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***What Makes Small Firms Grow?  
Finance, Human Capital, Technical Assistance,  
and the Business Environment in Romania***

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**What Makes Small Firms Grow?  
Finance, Human Capital, Technical Assistance,  
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Although the development of a new private sector is generally considered crucial to economic transition and development, there has been little empirical research on the determinants of startup firm growth. This paper uses panel data techniques to analyze a survey of 297 new small enterprises in Romania containing detailed information from the startup date through 2001. We find strong evidence that access to external finance (loans) increases the growth of both employment and sales. Taxes appear to constrain growth. There is some evidence that entrepreneurial skills increase growth, but only weak evidence for the effectiveness of technical assistance, and only when it is provided by foreign partners or international agencies. A wide variety of alternative measures of the business environment (contract enforcement, property rights, and corruption) are tested, but are found to have little or no association with firm growth.

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## 1. INTRODUCTION

How can policies promote the growth of small startup enterprises in transitional and developing economies? It is hard to overestimate the importance of this *de novo* private sector to the post-socialist economies in particular, where the existing enterprises inherited from central planning face difficult if not insurmountable problems in restructuring and adjusting to the demands of a market economy.<sup>1</sup> Indeed, many observers have taken development of the new private sector as a principal measure of “progress in transition”; see, for instance, the discussions in the annual *Transition Reports* of the European Bank for Reconstruction and Development or the recent World Bank (2002) report on “the first ten years” of transition.

The widespread interest in entrepreneurial start-ups and the policies that affect them, however, has not been matched by anything close to a corresponding research effort. Research on East European economies has paid some attention to factors affecting self-employment decisions, some of which may be classified as entrepreneurial entry, although no such study has yet been published on Romania or on many of the other countries.<sup>2</sup> But what policy-relevant factors determine whether the embryonic enterprises, once they have been founded, develop into larger firms, creating jobs for workers and producing goods for consumers, or instead languish as tiny “mom-and-pop” operations with relatively few externalities for economic development?

On this question, only scant evidence is available. In Romania, the focus of our analysis in this paper, official statistics are similar to those of other countries in painting an extremely limited picture, although they do show that small and medium size enterprises (SMEs, defined as up to 249 employees) have played a large and growing role in economic activity, accounting for more than 40

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<sup>1</sup> Kornai (1990) and Murrell (1992) were perhaps the earliest to emphasize the difficulties of restructuring old enterprises and the crucial importance of new firm growth to economic transition. Johnson and Loveman (1995) examine case studies in Poland, and McMillan and Woodruff (2002) provide a recent overview.

<sup>2</sup> Earle and Sakova (1999, 2000) analyze Bulgaria, Czech Republic, Hungary, Poland, Russia, and Slovakia.

percent of the regular work force at the end of 1999, for instance. Official figures have also reported a 27.5 percent reduction in the number of SMEs with positive gross profit from 1997 to 1999, giving rise to expressions of concern, but they provide little information on the factors explaining the growth and health of the sector.<sup>3</sup>

Following the official statistics, most research in transition and developing economies that has attempted to address these issues has studied the entire SME sector, including in the analysis firms with as many as 250 employees and paying little attention to the smallest category of micro enterprises (those with fewer than 10 employees).<sup>4</sup> The larger SMEs in the East European analyses are likely to be either inherited state-owned enterprises or spin-offs from such firms, and thus not genuinely new start-ups, nor do the data generally provide enough information on the history of the firm to permit any evaluation of the firm's origins.<sup>5</sup> This research has also generally been limited to analyzing managerial opinions concerning obstacles to growth, rather than estimating the statistical relationship between actual firm growth and objective measures of potential factors affecting growth.<sup>6</sup> The sole exception appears to be Johnson, McMillan, and Woodruff's (2000) cross-section study of survey data on employment and sales growth from 1994 to 1996 as a function of the "normal" reinvestment rate, profitability in the first year of operation, whether the firm had a loan before 1996, and a "security of property rights index." In OLS and ordered probit regressions using the start-up sample with employment greater than 10 and less than 270 (the

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<sup>3</sup> Figures are taken from National Agency for Regional Development (2000).

<sup>4</sup> In addition to National Agency for Regional Development (2000) on Romania, see, for instance, Earle, Estrin, and Leshchenko (1996) and Richter and Schaffer (1996) on Russia. Johnson, McMillan, and Woodruff (2000 and 2002) study survey data from five East European countries, but they exclude micro firms from the analysis, and the average employment of their sample of Romanian startups is 45.5. The focus on the broader SME sector in previous research has persisted in spite of the fact that micro firms represent the overwhelming majority of small firms, for example accounting for 92.8 percent of all SMEs in Romania in 1999 (National Agency for Regional Development, 2000).

<sup>5</sup> Much of the literature, therefore, identifies the new private sector with the SME sector, although the latter may include firms that are neither new nor private. World Bank (2002) evaluates the performance of 20 or so different transition economies using this approach applied to official statistics on the firm size distribution.

authors' preferred sample), none of these variables is estimated to have an effect statistically significantly different from zero at the 5 percent level for either growth measure. Although the results do not prevent the authors from drawing the conclusions that “[a] lack of bank finance does not seem to prevent private-sector growth” and that “[m]ore inhibiting than inadequate finance are insecure property rights” (p. 1), these issues clearly bear further examination.<sup>7</sup>

Research on developing countries, as reviewed for instance by Liedholm and Mead (1999) with respect to the Dominican Republic and several African nations, has included a number of quantitative analyses of small firm growth, but the studies involve only cross-sectional data and focus on the sector, region, and age of the firm and the gender of the entrepreneur; they are not concerned with the effects of policies.<sup>8</sup> As in transition economies, the available data sets on firms have been small, few of them containing panel data with objective measures of growth and of potential factors affecting growth over the life of the firm, and there has been little use of statistical techniques to isolate the effects of individual factors on growth.

This paper builds on the existing literature to contribute to our understanding of the policy-relevant determinants of small firm growth. Compared with previous work, our analysis has several advantages. To begin with, our data permit us to focus on the smallest category of micro enterprises – a set of firms that have successfully started up, but whose further growth is far from assured. The data, based on both accounting and survey information, include detailed histories of each firm in the sample, permitting a careful distinction of new start-ups from spinoffs and state enterprises and providing information for each year over the firm's life cycle from startup to the

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<sup>6</sup> See, for instance, Romanian Center for Small and Medium Size Enterprises (1998) and National Agency for Regional Development (2000) on Romania; Pissarides, Singer, and Svejnar (2000) on Bulgaria and Russia; and EBRD (1999) on several countries. For a similar study in the U.S., see W.E. Upjohn Institute for Employment Research (1996).

<sup>7</sup> Related work on investment in small firms in Central and Eastern Europe includes Bratkowski, Grosfeld, and Rostowski (2000) and Johnson, McMillan, and Woodruff (2002), the latter using the same data as in their earlier paper.

<sup>8</sup> Previous research on microfinance, surveyed for instance by Morduch (1999), has focused on the effects on consumption and income of borrowers and on school attendance of their children, but not on job or sales growth.

interview date, in most cases several years later. In this study, therefore, we are able to provide the first analysis (as far as we are aware) of these issues using panel data, with multiple observations on each firm. These data permit us to make use of statistical techniques to isolate the effects of individual factors, taking into account other characteristics of the firm and other factors that may be present, including unobserved heterogeneity, and to specify the timing of the relationship between a change in some factor (for instance, the availability of finance) and subsequent firm growth.

Our study is also unusual in considering simultaneously all the major categories of policy-relevant factors that have been discussed in the literature: finance (external sources, both formal and informal), human capital (skills of entrepreneurs, and the supply and skills of their workers), technical assistance (business associations, consultancy, and training programs), and the business environment (red tape, contract enforcement, property rights, and corruption). With respect to each of these, our data contain multiple indicators that attempt – insofar as possible – to provide objective measures of the factor and its precise timing. Where objective measures are difficult to obtain, particularly with some aspects of the business environment, we also use some estimates by managers, and we supplement our findings on the relationships between objectively measured growth and policy-relevant factors with information on managers' subjective evaluations of these relationships. The aim is to consider a wide variety of alternative measures and dimensions of the factors.

An important problem in this analysis, as in any attempt to draw inferences about the effects of potential determinants of firm performance, concerns the identification of causal effects of these determinants. This study handles the problem of inference in several ways. First, detailed survey data permit the analysis to control for relevant third factors. Second, the focus is on growth rather than level of performance, as firm idiosyncrasies are likely to be important determinants of the latter. Third, the study exploits panel data, which facilitate a precise specification of timing so that

the effect of a factor is measured after the factor has changed and which permit the use of fixed firm-specific effects to control for unobservable heterogeneity. Finally, the study has devoted much effort to examining the robustness of the results to changes in the specifications: the definitions of the dependent variable growth measures and of the independent variables-of-interest, the inclusion of alternative sets of control variables, the timing of the relationships, and the controls for unobserved heterogeneity.

