty. Infrastructure in that survey included both the quality and the price of utility services.

Figure 5: Ranking of Constraints to Future Operations and Growth in 1994

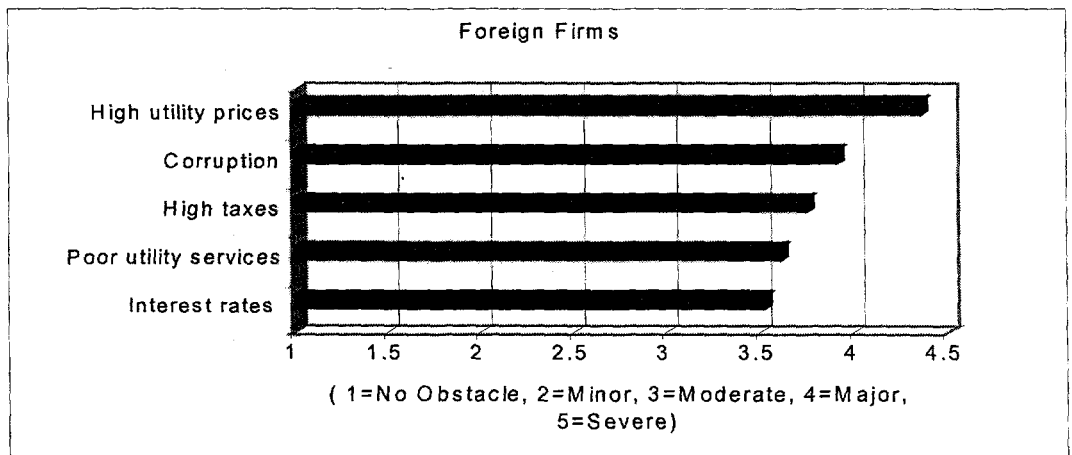
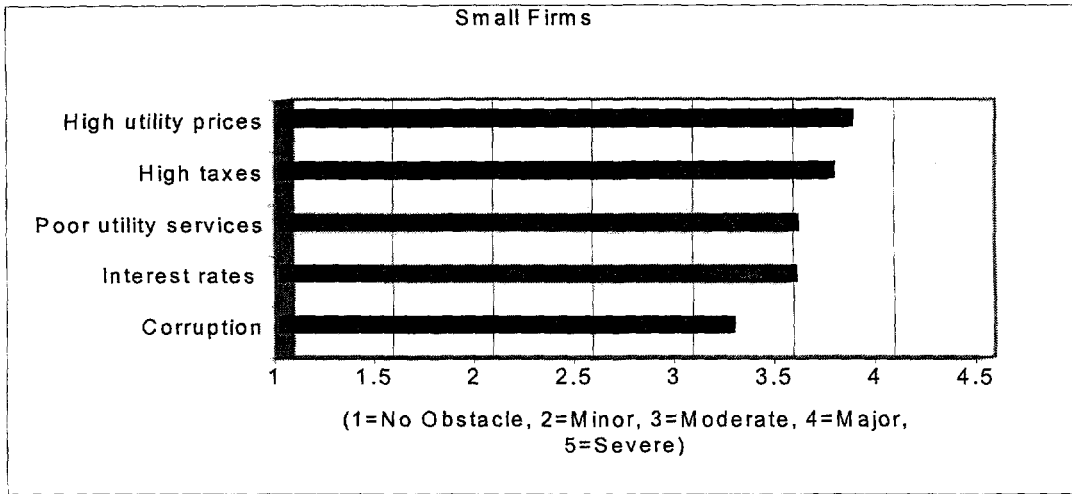
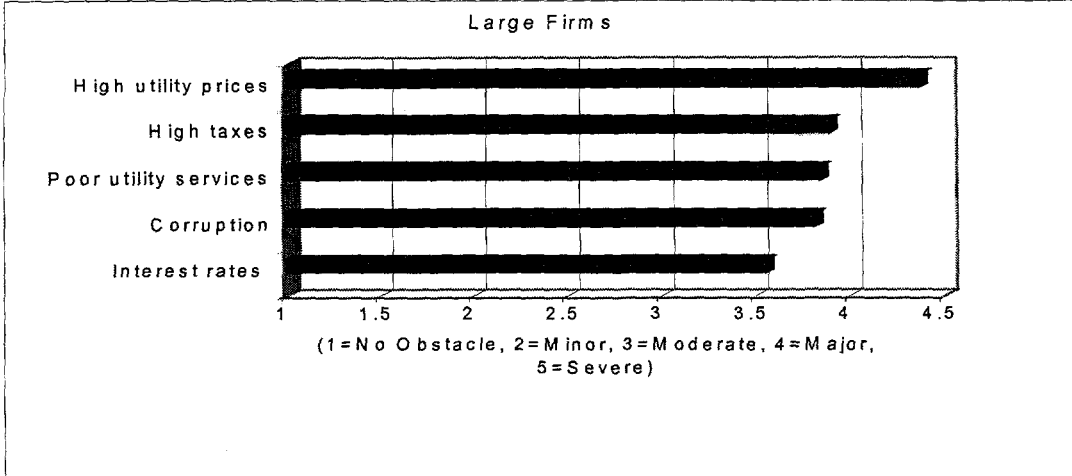