Section 2 describes the data construction, basic characteristics, and growth performance of the sampled firms. Section 3 analyzes managerial opinions concerning the constraints on growth that their firms face. Section 4 discusses objective measures of four sets of potential growth factors: finance, human capital, technical assistance, and the business environment. The panel data regression methods and results using objective measures of growth rates and policy-relevant factors are presented in Section 5. Section 6 concludes the paper with a summary of results and caveats.

## **2. DATA**

This paper studies a data set based on a survey of Romanian firms that was conducted in May-June 2001. The survey included a section to be filled out by an accountant, using standard Romanian definitions of key concepts (particularly to measure such variables as number of employees, sales, profits, reinvested profits, and loans), and a section of questions directed to the owner-manager in a face-to-face interview (to measure the number of working entrepreneurs, their characteristics and opinions, the receipt of technical assistance, and aspects of the business environment). In this section, we describe the sample, discuss possible selection bias, and provide basic descriptive statistics on the sample characteristics and on our measures of employment and sales growth. Our data on the policy-relevant factors potentially affecting growth are discussed in

Section 4.<sup>9</sup>**2.1 The Sample**

The sample was designed to cover all firms that had received at least one loan from three international loan agencies by March 2000.<sup>10</sup> The motivation for this sample choice was the extreme sensitivity of much of the information that had to be collected together with the fact that the research team had the support of the agencies in approaching the firms' owners.<sup>11</sup> Out of a total of 386 such firms, 297 were interviewed, with a refusal rate of about 10 percent.<sup>12</sup>

Data from these firms were collected for most variables on an annual basis, from the firm's start date through mid-2001, so that the entire past of each firm could be studied.<sup>13</sup> For the purposes of this analysis, "start date" was defined as either the date of starting operations after founding or of the last major reorganization (split-up, merger, or spin-off of the sample firm). The age of the firm (time since start date) is an important variable to control for in the analysis, and its distribution is shown in Table 1.

Table 2 contains the composition of the sample by region, industry, and employment size. The distribution by region follows the geographic spread of the loan programs, with particular concentration in Banat and the West. Concerning the industry distribution, nearly half the sampled firms operate in wholesale or retail trade, but there is also significant representation in several manufacturing sectors, transportation, and a variety of services. The size distribution reveals that

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<sup>9</sup> Much more detail about the sample, questionnaire, survey organization, and data processing procedures can be found in an appendix available from the authors on request.

<sup>10</sup> The three organizations are the Romanian-American Enterprise Fund (RAEF – Small Loan Program), the Cooperative Housing Fundation (CHF – Micro Loan Program), and World Vision (CAPA).

<sup>11</sup> Although loan officers supported interviewers in approaching the firms, the former did not participate in the interviews, nor did they receive any firm-level information, the confidentiality of which had to be guaranteed when it was collected.

<sup>12</sup> A total of 89 could not be interviewed, for the following reasons: 4 had been bought out, 20 had closed, 5 did not have the owner-manager present, 19 could not be found, 9 had had their loan foreclosed and therefore did not cooperate, and 32 refused for other reasons.



53 percent fall into the “micro” category, with fewer than 10 employees, and an additional 23 percent have between 10 and 19. Only 9.1 percent of the firms are “medium,” according to the standard definition of 50-249 employees. Thus, the sample in this study is heavily tilted towards the smallest size categories of firms, unlike most other studies of the SME sector.

An important concern that may arise with respect to our sample is that there is some form of “selection bias” in the process determining whether firms receive loans from these loan agencies, and therefore that any estimates of the impact of determinants on growth may be biased. As with any nonexperimental design, we cannot entirely exclude the possibility of selection bias, but there are a number of mitigating factors to bear in mind. First of all, most of our determinants are measured in continuous variables that show considerable variability within and across firms. For example, considering the role of debt finance, we note that there are many firm-year observations when there are no loans, and there is enormous variation in the size of loans in those firm-years where they are present.

Furthermore, as in any study of the effect of a policy, our ambition is limited to assessing “the effect of treatment on the treated.” Thus, again using the example of loans, the relevant counter-factual is that the firms in our sample had not received these loans in these years, or that they had received smaller or larger loans. Our use of firm-fixed effects in the estimating equations uses variation in growth rates within each sampled firm, rather than comparing loan recipients with nonrecipients, to continue that example. The results from this analysis may be generalized only to firms that are similar to those in our sample, and one should be cautious about extrapolations to firms lacking a common statistical support.<sup>14</sup> The relevant policy question in this case, however, concerns marginal changes: it is not whether loans should be extended to the universe of all firms in

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<sup>13</sup> Some variables representing characteristics of the business environment are not time-varying, however, limiting the ways in which they can be used in the analysis.

Romania, but rather whether the loan program should be increased (or reduced), either by increasing the loans that the sample firms receive or by raising the number of firms that receive loans. We believe that our results are informative for this more realistic policy question.

A final type of selection bias could result from the fact that our database includes only surviving firms. If the factors that increase growth also tend to raise the probability of survival, as stands to reason, this suggests that our estimates of the effects will be understated, which is of course a caveat about our results.

## 2.2 Measuring Small Firm Growth

The standard measure of growth used in past studies of small firms is the change in the number of workers since startup, a variable that is relatively easy for respondents to remember and that is uncontaminated by price changes (see, e.g., Liedholm and Mead, 1999). Moreover, job creation may be an important social goal, and policies to support small businesses are frequently justified on their supposed employment effects (Birch, 1987).<sup>15</sup> This study also emphasizes employment growth, but using a modified measure that is arguably more appropriate, and it also studies sales growth as an alternative measure. This section describes the employment and sales growth definitions and analyzes how the measures vary with such characteristics as firm age, sector, region, and year.

The definition of employment growth in the present study differs in a number of important ways from a simple calculation of the change in the number of workers from the firm's start-up to the date of interview. To start with, the definition here includes working owners (entrepreneurs), since job creation for owners may be equally valuable, from a social point of view, as jobs created

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<sup>14</sup> Heckman et al. (1998) discuss the importance of the common support in estimating treatment effects in the dummy treatment variable case.

<sup>15</sup> According to McMillan and Woodruff (2002), “[t]he creation of jobs has been arguably the most important benefit of the new entrants” in transition countries.

for others. Workers on external (rather than labor) contracts are also included in the definition, as the purpose here is not to distinguish different types of contractual relations.<sup>16</sup>

A still more important feature of the definition of employment growth analyzed here is that we study annual growth rates, rather than total change since startup. The use of annual rates permits a much more precise assessment of the timing of employment growth effects, rather than cumulating over a long period of time. Our analysis of the panel data to link, for each firm, the timing of employment growth to the changes in factors that may be hypothesized to affect this growth.<sup>17</sup> The start-up year is excluded from the analysis because it is typically a highly volatile period in which firms may not fully operate and because this creates more comparability with the sales growth results, which are plagued by problems of part-year operation during start-up.<sup>18</sup>

Similar principles are applied in our analysis of sales growth, where we study annual rates of change in real (PPI-deflated) sales. Sales are reported cumulatively by year; thus during the start-up year they are an unreliable measure of average performance due to the ambiguity of the precise date of start-up. We therefore restrict the analysis of sales growth to data only from the first full year of operation. Unfortunately, information on sales in 2001 is not available, and all analyses of sales therefore concern data only through the year 2000.

Figures 1 and 2 contain graphs of the distributions of annual average growth since the first

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<sup>16</sup> On the other hand, unpaid family helpers are excluded, both because their relationship is more frequently part-time and casual (as well as unpaid) and because they cannot be reliably measured in all years. An incidental benefit of including working owners in the definition is that operating firms then always have strictly positive employment, which avoids the problem of zeroes in computing ratios and growth rates. Note that many of the sample firms have multiple working owners (the average is nearly two per firm).

<sup>17</sup> We also examined cross-sectional differences in employment growth, but in this case the measure is scaled geometrically, in other words assuming a constant exponential growth rate, with the purpose of creating some comparability between firms of various ages. Results from these cross-sectional regressions are qualitatively similar to those reported here, and they are available from the authors on request. The studies discussed by Liedholm and Mead (1999) use cross sections, but appear to analyze employment growth from start-up without scaling by firm age, while our method measures job creation per unit of time.

<sup>18</sup> Indeed, a finding reported in Liedholm and Mead's (1999) summary of research on Africa, the tendency for firms with a smaller employment in the start-up year to grow more strongly than average subsequently, might be attributable to the fact that the smaller firms had not really started up in that first year but then caught up in the year following.

full year of operation after start-up for employment and sales, respectively. Overall, growth performance was very strong, with average employment growth about 8 percent and average sales growth about 9 percent. Growth performance varied quite considerably across these firms, however. While most firms grew on average, a significant subset experienced no growth or declined. At the top end, 10 percent of firms experienced employment growth averaging over 30 percent a year, and 10 percent had sales growth over 50 percent. Thus, the sample contains enough variation for the study to be able to relate growth to potential determinants.<sup>19</sup>

Table 3 shows that growth rates vary significantly by year, with a general decline over much of the period. To some extent, the decline may be reflecting the recession of the late 1990s in Romania, and it may also reflect age effects: as the firms in the sample grow older, their growth rates follow a typical life cycle decline. This pattern suggests not only that age and year should be controlled for in the statistical analysis, but also that our search for the growth effects due to factors such as loans or technical assistance faces an uphill battle in the face of the life cycle effect.

### **3. MANAGERS' OPINIONS OF GROWTH CONSTRAINTS**

Most studies of factors explaining small firm growth rely on managers' survey responses concerning their perceptions of constraints. The problem with such an approach is that the responses to survey questions are clearly subjective and sometimes self-serving; therefore they cannot be taken as conclusive evidence. Nevertheless, such questions do permit the issues to be phrased directly, which is a particular advantage when it is difficult to design objective measures of factors. As a supplement to the analysis of objective factors and growth measures, opinions of entrepreneur-managers were also collected in this project, and they are reported in this section.

The phrasing of the questions involved listing a total of 14 constraints and asking the

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<sup>19</sup> Growth rates by region, industry, year, and age also vary, and we control for them in the analysis.

respondents to rate the degree to which he/she believed that the factor constrained their own firm's growth. Four sets of factors are analyzed:

- Finance: capital constraints, lack of collateral, and level of taxation.
- Non-financial inputs: difficulties in hiring appropriate employees and in finding adequate premises and supplies.
- Malfunctioning of the business environment: poor contract enforcement, administrative burden of taxation, bureaucratic interference, police protection and private protection payments, and unfair competition.
- Macroeconomic climate: inflation and low demand for goods and services provided by the firm.

The assessment on these factors is measured on a scale from 1 to 5, where 1 indicates not binding at all and 5 indicates extremely binding. For many purposes, little information is lost by grouping scores 1-3 together as non-constraining or neutral factors and scores 4-5 as "very constraining" or "extremely binding" obstacles, and the results for the percentage of firms reporting scores 4-5 are presented in Table 4. Results are provided for firms by category of growth rate (below and above the median) and by category of employment size ("micro" = 0-9, "small" = 10-49, and "medium" = 50-249, following the official categories in Romanian legislation). In addition, respondents ranked the top five "most constraining" factors, and the results are shown in Figure 3.

### *Financial Constraints*

A common finding in studies of managerial opinions in small businesses is that managers feel the firm is capital-constrained.<sup>20</sup> The opinions expressed in our survey were quite consistent, showing that financial factors rank highly in managers' opinions on constraints in Romania. As

shown in Table 4, about 78 percent of firms considered lack of capital as a very constraining factor, and the percentage was higher in slow-growing firms and those in the smaller size categories. Lack of collateral was taken as a serious barrier to accessing credit by 42 percent,<sup>21</sup> although in this case faster growing firms were more likely to cite it as a constraint, while there is no clear relationship with size. The high level of taxation, which may reduce the possibility of internal finance as an alternative to costly external sources, was considered an important constraint by nearly all firms (91.1 percent), with comparatively little variation by growth rate or size.<sup>22</sup> As shown in Figure 3, more than half of the firms reported either lack of capital or the level of taxation as the “most constraining” factor of all.

### *Labor and Material Inputs*

It is sometimes claimed that well-functioning markets for labor and other production inputs have been slow to develop in the transition economies. Educational systems designed to serve the pursuit of rapid industrialization may be poorly adapted to producing skills appropriate to a market economy, and soft budget constraints may keep resources bottled up in unproductive sectors of the economy. These problems could be particularly acute for small firms and new entrants that would like to expand. In the current study, about one-third of entrepreneur-managers mentioned hiring as a severe constraint, the problem reportedly greater for slow-growing firms and for micro and small firms. The availability of non-labor inputs, such as buildings and land, appears to be even less serious, as 18 percent of firms reported difficulties in finding and renting adequate premises

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<sup>20</sup> See, for instance, Pissarides, Singer, and Svejnar (2000) on Bulgaria and Russia and Barlett and Bukvic (2001) on Slovenia. EBRD (1999) uses a four-point scale, with four implying the highest level of constraint, and reports an average score of 3.11 for financing for start-ups in 1997-99 across 22 transition economies.

<sup>21</sup> The same percent was obtained in a study carried out by the Romanian Center for Small and Medium Enterprises (1998) in 1996, suggesting there has been little change in collateral demands of the main credit providers.

<sup>22</sup> The survey used for the EBRD (1999) report finds an average score on “taxes and regulation” of 3.26 for all countries and 3.55 for Romania, but unfortunately does not distinguish tax level, administrative burden of taxation, and other regulatory burdens.

(buildings), and about 11 percent were concerned about the reliability of supplies.<sup>23</sup> These factors were seldom mentioned on the list of worst constraints.

### *Business Environment*

In order to assess the business environment, respondents were asked to report the degree of constraint associated with a variety of factors concerning contract enforcement, administrative burden of taxation, bureaucratic interference, police protection and private protection payments, and unfair competition. Some recent studies have argued that these factors are particularly important barriers to small firm development.<sup>24</sup>

The survey results, again shown in Table 4, indicate that only 17.7 percent of entrepreneurs consider that at least one type of contract enforcement (with either customers or suppliers) is a very binding or serious constraint. Moreover, protection payments to the police and private parties (mafias), which threaten property rights, are evaluated as serious problems by only trivial numbers of firms. Constraints associated with bureaucratic interference are somewhat higher, with about one-third of firms reporting serious problems, a fraction that is higher in slower growing and smaller enterprises; about 5 percent of firms reported this problem as the most constraining they faced. Nevertheless, by these conventional measures, the business environment appears to be less constraining than recent claims suggest.

More important in these managerial opinions is the allegation that some competitors receive unfair advantages on the market, with about 47 percent of firms considering unfair competition a

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<sup>23</sup> The problem appears to be greater for SMEs elsewhere in the region. Pissarides, Singer, and Svejnar (2000), for example, report that 52 percent of the Russian and 55 percent of the Bulgarian managers in their sample considered that “getting land, office space and buildings” was a very important constraint; the data pertain to 1995, still very early in transition, however, compared to the present study's information on Romania in 2001. EBRD (1999) returns fairly low values for “infrastructure”: an average of 2.07 for all countries, and 2.51 for Romania.

<sup>24</sup> See EBRD (1999) and Johnson, McMillan, and Woodruff (2000, 2002).

binding factor.<sup>25</sup> Whether competition is evaluated as “unfair” could certainly involve some subjectivity, but in the Romanian context it may reflect the presence of subsidies or regulations favoring larger, state-owned firms (particularly *regii autonome*) or jealousy over special preferences granted to foreign investors, which have been quite controversial in the country. Also, Romanian mass media often report cases of unfair benefits received by firms with strong political connections. About 6 percent of firms report this factor as the most constraining.

Still more substantial is the view that the administrative burden of taxation is an important constraint, with 90 percent of managers so reporting. This variable is unusual in studies of small firm growth, as the level and administrative burden of taxation are rarely distinguished.<sup>26</sup> But it does represent an aspect of the environment for business that may be influenced by government. In any case, despite the fact that most managers take a dim view of the complexities of the tax code, few cite it as one of the most constraining factors, implying that it is relatively less important than some of the others.

### *Macroeconomic Climate*

Inflation was viewed by most firms as a very important constraint, and about 30 percent cited it as the single most constraining factor, as shown in Figure 3. Low demand for the firm’s products was cited as a constraint by 37 percent, but it was one of the most important factors for very few firms. These results suggest that, to small firms, macroeconomic stability is viewed as more important than demand growth; apparently most of these firms believe they have a market, but they require a stable environment to be able to make pricing and other business decisions.

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<sup>25</sup> The Romanian Center for Small and Medium Enterprises (1998) report a similar response in their study using 1996 data. Unfair competition was reported to be the second most serious constraint on sales.

<sup>26</sup> Administrative burden is also not the typical measure of the business environment employed by studies such as EBRD (1999) and Johnson, McMillan, and Woodruff (2000, 2002). As noted above, EBRD (1999) combines “taxes and regulations” into a single category.



#### 4. OBJECTIVE MEASURES OF POTENTIAL FACTORS AFFECTING GROWTH

This section presents our measures of factors that may promote or constrain the growth of the sample firms. We refer to these measures as “objective,” and for the most part the variables do refer to quantities that may be independently verified and that are defined according to generally accepted and interpersonally comparable metrics. Some of the variables, however, result from questions in which manager-owners were asked to estimate some factual condition or circumstance. Such measures are particularly important in the business environment section of the survey, when respondents were asked about various aspects of government regulation and interference, contract enforcement, property rights, and corruption. With respect to these estimated variables, however, our method remains the same – to investigate their effects on firm growth in a multivariate panel framework – and thus the empirical strategy differs from the standard analysis of managerial opinions concerning growth constraints presented in the previous section.