The major differences between 1994 and 1998, besides a general elevation of constraints in their perceived severity, are (1) the top rating of utility prices when offered in the 1998 survey as a separate constraint choice, (2) the identification of corruption as a leading constraint when offered in the 1998 survey, (3) the recognition of labor force skills as a moderate constraint, and (4) the new evaluation of the lack of business services as a moderate constraint.

A closer look at the constraints by firm category shows that there is little difference between the relative rankings in 1998 by small and large firms (Figure 6). However, for large firms constraints were generally more binding, as reflected in higher perception scores. For foreign firms (and construction industry), corruption was the second constraint in severity. For Kampala-based firms, access to utility services was less binding than for other locations, while commercial firms and construction companies were less concerned with high taxes than the other firms.

¹⁶ The 1994 survey differed slightly in its formulation of constraints, offered fewer choices of constraints to rank, and included firms from more subsectors of the economy.

Figure 6: Leading Constraints to Investment by Category of Firms in 1998



Competition

When asked whether competition for their principal product had changed during the past three years, 88 percent of firms said it had increased, 10 percent reported unchanged competition, while only 2 percent said it had decreased. Similarly, the number of new firms exceeded those that had exited. The firm-level evidence of increased competition is consistent with the liberalization of the economy, and continued start-up of new firms.

Another feature of competition is its fairness. In 1994, there was a perception of unfairness in tax and regulatory administration. In 1998 this perception remains, with tax evasion as a leading constraint from unfair competition. Firms in commercial agriculture reported the lowest incidence of unfair competition. However, the numerical constraint scores for competitors evading taxes, undercutting fair prices, or smuggling have all declined. Hence, while the overall level of competition has increased, firms' perception is that it has become slightly fairer since 1994.

Lower profits are thus consistent with the observation of increased competition and the pressure it places on firms to reduce costs. Many of the constraints reported by firms, such as utility prices, cost of imported inputs, and interest rates, are cost items that are outside their direct control. Hence, one can infer from the perception data that increased competition may not have been matched with corresponding improvements in physical and other support systems, particularly those that are in the public domain. This makes it difficult for firms to respond to the challenge of increased competition brought about by external liberalization by cutting costs.

Costs Beyond Firms' Control

The Ugandan firm survey points at least to three categories of costs which are beyond the firm's control but nonetheless tend to lower their profits. First, capital goods, which are typically imported items, are more expensive in Africa than elsewhere. The Ugandan survey found that transport and other import-related costs add about 50 percent, on average, to the cost of imported inputs compared to their cost in the country which produced them (typically Europe). While for the African comparator countries similar data are not available, it is likely that Uganda is more disadvantaged, given that it is a land-locked country.