Our classification of potential growth factors emphasizes policy-relevant variables and draws upon previous research on one or another aspect of these issues. The four sets of factors, in our classification, are as follows:

- *Finance*: all sources of capital – retained earnings, conventional bank lending, informal credit markets, “fiscal facilities” offered by the state, and international aid programs.
- *Human capital*: education, experience and other characteristics of both entrepreneurs and their workforces, including training and constraints on hiring.
- *Technical assistance*: membership in a business association and training and consultancy programs from a variety of sources.
- *Business environment*: competition, red tape, contract enforcement, property rights and corruption.

Each of these factors has been the subject of considerable discussion, but no prior study has

considered all of them simultaneously and attempted to evaluate their relative importance on firm growth performance. In this section, we present our measures for each set of factors in turn.

#### 4.1 Finance

Financial constraints on the start-up and growth of new ventures have received much attention in the transition economies. While some studies have shown a clear role for financial constraints in entrepreneurial start-up, the importance of finance for the subsequent growth and performance of small firms has been more controversial.<sup>27</sup> Some recent studies have argued that financial constraints are either unimportant, or much less important than other factors.<sup>28</sup>

The measures of financial constraints studied here include the size, number, and source of loans, the rate and amount of reinvested profit, and the extent of access to “fiscal facilities” lowering taxes. Starting with loans, the Romanian survey sample includes only firms that have received a loan from a USAID-supported program; thus all these firms have received at least one loan. Not every firm received a loan every year, however; indeed in most years of their operations, the sample firms had no loans whatsoever. Moreover, some firms received larger loans than others. The amount of loans therefore varies considerably both across firms, and over time for each firm.

Tables 5 and 6 provide information on the incidence and size of loans, measured as a ratio to employment and sales.<sup>29</sup> Only from 1999 did the percentage rise over 50, and it peaked at 75

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<sup>27</sup> Earle and Sakova (1999, 2000) analyze the impact of finance on entry into entrepreneurship.

<sup>28</sup> See, for example, EBRD (1999); Bratkowski, Grosfeld, and Rostowski (2000); Johnson, McMillan, and Woodruff (2000 and 2002). On the other hand, Pissarides, Singer, and Svejnar (2000) find that the managers in their samples report the lack of external finance to be a serious constraint. In this previous research, only Johnson, McMillan, and Woodruff (2000) estimate growth equations similar in spirit to ours, but their framework is cross-section with growth measured from 1994 to 1996, their sample excludes micro enterprises, and the external financial indicator is a simple dummy variable for whether the firm ever received a loan prior to 1996.

<sup>29</sup> The size of the loan is measured as the sum of the amounts in the second half of the previous year and the first half of the current year. The amounts are determined by the extent to which the loan expands financial possibilities in that year, defined as the full amount of the loan in the first half year of disbursement and declining linearly over the term of the loan thereafter. These calculations assume that the loan is repaid in equal installments continually over the term, which seems to be the most common practice. We also estimated the equations with a variety of alternative specifications, for instance the magnitude of loans in year  $t-1$ , with very similar results to those reported here.

percent in 2000, falling to 68 percent in 2001. The mean loan per employee is generally about \$3000, and when the lei value of sales is converted at current exchange rates, the mean loan amount is about 70 percent of sales; for Romanian firms, these are substantial loans.<sup>30</sup>

An alternative to external finance is reinvesting profits. Table 7 shows the variation in the percentage of profit that firms report reinvesting. About 25 percent of the firms never reinvest in any year, but the average rate among the rest is high. The fraction of firms reinvesting is higher earlier in the period, but the average rate among those reinvesting is fairly constant at about 80 percent.

The relevant notion of profits for reinvestment purposes is net or after-tax profits; thus the extent to which firms have profits to reinvest is influenced by their tax rates. A particularly interesting policy in this respect has been the granting of so-called “fiscal facilities,” which may be given for a variety of reasons and under a variety of programs. Most of these involved tax reductions (60 percent reduce the profit tax and another 15 percent reduce import or export taxes), and seven percent involve credits. Unfortunately, the value of these benefits is difficult to quantify, but Table 7 shows the percentage of firms reporting receiving them and their number by year. About 90 percent of the sample did not receive any facility in any given year, but those who did had extra financial resources that they could use to grow.

## 4.2 Human Capital

Although it is frequently claimed that the transition economies of Eastern Europe started the process with relatively strong human resources due to well-developed educational systems, it is less clear that the skills of the population were well-g geared toward entrepreneurial endeavors or toward

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<sup>30</sup> Concerning the sources of finance, informal loans from family, friends, and loan sharks account for a rather small percentage of the total (about 3.5 percent), while formal loans from banks and international organizations account for 95 percent. Interfirm credit also plays only a small role for our sample firms, in contrast to McMillan and Woodruff’s (1999) analysis of firms in Vietnam.

responding to the demands of the market rather than central planners and factory bosses. Table 8 shows some characteristics of entrepreneurs in our data. These are computed by taking the share-weighted average across owners for each year and for each firm, averaging these across years for each firm, and then averaging across firms. The figures thus give the average percentage ownership by each characteristic.<sup>31</sup>

The Table shows that women own an average of about 30 percent, while only 0.7 percent is accounted for by foreigners. Most entrepreneurs are new to the industry in which their firms operate, as 59 percent worked outside the industry prior to starting up the firm. Entrepreneurs tend to be well educated, with 49 percent having completed some form of university education, and an additional 32 percent had completed academic secondary schools. The age distribution is given in Figure 6. Most entrepreneurs are in their 30s and early 40s, and an unusually low fraction is over 50 years old.<sup>32</sup>

The survey also collected information on workers' characteristics, including their educational attainment. By contrast with their employers, few employees had university education: 12.6 percent, about the national average. About 33 percent of workers had not finished high school.

A final human capital measure is a proxy variable for the difficulty of hiring, analogously to the managerial opinion variable on this topic in Section 3. Our measure is the respondent's estimate of the costs of hiring an additional worker, including all the time spent advertising, interviewing, selecting, and training a new employee. The range of this variable is from zero to 480 hours, with a mean of 45.9 and median of 24.0. The survey also asked about initial training costs, measured in time; the mean was 54 days for a newly hired unexperienced worker, and 22 days for

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<sup>31</sup> If each firm had a single, unchanging entrepreneur, this would correspond to the percentage of entrepreneurs, but with multiple entrepreneurs holding differential ownership stakes, it is important to take into account these weights in estimating the relative importance of each characteristic.

those with some experience. In some specifications, we summed the hiring and training times to obtain a measure of the total cost.

### 4.3 Technical Assistance

Much effort and many financial resources have been expended on the design of technical assistance programs for small firms in transition economies, but rather little evidence is available on how well these programs have functioned. Rather few firms in our data report actually having received technical assistance: about 30 percent overall, 10 percent receiving only training, 9 percent receiving only consulting, and 10 percent receiving both.

Although relatively few firms have received technical assistance, those that do tend to receive multiple services. The types of services received, source of financing, and service providers are shown in Table 9. Most common are consulting in marketing and training of entrepreneurs and workers. About half the services were paid for by the firm itself, while USAID accounts for only 13.5 percent. Both domestic and foreign/international providers are represented in our data.

Respondents were also asked to rate the usefulness of each instance of technical assistance on a three-point scale (“not useful at all,” “somewhat useful,” and “very useful”). Despite the low incidence of technical assistance, the recipients rate what they have received very highly, 75.0 percent of services being rated “very useful” and an additional 21.5 percent “somewhat useful.” These subjective ratings, while informative, cannot be equated with evidence of a positive effect of receipt of technical assistance services on the firm’s growth rate. Such evidence requires multivariate analysis of factors explaining growth, including technical assistance.

Donors have actively promoted business associations as an important way to promote SME development. Only 28.5 percent of the firms in the sample are members, however. Members

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<sup>32</sup> The study also investigated a variety of other characteristics of entrepreneurs, including their family backgrounds and their experience prior to 1990 (including political background), but these variables were unassociated with measured

report wanting to be a part of business associations for several purposes, the most common being consulting services, locating customers and suppliers, and training. Many of the other firms report not being members because the services are not useful or membership is not worth the cost.

#### **4.4 Business Environment**

The final set of factors concerns the environment within which firms operate: costs of registration and problems with bureaucracy, use of the courts and other means to handle disputes, predatory behavior from police and private parties, and the extent of under-reporting of financial indicators.<sup>33</sup> An important problem in this field is ensuring accurate indicators for these problems, and the survey attempted a wide variety of alternative measures, only some of which are discussed here.

The costs of registration are frequently used as a measure of bureaucratic interference into small firm operation. In the Romanian case, the approval of three different agencies was necessary during most of the period we are studying: the Ministry of Finance, the Ministry of Labor and Social Protection, and the Registry of Trade and Commerce. It is frequently maintained that bribes are either necessary or useful for expediting the registration process, and our questionnaire asked respondents to estimate the distribution of the total monetary cost among official payments, unofficial payments (bribes), and consulting fees (which might also be partly bribes).<sup>34</sup> Official payments account for 90 percent, consulting fees for 7 percent, and bribes only about 3 percent, according to firm reports.