Second, infrastructure services are highly deficient and costly in Africa, which also affects profits (and tends to shift the MR curve to the left). The 1998 survey confirmed that the cost of utilities is the most binding constraint to all types of firms. Reliability and adequacy of electric power supply remain the leading infrastructure constraints to Ugandan enterprises, the only "major" constraints in the evaluation of respondents. Responses suggest that the electric power supply has in fact worsened in the last few years as demand has increased. Given the poor quality of infrastructure services, investment in productive capacity often requires an additional investment in complementary capital by the firm. A case in point is the need to purchase electric power generators.¹⁷ As many as 77 percent of large firms, 44 of medium-sized firms and 16 percent of small firms own power generators. Over half of the firms in tourism and agro-processing have invested in their own power generating capacity. Although a very rough estimate, the survey indicates that the firms in

¹⁷ See Reinikka and Svensson (1999) for the impact of deficient complementary capital on private investment.

the five sectors alone have installed a small-scale generating capacity, which is about 60 to 80 percent of Uganda's total hydro power.

Despite rapid economic growth, large-scale hydro power generation has not increased at all since the late 1980s. This is reflected both in a perceived deterioration of service from the public sector and increased private investment in subsistence power generation by firms. The data show that the number and size of generators bought by firms increased considerably in 1995–97, compared to the early 1990s. In terms of cost, investment in generators represents 16 percent of the value of total investment in 1997 and firms report that they are about three times as costly to run as power from the public grid.

Third, corruption is another factor that adversely affects returns to investment and hence shifts the MR curve inwards. While cross-country comparisons are not available, the Ugandan survey data show that the larger, more profitable, more export-oriented the firm, the higher the incidence and the amount of bribe payment (Svensson 1999). As can be expected, firms in the formal sector are more likely to have to pay bribes, for example, to tax collectors or for utility services. For the firms that reported positive bribe payments, the average amount of informal payment was US\$8,300 per year (median value US\$1,800), which corresponds to US\$88 per worker, or roughly 3 percent of their gross sales. For comparison, the cost of fuel constituted, on average, 4.6 percent of gross sales, and interest payments to gross sales for the average firm in 1997 were 3.9 percent. Clearly, bribes are significant.

Risks

Factors that affect the discount rate θ and hence shift the horizontal line in Figures 2–3 include risk. The Ugandan survey reveals at least three types of risks that can adversely affect firms' expectations of future returns. It is important to note, however, that we do not have comparative data on risk from other African countries. Presumably, some of these risks are fairly similar across most African economies. Similarly, the distinction between risks and costs is not clear-cut so that the diagnosis here is only indicative at best.

First, erratic infrastructure services create a high risk in terms of unexpected delays (and related extra costs) in production, imports and exports. For example, it takes 30 days, on average, for imported inputs to arrive from their original destination in the port (typically Mombasa), another 30 days from the port to the Ugandan customs and, finally, an extra nine days to the firm. While these figures are *ex post* averages, there is considerable variance among firms. In electric power supply, firms report that a total of 87 operating days are lost in a year due to power cuts. While variance between firms is smaller with respect to power shortages than other infrastructure services, it creates uncertainty, particularly regarding its future improvements (Reinikka and Svensson 1999).

Second, while tax policy and administration have improved a great deal during the past decade, the system is still adversely affected by lack of trust. This manifests itself in poor compliance on the one hand and arbitrary procedures in granting tax exemptions and carrying out tax assessments and audits on the other. In the 1998 survey, for example, manufacturing firms reported that one half of their competitors gain an advantage through tax evasion. In construction and agro-processing, the reported share was about 40 percent, while in commercial agriculture, where the share of tax paying firms is the lowest, only 5 percent of competitors were perceived to evade taxes. In response, tax audits and assessments by the tax collector are frequent. However, predetermined criteria do not exist for conducting an

audit, although factors such as the compliance record, quality of returns, and the size of the firm seem to be important.

Sixty-eight percent of all Ugandan firms were audited either for corporate income tax, VAT, or both during the past three years. As many as 51 percent of firms had a disagreement with the revenue authority on their tax assessment, carried out by the latter. Similarly, the VAT refunds may be denied (18 percent of firms did not receive any refund, while 40 percent received less than they claimed). Or they may take a long time to arrive (over half of the firms waited for more than six weeks, while 10 percent waited for more than six months). These features of the tax administration create uncertainty about the firm's tax liability.¹⁸ Similarly, unreliable VAT (and duty drawback) refunds can make future after-tax returns less certain and hence increase the firms discount rate.

Third, crime poses another risk for Ugandan firms. As to the incidence of crime and the financial loss due to crime, the survey shows that 54 percent of the firms had been victims of merchandise robbery or theft of goods and equipment over the past three years. Thirty-seven percent of the firms had also been victims of fraud. The loss from all these incidences was US\$7,500 at the median firm during 1995–97. Compared to corruption the incidence of crime seems to be relatively random, however. There is no evidence that the incidence of robbery or fraud, or the size of the loss from them, are correlated with profit, sales or other cost and revenue related data from the firms. Nor is there evidence that certain sectors, or foreign owned firms, or firms engaged in trade, are more often the subject of crime. The only characteristic of firms that seems to matter is size (proxied by employment) and location. Larger firms are more often exposed to crime, and being in Kampala implies a roughly 20 percent increase in the probability of robbery or theft, independent of the size of the firm. The probability that the average [median] firm in the sample, which is located in Kampala and has 120 (35) employees, had suffered from robbery and/or theft during the past three years is around 70 [63] percent.

Not surprisingly, larger firms and firms located in Kampala spend significantly more in security. The annual cost of security for the median firm is US\$1,800 (which is equal to what the median firm reports as corruption payments per year). The data reveals that a one percent increase in employment (size) is associated with a 1.5 percent increase in security spending.

Finally, it is interesting to note that non-commercial risks (captured by 'political instability' in the overall ranking of constraints) do not seem to concern many firms that are already in operation. According to a regional foreign investor survey in 1994, however, these risks were more of a concern for potential investors (The World Bank 1994b).

Policy Credibility and Investor Confidence

The firm survey reveals that the private sector in Uganda was fairly confident in the early part of 1998 that good macroeconomic management will continue both in the short and medium term, that is, one and three years from the time of the interview. This optimism was spread across all five sectors. At the time when the survey was carried out (February–July 1998), the inter-bank exchange rate averaged about U Sh 1190 per US dollar. Firms expected the exchange rate to be about U Sh 1200, on average, a year later, while foreign-owned firms

¹⁸ See Chen and Reinikka (1999) for details on Ugandan business taxation.

anticipated a slightly higher depreciation.¹⁹ In the medium term a small depreciation was expected (less than 10 percent). These results indicate that firms did not expect any major exchange rate volatility either in the short or medium term.

Inflation forecasts were also relatively favorable. Over half of the firms expected that the country's single-digit average annual inflation—which has been maintained consistently since 1993—will continue both in the short and medium term.

Two-thirds of the enterprises expected the trade regime to be further liberalized, and almost all firms expected the privatization program to continue. In fact, privatization appeared at the time of the survey to be the most credible of all the government's economic policies. While a large number of productive enterprises have been privatized over the past several years, privatization of a few high-profile enterprises subsequently failed and have been investigated for corruption. As a result, the privatization program was partially suspended in 1998–99.

Firms were less optimistic about financial sector reform and its impact on future interest rates. About half of the respondents expected interest rates to be lower in three years' time. However, close to 40 percent of firms did not believe that the banking sector can be reformed in the medium term and expect even higher interest rates than now. Concerning access to bank financing, four out of every five respondents expected the situation to remain the same or improve. In 1999 the Ugandan financial sector has seen a number of bank closures so firms might have been even more pessimistic, had the survey been carried out a year later. While this may be a temporary set back and a sign of more effective banking supervision, it is likely to have a negative effect on investor confidence, at least in the short term.

Firms seemed to believe in continued growth in 1998: over two-thirds of firms anticipated that their production would increase over the next three years. However, regarding expected future tax rates, they showed some pessimism: over half anticipated that tax rates would be increased; only 25 percent believed that rates would decrease. In the last two government budgets, that is, after the survey was implemented, tax rates have been reduced slightly.

While comparable information is not available for the four other African countries, it is conceivable that investor confidence, as demonstrated by generally positive expectations about the future, reduce the discount rate of Ugandan firms compared to their counterparts in many other African countries. As a result, investment rates are close to the African average, despite lower profitability.