The survey also collected information on the number of permits required for the firm to

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firm performance in this data set.

<sup>33</sup> IRIS (2000) contains a detailed discussion of legal procedures, regulation, and taxation of small businesses in Romania.

<sup>34</sup> Anecdotal evidence suggests that bribes are frequently paid indirectly, through a third party; for instance, a lawyer or other agent may be hired to carry out the registration, and part of the “fee” paid to this agent may end up in the hands of the bureaucrat. Most surveys of corruption fail to measure this channel.

operate in the first year after founding and the number of government inspections that took place that year. While most firms needed relatively few permits and received a moderate number of inspections (in both cases defined as less than ten), some firms experienced more bureaucratic hassles.<sup>35</sup>

Most firms have disputes with customers or suppliers at some time or other in their history, but an interesting question is how the disputes are handled. Survey respondents were asked to specify the dispute-resolution methods they had used in the past and the single method they would most likely use in the future. The results show that going to court is common (58.6 percent of firms report having done so, and 37.7 percent say this would also be the most likely future method), but still more common is resolving never to deal with the party again.

To elicit truthful responses on protection payments, firms were asked to specify the incidence in their sector. Only about 7 percent of firms say “rather yes” to the statement that it is sometimes necessary for firms in the sector to make such payments to either private parties or the police.

Respondents were also asked whether they were willing to pay for a clean business environment. The results from 282 respondents is that 77 percent claimed they were willing to pay, and the amounts they reported to be willing to pay were not inconsequential (5-10 percent of sales).

A final indicator is truthful reporting. If a firm has little to fear from predatory government bureaucrats or private mafias, it is more likely to truthfully report financial indicators. Firms were asked to estimate the extent of under-reporting by “other firms in the same industry and region.” The results show that an average of 24 percent of employment, 32 percent of wages, 28 percent of

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<sup>35</sup> IRIS (2000) claims that it was not only the number of required permits that bothered firms, but also the cost of preparing the necessary documentation to get permits; the median amount of time preparing documentation for the Trade Registry was seven days, for example. In the current survey, the median respondent reported a total of 30 days of work for filling out forms and dealing with the Trade Registry, the fiscal authorities, and the Labor Chamber in order to be able to operate, but this variable was unassociated with subsequent firm growth.

profits, and 25 percent of sales are said to go unreported. According to these measures, the hidden economy is quite substantial in Romania.<sup>36</sup>

## 5. ESTIMATION FRAMEWORK AND RESULTS

This section reports regression results relating employment and sales growth to the four types of factors, while controlling for other relevant variables: firm age, past and current reorganizations (two dummies, one for mergers and acquisitions, and the other for split-ups and spin-offs), size category, size of the city where the firm is located, industry, region, and year dummies. One might expect growth rates to decline with age and size. By definition, mergers and acquisitions should be associated with growth, and split-ups and spin-offs with contraction. Firms in larger cities may have more growth opportunities. Industry and regional dummies control for demand and other factors not otherwise included, and year dummies control for macroeconomic shocks. The regressions are based on a 1994-2001 panel, since the number of observations is very small in 1992 and 1993. The equations we estimate are all variants on the following basic form:

$$y_{it} = \beta_1 Finance_{it-1} + \beta_2 HumanCapital_{it-1} + \beta_3 TechnicalAssistance_{it-1} + \beta_4 BusinessEnvironment_{it-1} \\ + \gamma_1 Age_{it} + \gamma_2 Reorganized_i + \gamma_3 FirmSize_{it-1} + \gamma_4 CitySize_i + \gamma_5 Industry_i + \gamma_6 Region_i \\ + \alpha_t + \alpha_i + \varepsilon_{it} ,$$

where the  $\beta$  are the parameters of interest corresponding to policy-relevant factors, and the  $\gamma$  reflect the impact of controls. In alternative versions of this equation,  $y_{it}$  stands for employment and sales growth –  $\ln(E_{it}/E_{it-1})$  and  $\ln(S_{it}/S_{it-1})$  – and different specifications of the policy-relevant factors are employed. Summary statistics for these variables, which are based on those discussed in Section 4, above, are provided in Table 23, and precise definitions may be found in the data appendix.

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<sup>36</sup> A recent paper estimating the size of the shadow economy labor force as a percentage of the working age population in 22 transition countries reports a figure of 24.3 percent in Romania, just above the Central and East European average of 23.3 percent (Schneider, 2002).



Nontime-varying controls, which are subscripted only with an  $i$ , drop out of the equation when the firm fixed effects  $\alpha_i$  are included, as does the age variable, when both  $\alpha_t$  and  $\alpha_i$  are included. In most specifications we include the  $\alpha_i$  to control for unobserved firm heterogeneity, but as some business environment measures are contemporaneous or refer to the firm's startup period, we also estimated every equation by OLS. As is well-known, OLS is more robust in the presence of measurement error.

We estimated hundreds of versions of this equation, varying with the choice of variables, timing, controls, and use of firm fixed effects. Some representative results from these estimations are provided in Tables 11-14. Table 11 displays the results of the pooled OLS and firm fixed effects base specifications. Tables 12, 13, and 14 show results from alternative specifications of the financial, technical assistance, and business environment factors, respectively.

The results in Table 11 demonstrate a positive and significant relationship between the amount by which a firm's financial constraint is relaxed by loans in one year and the increase in employment and sales in the next. We exploited the fact that the data contain detailed information on the timing of all the firm's loans to construct alternative loan measures. In particular, we examined the effect of average loans over the years  $t-1$  and  $t$  and those in the second half of year  $t-1$  and the first half of year  $t$ . The results were very similar to those presented here.<sup>37</sup>

"Fiscal facilities" provided by the state consistently and substantially raise employment growth. The presence of fiscal facilities in one year increases employment growth by 0.08 in the fixed effects specification, suggesting that the high statutory tax rates represent a significant financial constraint on small firm employment expansion. This is consistent with the opinions expressed by about one quarter of entrepreneurs that the level of taxation is the most constraining

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<sup>37</sup> We say "average" over this period because our measure assumes that the degree to which the financial constraint is relaxed declines linearly over the term of the loan; thus, we calculate the average of this "relaxation rate."

factor for the development of their firm.

The proportion of reinvested profit has no significant relationship with either employment or sales (Table 12), however, despite the fact that each year more than half of the firms in the sample reported reinvesting some of their profit. This suggests that rather than being a substitute for external funds, reinvested profit is a fallback solution. And since firms' reported net profits tend to be quite low, they may not be earning sufficiently high levels to meet their investment needs.<sup>38</sup> Trade credit also shows an insignificant influence. So far, the results support the proposition that financial constraints are highly significant for the sample firms, as an increase in external financial resources has a positive impact on both employment and sales growth.

The effects of the human capital variables on employment and sales growth are weaker in general than those for financial constraints. There is a strong positive relationship, however, between the entrepreneur's level of education and employment growth in the fixed effects specification. Most of the impact comes from high school graduation. Also, there is evidence that entrepreneurs whose prior work experience is inside the firm's industry, males, and foreigners are more successful at raising employment growth. These relationships do not show up for the sales growth, however. The negative, slightly convex relationship between both growth measures and age, found in the OLS specifications, disappears once firm fixed effects are added. The results for worker education show no precisely estimated effect.

Technical assistance is associated with faster employment growth in the OLS equation, but the estimated coefficient becomes statistically insignificant when firm fixed effects are added. As shown in Table 13, there is some evidence of a positive effect of technical assistance only when it comes from a foreign partner or international organization, and only is the impact of the latter

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<sup>38</sup> Though net profit is surely underreported, that probably does not fully explain the low numbers. Note that the entrepreneurs reported that only 28 percent of profits were not reported on average.

marginally statistically significant (at the 10 percent level) when firm fixed effects are added – and only in the employment growth regression. None of the variables shows a positive effect on sales growth once firm fixed effects are added. The combination of sometimes positive OLS and insignificant fixed effects results suggest that the firms with better growth opportunities received technical assistance, but that the technical assistance itself had no impact.

Finally, regressions were run using many different measures of the business environment, including measures of corruption, competition, permits, inspections, and problems with contract enforcement and property rights.<sup>39</sup> Among hundreds of alternative specifications investigated, no evidence was found that these variables constrain growth.<sup>40</sup> To some extent the comparative lack of strong results in this area may simply reflect the difficulty of finding reliable measures of the relevant concepts, particularly time-varying measures for each firm, but the results at least provide a caveat for policies and programs that would reallocate resources towards business environment issues at the expense of providing finance in Romania.

## 6. CONCLUSIONS

Although the importance of small startup companies for economic growth and innovation is widely recognized in all types of economies – developed, developing, and transitional – there has been relatively little research into the policy-relevant factors that stimulate their growth. Studies of managerial opinions concerning the obstacles faced by their firms are useful and suggestive, but we believe that there is a need for careful quantitative studies using panel data to analyze the statistical

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<sup>39</sup> The survey provides about 30 alternative measures of the business environment, not counting measures of competition. The regressions attempted various combinations of these, using cross-section as well as panel specifications, and alternative sets of controls (including very parsimonious equations with few or no controls).