While economic performance continues to be strong in Uganda, a deterioration in the regional security situation in 1998–99, problems of corruption in the privatization program, and weaknesses in the banking sector might be reflected in less optimistic expectations if the survey was carried out in 1999. In our conceptual framework, this would imply an upward shift in the discount rate (θ) and consequently a reduced investment level (i). In order to maintain the current investment level or increase it in the face of more pessimistic expectations, addressing the cost and risk factors identified above becomes even more pressing.²⁰

¹⁹ The short-term outcome was somewhat higher, i.e., around U Sh 1350 including a speculative peak in May 1999.

²⁰ When asked an open-ended question about the best investment opportunity in the Ugandan economy in the

V. Conclusions

Despite an improved policy environment, investment rates in Uganda are relatively similar to those elsewhere in Africa. On average, the investment rate is slightly over 10 percent, while at the median firm, it is below 1 percent. Such low investment rates in response to economic reform pose a serious policy problem. Unlike in many other African comparator countries, in Uganda (and Ghana) a majority of firms experienced a positive change in the in value-added and gross sales. Investment by small firms seemed to be partly constrained by liquidity, while large firms, on average, could choose to invest more from internal funds. Ugandan profits are found to be considerably lower than profit rates elsewhere in Africa.

These results are consistent with the view that during the sample period, Ugandan firms displayed more confidence in the economy than their counterparts in many other African countries. Thus, for a given profit rate Ugandan firms invest more. At the same time increased competition, due to far-reaching economic liberalization, has put pressure on firms to cut costs. Many of the costs, such as utility prices, transport costs, and interest rates, are not in the firms' control, however. As there has been no matching improvement in these sectors in Uganda, firms have not been able to meet the challenge of increased competition by reducing costs. Thus, profits have been squeezed.

From the survey, we were able to identify a number of cost factors that can explain the observed lower level of investment in Africa in general and the lower profits in Uganda in particular. First, capital goods are more expensive, largely due to higher transport costs, and inefficiencies in transit transport and ports. Second, apart from investing in productive assets, firms often need to purchase complementary capital, such as power generators, in order to stay in operation. Third, corruption is a problem for most firms but particularly for those that invest more, and are larger in terms of employment, active in the formal sector, and trade-oriented.

We identified several risk factors that are likely to increase the discount factor firms apply to the future cash flow from investment and make longer term investment less attractive. These include risks posed by erratic infrastructure services, arbitrary tax administration, and crime. At the same time, macroeconomic policy credibility and investor confidence have improved considerably in Uganda. The risk of economic policy reversal is perceived to be relatively minor. This reduces the discount rate of firms.

For policy the Ugandan survey findings suggest four key priorities. First, the electric power sector urgently needs an effective reform program, combined with new investment in large-scale hydro-power capacity. This is key to the firm sector growth. Without a major improvement in power supply, sustainability of current growth rates is uncertain. Other utilities also need to improve their service delivery. Second, while the government has committed in its 1998/99 and 1999/00 budgets not to raise tax rates, tax administration needs improvement. One way could be to initiate a trust building effort through setting up a

medium term (that is, in the next three years), firms listed a large variety of economic activities. Agriculture (horticulture, fruit, flower, fishing, cattle, etc.) and agro-processing were the most popular choices. Tourism and manufacturing the latter mainly for the local market, were also frequently mentioned opportunities. A few firms considered trading as the most profitable activity but the share of these firms was small in the total survey sample.

systematic mechanism of consultation between the tax collector and taxpayers as well as proper appeals procedures.

Third, a concerted effort to reduce corruption and improve contract enforcement is required. Such efforts are likely to take time, and it is important in the beginning to choose measures that have a strong signaling effect. A recent household survey found that judiciary and police are one of the most corrupt institutions (Republic of Uganda 1998). Tackling corruption in these institutions should lead to less crime and as well as a reduction in the cost of security, both of which are now a serious problem for firms. Finally, there is a need to open a more efficient transport route to the coast, both in terms of improving the infrastructure and reducing red tape. The international donor community active in Uganda could play a role, as it is likely to be difficult for Uganda alone to bring about major changes in transit transport when part of the problem is in the neighboring countries.

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Annex

**Table A1: Distribution of Establishments and Employment
Within the Five Selected Industrial Sectors**

	<i>Small</i>		<i>Medium</i>		<i>Large</i>		<i>Very Large</i>		<i>Total</i>	
	<i>(5 – 20)</i>		<i>(21 – 100)</i>		<i>(101 – 500)</i>		<i>(> 500)</i>			
	<i>No.</i>	<i>Share (percent)</i>	<i>No.</i>	<i>Share (percent)</i>	<i>No.</i>	<i>Share (percent)</i>	<i>No.</i>	<i>Share (percent)</i>	<i>No.</i>	<i>Share (percent)</i>
<i>Commercial agriculture</i>										
Establishments	39	61	13	20	7	11	5	8	64	100
Employment	457	3	385	3	1,385	10	11,326	84	13,553	100
<i>Agro-processing</i>										
Establishments	265	66	113	28	20	5	5	1	403	100
Employment	2,358	16	4,933	33	3,346	22	4,332	29	14,969	100
<i>Other manufacturing</i>										
Establishments	493	74	145	22	29	4	2	0	669	100
Employment	4,227	25	6,121	37	5,181	31	1,053	6	16,582	100
<i>Construction</i>										
Establishments	32	60	13	25	6	11	2	4	53	100
Employment	339	6	601	10	1,397	23	3,818	62	6,155	100
<i>Tourism</i>										
Establishments	82	88	10	11	1	1	0	0	93	100
Employment	739	58	417	33	120	9	0	0	1,276	100
<i>Total</i>										
Establishments	911	71	294	23	63	5	14	1	1,282	100
Employment	8,120	15	12,457	24	11,429	22	20,529	39	52,535	100

Source: 1996 Updated Industrial Census, Department of Statistics, Entebbe.

Table A2: Characteristics of the Firms in the Sample

	<i>Enterprises</i>		<i>Employment</i>	
	<i>Number</i>	<i>Share (percent)</i>	<i>Number</i>	<i>Share (percent)</i>
<i>By firm size</i>				
Small (5–20)	93	38.3	990	3.3
Medium (21–100)	86	35.4	4,293	14.3
Large (> 100)	64	26.3	24,788	82.4
Total	243	100.0	30,071	100.0
<i>By sector</i>				
Commercial agriculture	28	11.5	2,137	7.1
Agro-processing	58	23.9	12,792	42.5
Other manufacturing	102	42.0	7,748	25.8
Construction	26	10.7	6,240	20.8
Tourism	29	11.9	1,154	3.8
Total	243	100.0	30,071	100.0
<i>By location</i>				
Kampala	130	53.5	18,602	61.9
Jinja-Iganga	45	18.5	3,806	12.7
Mbale-Tororo	19	7.8	2,382	7.9
Mukono	24	9.9	3,801	12.6
Mbarara	25	10.3	1,480	4.9
Total	243	100.0	30,071	100.0
<i>By ownership</i>				
Ugandan	170	70.0	9,477	31.5
Foreign	39	16.0	11,700	38.9
Joint	34	14.0	8,894	29.6
Total	243	100.0	30,071	100.0

Source: 1998 Firm Survey.

**Table A3: Distribution of Establishments and Employment
of the Firms Included in the Survey Sample**

	<i>Small</i>		<i>Medium</i>		<i>Large</i>		<i>Total</i>	
	<i>(5 – 20)</i>		<i>(21 – 100)</i>		<i>(> 100)</i>			
	<i>No.</i>	<i>Share (percent)</i>	<i>No.</i>	<i>Share (percent)</i>	<i>No.</i>	<i>Share (percent)</i>	<i>No.</i>	<i>Share (percent)</i>
Commercial agriculture								
Establishments	13	46	10	36	5	18	28	100
Employment	122	6	554	26	1,461	68	2,137	100
Agro-processing								
Establishments	18	31	18	31	22	38	58	100
Employment	214	2	911	7	11,667	91	12,792	100
Other manufacturing								
Establishments	42	41	38	37	22	22	102	100
Employment	453	6	1,760	23	5,535	71	7,748	100
Construction								
Establishments	3	12	12	46	11	42	26	100
Employment	22	0	641	10	5,577	89	6,240	100
Tourism								
Establishments	17	59	8	28	4	14	29	100
Employment	179	16	427	37	548	47	1,154	100
Total								
Establishments	93	38	86	35	64	26	243	100
Employment	990	3	4,293	14	24,788	82	30,071	100

Source: 1998 Firm Survey.