<sup>40</sup> Johnson, McMillan, and Woodruff (2000) similarly find little evidence of a relationship between property rights enforcement and growth in Poland, Romania, and Slovakia, which they report to have significantly better property rights enforcement than Russia or Ukraine. One interpretation of the evidence is that below a certain level of property rights protection, the policy emphasis should be on improving protection, but once protection has reached a certain level, improving access to finance may have a bigger payoff for growth.

relationship between firm growth and objective measures of factors related to policies. In this study we have attempted to begin to fill this gap, using a remarkable data set with detailed information over the entire lifespans of firms. Here we summarize the conclusions from our analysis of these data, and we also discuss caveats that are important in interpreting our work and that suggest how future research may proceed.

The results provide strong evidence that loans are an important factor in stimulating the growth of small startup firms in Romania. Internal finance and trade credit appear to be relatively unimportant in accounting for firm growth. This finding, which is highly robust to alternative specifications and methods of estimation, runs counter to the claims of some recent studies that finance is not an important constraint for small firm growth in Eastern Europe. Among the financial determinants of growth, “fiscal facilities” provided by the state consistently and substantially raise employment growth, suggesting that the statutory tax rates represent a significant financial constraint on small firm expansion.<sup>41</sup>

Other factors tend to be weaker and much more sensitive to specification. Concerning human capital, the findings suggest that the entrepreneur’s level of education and prior experience in the industry is positively associated with higher employment growth. Having a male or foreign entrepreneur is also associated with employment growth.

Concerning technical assistance, only that received from foreign partners or international agencies appears to be in any way related to growth. In general it appears that firms that were growing anyway were receiving technical assistance, but the actual assistance had little additional impact.

A final set of policy-relevant variables concerns competition, contract enforcement, property rights, and other aspects of the business environment. Although transition economies have

stimulated fascinating discussions of these issues, the analysis in this project reveals that the relationship between measures of the business environment and firm performance is weaker than it is for the other factors. Among many variables investigated – including measures of corruption, permits, inspections, and problems with contract enforcement and property rights – little or no evidence was found that they constrain growth.

These policy conclusions are of course subject to a number of caveats. First of all, the specific conclusions are limited to the sample of firms analyzed in this study. All of these firms are unusual, at least in the sense that they received a USAID-sponsored loan, and thus their average quality may reasonably be supposed to be higher than the average in the entire universe of small Romanian enterprises. Although our use of fixed effects controls for quality differences among the sample firms, extrapolating the study's exact findings to a broader category of firms requires an assumption that the factors that influence growth are similar in both cases.

On the other hand, our assessment, as in any policy analysis, is limited to “the effect of treatment on the treated.” Using the example of loans, the relevant counter-factuals are that the firms in our sample had not received these loans in these years, or that they had received smaller or larger loans. The results may be generalized only to firms that are similar to our sample firms. The relevant policy question, however, is not whether loans should be extended to the universe of all firms in Romania, but rather whether the loan program should for example be doubled in size, either by doubling the loans that the sample firms receive or by doubling the number of firms that receive loans. If small firms in Romania are indeed capital-constrained, as our evidence strongly suggests, then we doubt that the next 300 or so firms in the queue for finance would differ

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<sup>41</sup> The Romanian government has recently removed many of these facilities.

materially from the 300 who did receive the USAID loan. Thus, for such policy questions, our results may provide some guidance.<sup>42</sup>

Concerning sample size, the number of firms and years in this study is larger than in most other studies of firm performance in transition economies, but it is still small enough to suggest caution in interpreting the results. The use of time series information on each firm and the focus on micro enterprises – which are advantages of this study relative to other research in this area – mitigate the problem to some extent, but not entirely. For instance, the estimates of the number of jobs created by loans fluctuate depending on the precise measures and statistical methods employed in the analysis. The positive association of higher employment growth and receipt of loans is strongly supported by the data, but the precise point estimates of the magnitude of job creation should be treated with caution.

The strength of our conclusions is also limited by measurement difficulties. With respect to the business environment, for example, the extent to which contracts are enforced and the degree to which property rights are respected are variables that are difficult to measure. Although we collected information on a wide variety of alternative measures and explored many different ways of estimating their effects, the finding of little relationship between these variables and firm growth may simply reflect the difficulty of measurement.

Inferences concerning the association of firm growth with the potential factors may also be limited by lack of variation in the sample. To take the business environment variables again as an example, it is possible that their variation within Romania is insufficient to be related to differences in growth rates. Perhaps all firms are equally constrained by these factors. In fact, however, the

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<sup>42</sup> Moreover, a possible implication of a systematic quality difference between our sample and population of Romanian firms could be, assuming that firms of lesser quality tend to be more credit-constrained, that our estimated positive effect of loans on growth is actually understated relative to the population average effect. For the business environment, however, the possible bias may go in the other direction if successful firms are more subject to bureaucratic and other forms of predation, implying that our estimated zero effect is if anything overstated.

survey data do show fairly substantial variation in both the business environment measures and in growth rates.

The final caveat concerns the limits of statistical methods to yield causal conclusions. While the study has made every effort to isolate the effects of individual factors and to estimate their magnitudes, in particular through the use of panel data techniques and careful specification of the timing of the relationships, the possibility of reverse causality remains. For instance, it is possible that firms with superior growth prospects tend to receive bigger loans; in this case, the loan effect would result from careful selection by loan officers, rather than through relaxation of the financing constraint (and monitoring of the firm's behavior). Our understanding is that loan applications are typically evaluated based on the level of the firm's past performance, rather than the particular project for which the loan would be used, and our use of firm fixed effects would control for this form of selection bias. Moreover, our identification of growth spurts in the period immediately following the receipt of a loan is strong evidence that the loan is the driving force in increasing growth, rather than *vice versa*, but we cannot entirely exclude the possibility that some dynamic selection mechanism also plays an important role.

## APPENDIX: VARIABLE DEFINITIONS

### GROWTH MEASURES

**Employment Growth** is the log of the ratio of current employment to employment in the previous year, where employment level is defined as the sum of regular workers, contract workers, and working entrepreneurs.

**Sales Growth** is the log of the ratio of sales in the current year to sales in previous year, where sales level is calculated in 2000 prices, in ROL, using PPI at 2-digit CAEN aggregation level. CAEN is the Romanian National Classification for Economic Activities.

### FINANCE

**1 Year Lagged Amount of Loans** is the log of the average amount of loans in year t-1, scaled by the average of employment in year t-1 and t-2 (in employment growth regressions) or by average sales in year t-1 and t-2 (in sales growth regressions). The average amount of loans in year t-1 is the average of the first and second six-month periods in year t-1. The amount in any six-month period is the full amount received in that period, plus a fraction of not yet matured loans received in previous periods, where the amount declines linearly until maturity.

**Reinvested Profit** is the proportion of net profit reinvested in year t-1.

**Number of Fiscal Facilities** is the total number of fiscal facilities received in year t-1.

**Proportion of Materials Bought with Trade Credit** is the average proportion of materials bought with trade credit in year t-1.

### HUMAN CAPITAL

**Entrepreneur's Experience in Other Industry** is the average proportion of shares in year t-1 held by individuals who worked in another industry prior to owning shares in the firm.

**Entrepreneur's Age** is the average age of individual owners in year t-1, weighted by their proportion of shares.

**Entrepreneurs with High School** is the average proportion of shares in year t-1 held by individuals whose highest educational attainment is a high school education.

**Entrepreneurs with University** is the average proportion of shares in year t-1 held by individuals whose highest educational attainment is a university education.

**Foreign Entrepreneurs** is the average proportion of shares in year t-1 held by foreign individuals.

**Female Entrepreneurs** is the average proportion of shares in year t-1 held by females.

**Workers with High School** is the proportion of workers on regular contracts in mid-2001 whose highest educational attainment is a high school education.

**Workers with University** is the proportion of workers on regular contracts in mid-2001 whose highest educational attainment is either a short or long-term university education.

### TECHNICAL ASSISTANCE

**Number of Technical Assistance Services** is the number of services in year t-1.



**Number of Training Services** is the number of training services in year t-1.

**Training for Workers/Managers** is the number of training services for workers/managers in year t-1.

**Number of TA Paid by Firm** is the number of services paid by the firm in year t-1.

**Number of TA from Government/NGOs/Foreign/International Organizations** is the number of services provided by each source in year t-1.

## **BUSINESS ENVIRONMENT**

**Proportion of Permits Not Obtained** is the proportion of permits that the firm did not have, but should have had by law in year t-1.

**Number of Permits/ Inspections in First Year of Operation** is a dummy equal 1 if the number of permits/ inspections needed during the first year of operation was greater than 9.

**Disputes per Year** is the number of contract disputes that could not be resolved through direct negotiations that the firm has ever had, divided by the number of years in operation.