A4. Derivation of the Investment Equation

Let the cost of instantaneous net investment be given by $C(I)$, where I is net investment and C is a cost function with $C(0) = 0$, and $C', C'' > 0$ for all $I > 0$. Let profit be a concave function of the capital stock $\Pi = \Pi(t, K)$ and assume that the firm takes product and factor prices as given. As shown by Tybout (1983), with constant relative prices, investment can be written as

$$I(t) = \beta[K^* - K(t)] \quad (A1)$$

where K^* is the desired capital stock implicitly determined by $\Pi'(K^*) = rC'0$, and β is a composite variable (constant) of the discount rate, r , and Π'' and C'' evaluated at K^* and 0 respectively. Hence, in the flexible accelerator model, investment is driven by the gap between the desired and actual capital stock, where the relative sluggishness of adjustment depends on the user cost of capital. Assume that managers expect that the future demand for their output will be Q^* , and let $K^*(t) = \gamma Q^*(t)$, where γ is determined by relative prices. In discrete time, equation (1) can be written as

$$I(t) = \beta[\gamma Q^*(t) - K(t-1)] \quad (A2)$$

We assume that demand expectations are linear functions of current output. Thus,

$$I(t) = \beta[\gamma\phi Q(t) - K(t-1)] \quad (A3)$$

By first-differencing equation (A3) and noting that $I(t-1) = K(t-1) - K(t-2)$, equation (A3) can be written as

$$I(t) = \alpha_0 \Delta Q(t) + (1 - \beta)I(t-1) \quad (A4)$$

where $\alpha_0 \equiv \beta\gamma\phi$ and $\Delta Q(t) = Q(t) - Q(t-1)$. This is the traditional flexible accelerator model in which fluctuations in sales motivate changes in capital spending, i.e., investment is driven by demand.

As shown in Tybout (1983), if firms must finance all investment out of profits and retained earnings, the firms will behave according to (4) when they have funds to do so. However, with currently binding shortages, they will simply allocate current profits to investment. Hence,

$$I(t) = C^{-1}[\Pi(t)] \quad (A5)$$

We can now form a general empirical model by nesting (A4) and (A5),

$$I_i(t) = \alpha_{i0} \alpha_Q \Delta Q_i(t) + \alpha_{i\Pi} \Pi_i(t) + \alpha_i I_i(t-1) + \alpha'_x X_i + d_t + \varepsilon_i \quad (A6)$$

where α_{i0} is a constant for firm i , α_x is a $n \times 1$ vector of coefficients, X_i is a $n \times 1$ vector of firm specific controls (firm age and size), d_t is a time dummy and ε_i is an iid error term. To avoid heteroskedasticity problem with respect to size, $I(t)$, $\Delta Q_i(t)$ and $\Pi_i(t)$ are scaled by the inverse of the end of the previous period capital stock, $K(t-1)$. Thus, we are regressing investment rate, $I_i(t)/K_i(t-1)$, on change in output (value added) rate, $\Delta Q_i(t)/K_i(t-1)$ and profit rate, $\Pi_i(t)/K_i(t-1)$.

We estimate a number of variations of (A6): with fixed effects (α_{i0}) and with a common constant (α_0); and with and without the lagged investment variable. Given the short panel, there are clear costs of estimating the more complex regressions. With fixed effects we lose all firms who do not have observations for all three years.²¹ Similarly, including a lagged dependent variable implies that we lose observations for firms that started up after 1995, and fixed effects in a dynamic model with short time dimension results in biased estimates [Nickell (1981)] that cannot be overcome by instrument variables techniques (due to the short panel) as suggested by Arellano & Bond (1991).

²¹ Note that to create a panel with at the most two observations for each firm we must use data for three years since $\Delta Q(t) = Q(t) - Q(t-1)$.

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