**Dummy for Protection Payments to Private Parties/ Police/ Government Officials** is a dummy equal 1 for firms in the same industry making protection payments to each party in mid-2001.

**Unofficial Payments** is the sum of the Private Party, Police, and Governmental Officials dummies.

**Payment for a Clean Environment** is the proportion of sales the firm was willing to pay to operate in a clean business environment.

**Proportion of Sales Sold with Trade Credit** is the proportion of sales sold with trade credit in year t-1.

**Proportion of Overdue Receivables** is the amount of overdue receivables as a proportion of sales in year t-1.

## **BASIC CHARACTERISTICS OF THE FIRM (REGRESSION CONTROLS)**

**Age of Firm** is the age of the firm since start date (either start-up date in the case of new firms with no antecedents in state-owned enterprises or the date of the reorganization of a former state enterprise).

**Reorganization** is a dummy equal 1 if the firm was founded as a result of the reorganization of a pre-existing firm (i.e., if the firm was spun-off from another entity or founded on the basis of a split-up or merger).

**Spin-off** is a dummy equal 1 if the firm spun-off assets in year t-1.

**Acquisition** is a dummy equal 1 if the firm made an acquisition in year t-1.

**Industry Dummies** include Heavy, Wholesale, Retail Trade of Food, Nonfood Retail Trade, Transportation, Light, and Other Services (1-digit CAEN level of aggregation).

**Regional Dummies** include South, Banat, West, Center, Moldova, and Bucharest.

**City Size** is the log of the population of the city where the firm is located.

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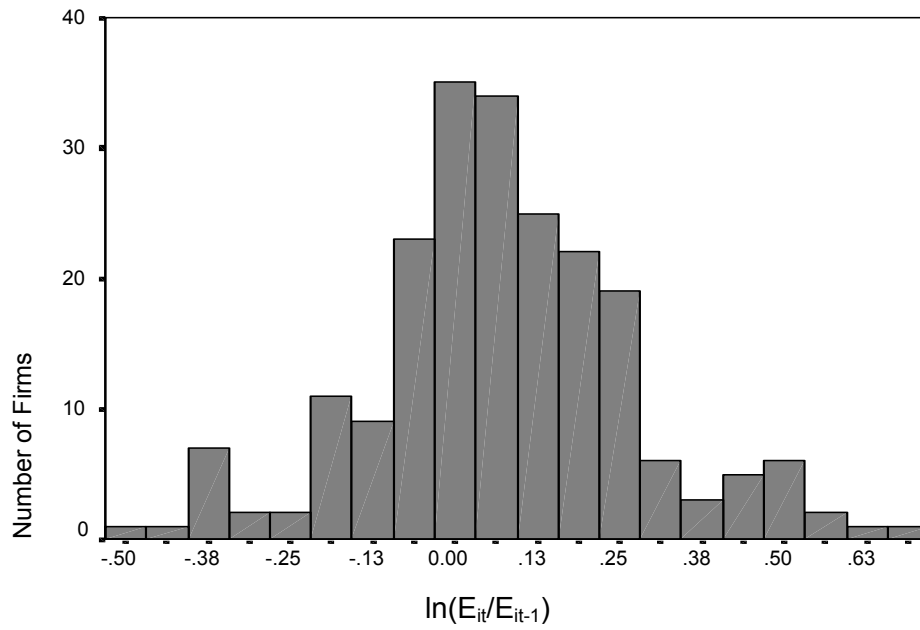
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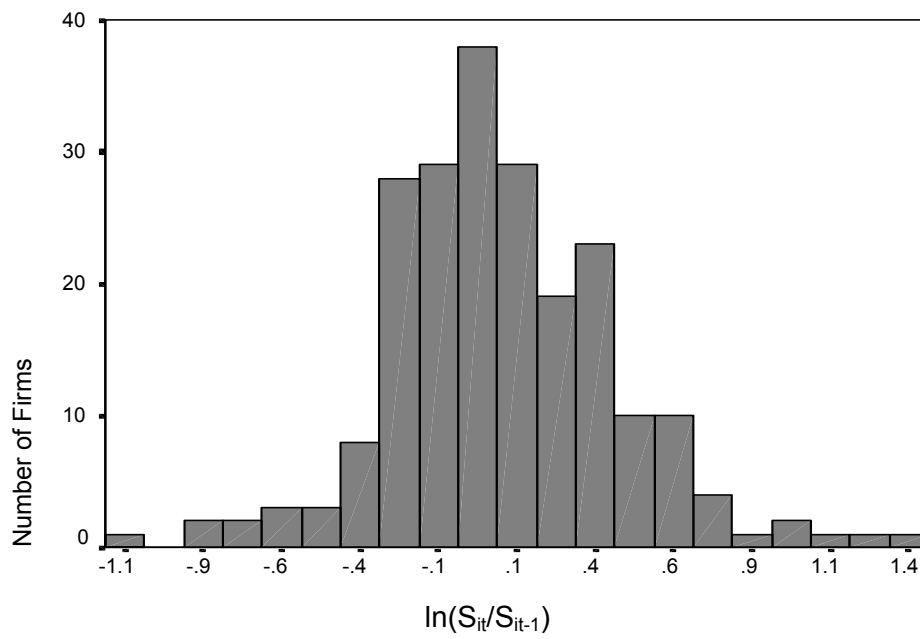
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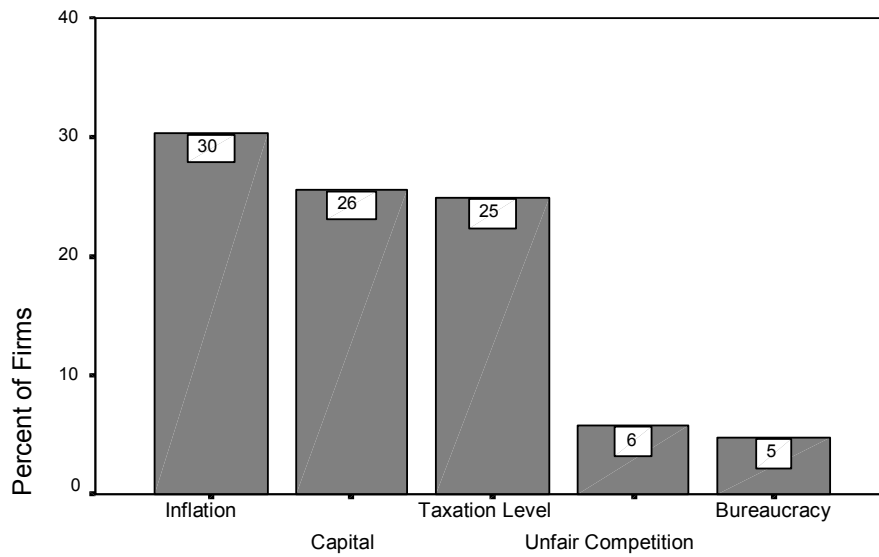
**Figure 1: Average Annual Employment Growth**



**Figure 2: Average Annual Sales Growth**



**Figure 3: Managerial Opinions about Factors Creating the Largest Growth Constraints**



**Table 1: Start Date (Year of Starting Operation or Last Major Reorganization)**

Year	Number of Firms	Percent of Firms
1989	4	1.4
1990	3	1.0
1991	32	10.8
1992	41	13.8
1993	34	11.4
1994	64	21.5
1995	25	8.4
1996	25	8.4
1997	26	8.8
1998	25	8.4
1999	18	6.1

Sample Size: 297.

**Table 2: Sample Composition**

	Number of Firms	Percent of Firms
<b>Region</b>		
Banat	94	31.6
West	64	21.5
Center	54	18.2
Moldova	17	5.7
South	58	19.5
Bucharest	10	3.4
<b>Industry</b>		
Light Industry	61	20.5
Heavy Industry	27	9.1
Trade	142	47.8
Transportation	22	7.4
Other Services	45	15.2
<b>Number of Employees</b>		
0 – 1	9	3.3
2 – 4	52	18.9
5 – 9	86	31.3
10 – 19	64	23.3
20 – 29	20	7.3
30 – 39	8	2.9
40 – 49	11	4.0
50 – 59	7	2.5
60 – 69	5	1.8
70 +	13	4.7

Sample Sizes: 297 for Region, 297 for Industry, and 275 for Number of Employees.

Notes: Banat includes the counties of Caras Severin, Mehedinti, and Timisoara; West includes Arad and Cluj; Center includes Alba, Hunedoara, Mures, and Sibiu; Moldova includes Buzau, Galati, and Iasi; South includes Arges, Constanta, and Dolj. Bucharest is the capital.

3-digit activities are grouped into 5 categories: Light Industry (food, beverages, textile, confection, shoes, leather, furniture, paper, publishing, construction services); Heavy Industry (chemical, rubber, plastic, metal parts, electric equipment, and instruments, recycling metallic materials, other products from minerals and metals); Trade (wholesale, retail food, retail non-food); Transportation; Other Services (accommodation and catering, real estate, repair, communication and education, information technology, unclassified service for firms and individuals).

**Table 3: Average Growth by Year**

Year	Employment		Sales	
	Average Growth	Sample Size	Average Growth	Sample Size
1994	0.08	54	0.18	48
1995	0.25	103	0.28	103
1996	0.16	168	0.32	170
1997	0.18	194	0.03	194
1998	0.18	222	0.13	219
1999	0.08	246	0.17	244
2000	-0.02	271	0.03	268
2001	0.01	271	n.a.	n.a.
Average Annual	0.07	238	0.11	248

Note: Firms are included from age 2 onwards.

**Table 4: Managerial Opinions about Growth Constraints**

Type of Factor	All Firms	Growth Rate		Firm Size		
		Slow	Fast	Micro	Small	Medium
<b>Finance</b>						
Lack of capital	77.7	82.6	70.4	80.8	77.1	64.0
Lack of collateral	41.5	35.8	45.4	37.6	43.8	36.0
Level of taxation	91.1	92.7	88.9	92.8	86.7	96.0
<b>Inputs</b>						
Hiring difficulties	32.6	39.8	27.8	33.1	35.2	24.0
Difficulties finding premises	18.4	22.9	17.6	23.2	18.1	8.0
Unreliable supplies	11.0	15.6	5.6	13.6	11.4	8.0
<b>Business Environment</b>						
Poor contract enforcement	17.7	18.9	17.0	8.3	28.2	4.0
Admin. burden of taxation	90.8	91.7	88.0	89.6	89.5	96.0
Bureaucratic interference	33.3	35.2	29.6	35.5	32.4	28.0
Unfair competition	46.8	49.1	37.4	41.9	51.0	41.7
Police protection payments	2.5	4.6	0.9	5.6	0.0	0.0
Private protection payments	1.8	2.8	0.9	3.2	1.0	0.0
<b>Macroeconomic Factors</b>						
Inflation	84.8	90.8	79.6	92.0	81.9	68.0
Low product demand	37.2	47.2	29.9	45.2	32.7	16.0
Sample Size	282	217		255		

Note: Respondents were asked to rate the degree to which they believed that the factor constrained their own firm's growth. The degree is measured on a scale from 1 to 5, where 1 indicates not binding at all and 5 indicates extremely binding. In the table scores 1-3 are grouped together as non-constraining or moderately constraining factors and scores 4-5 as "very constraining" or "extremely binding" obstacles. "All firms" includes the entire sample; "slow" and "fast" growth refer to below- and above-median employment growth, respectively; and "micro," "small," and "medium" are defined as employment 0-9, 10-49, and 50-249, respectively.



**Table 5: Incidence and Mean Size of Loans/Employment**

Year	Percentage Firms Receiving Loans	Mean Loan for Recipient Firms	Mean Loan for All Firms	Sample Size
1994	25.0	1843.2	460.8	16
1995	21.2	2218.6	470.6	33
1996	27.9	3573.5	999.1	93
1997	27.1	8481.4	2298.2	155
1998	37.1	3847.5	1426.6	178
1999	51.5	2659.4	1368.4	206
2000	75.0	2793.9	2095.4	236
2001	67.9	2222.6	1510.3	259

Note: Loans are measured in USD.

**Table 6: Incidence and Mean Size of Loans/Sales**

Year	Percentage Firms Receiving Loans	Mean Loan for Recipient Firms	Mean Loan for All Firms	Sample Size
1994	19.1	8.5	1.6	21
1995	22.5	13.4	3.0	40
1996	26.8	16.8	4.5	97
1997	25.8	44.2	11.4	163
1998	35.3	25.9	9.2	187
1999	51.5	27.4	14.1	206
2000	74.4	41.4	30.8	238
2001	66.0	20.1	13.3	256

Note: Loans are measured in USD and sales in million ROL, in 2000 prices. In 2000, the average exchange rate was 21,700 ROL per USD.

**Table 7: Reinvestment Rates and Fiscal Facilities**

Year	Reinvestment Rates			Fiscal Facilities		
	Reinvestment Rate	Percent Firms Reinvestment>0	Sample Size	Average Number of Facilities	Percent Firms Receiving Facilities	Sample Size
1992	55.0	75.0	4	n.a	n.a	n.a
1993	55.0	71.4	7	n.a	n.a	n.a.
1994	71.4	84.6	39	1.8	10.3	39
1995	62.1	75.0	80	1.5	10.0	80
1996	55.7	66.7	114	1.4	7.9	114
1997	56.3	69.1	178	2.3	9.6	178
1998	49.5	59.6	203	2.0	8.9	203
1999	42.0	50.4	228	1.8	10.9	228
2000	43.2	52.4	254	1.4	11.0	254
2001	n.a	n.a	n.a	1.4	7.9	279

**Table 8: Characteristics of Entrepreneurs**

Entrepreneur's Characteristics	Average Percent Ownership
Female	29.9
Foreigner	0.7
Experience in Other Industry	59.1
High School Education	30.3
University Education	49.0

Sample Size: 293.

Note: Entrepreneurs' characteristics are weighted by the share ownership of each individual owner. Organizational owners are excluded.

**Table 9: Characteristics of Technical Assistance**

	Percent of All Services
<b>Type</b>	
Accounting	8.6
Legal	7.8
Business Plan Writing	11.2
Marketing	15.5
Use of New Technology	11.6
Information and Technology	1.3
Management	9.9
Training of Entrepreneurs	15.1
Training of Workers	15.9
Other	3.0
<b>Financing Source</b>	
Romanian Government	2.2
Romanian Foundation	1.7
Business Association	13.0
Paid by Firm	50.4
Foreign or International Organization	13.0
USAID	13.5
Other Source	6.1
<b>Service Provider</b>	
Local Governmental Agency	4.4
Central Governmental Agency	6.1
Romanian NGO	20.1
Romanian Firm or Freelancer	29.7
International Organization	27.1
Foreign Organization or Individual	10.5
Other	2.2

Sample Sizes: 232 for Types, 230 for Financing sources, and 229 for Service Providers.

**Table 10: Variables in the Regressions: Policy-relevant Factors**

Variable	Mean	Standard Deviation
<b>Financial</b>		
1 Year Lagged Loan Amount/Employment	1622.65	4674.47
1 Year Lagged Loan Amount/Sales	9.53	20.85
Number of Fiscal Facilities	0.18	0.61
Percent of Profit Reinvested	50.85	45.20
Percentage of Materials Bought with Trade Credit	37.00	32.62
<b>Entrepreneurs' Characteristics</b>		
Female	0.30	0.41
Foreigner	0.01	0.06
Experience in Other Industry	0.57	0.47
High School Education	0.28	0.43
University Education	0.48	0.47
Age	40.80	8.55
<b>Workers' Education</b>		
Percent of Workers with High School	54.23	34.72
Percent of Workers with University	12.53	19.36
<b>Technical Assistance</b>		
Number of Consulting and Training Services	0.12	0.43
Number of Services Paid by Firm	0.06	0.27
Number of Training Services	0.04	0.20
Membership in a Business Association	0.28	
TA from Government	0.01	0.11
TA from NGOs	0.02	0.13
TA from Foreign Source	0.01	0.08
TA from International Organization	0.03	0.17
<b>Business Environment</b>		
Percent of Permits not Obtained	2.33	10.51
Average Number of Disputes per Year	0.26	1.15
Payment for a Clean Environment	0.08	0.15
Percent of Sales Sold with Trade Credit	30.45	34.53
Overdue Receivables as Percentage of Sales	14.23	21.32
Number of Permits in First Year of Operation	0.42	
Number of Inspections in First Year of Operation	0.21	
Unofficial Payments to Private Parties	0.07	
Unofficial Payments to Police	0.06	
Unofficial Payments to Government Officials	0.28	

Note: The following are dummies. Numbers of permits and inspections in the first year of operation has a value of 1 if the firm reported more than 9 permits and inspections, respectively. Unofficial payments has a value of 1 if the firm reported that such payments were made.

**Table 11: Determinants of Growth: Base Specification**

	Employment Growth		Sales Growth	
	OLS	Fixed Effects	OLS	Fixed Effects
<b>Financial:</b>				
1 Year Lagged Loan Amount	0.027 (2.04)	0.064 (4.14)	4.417 (1.54)	7.921 (2.84)
Number of Fiscal Facilities	0.043 (2.27)	0.080 (2.39)	0.006 (0.21)	-0.005 (-0.08)
<b>Entrepreneurs' Characteristics:</b>				
Experience in Other Industry	0.030 (1.10)	-0.599 (-2.54)	0.083 (1.27)	-0.035 (-0.06)
Age	-0.015 (-1.87)	0.024 (0.61)	-0.047 (-2.20)	-0.023 (-0.24)
Age <sup>2</sup>	0.000 (1.51)	-0.000 (-0.85)	0.000 (1.94)	0.001 (0.53)
<b>Education:</b>				
High School	0.007 (0.18)	0.508 (2.12)	0.036 (0.42)	0.517 (1.00)
University	0.024 (0.60)	0.715 (2.34)	-0.007 (-0.07)	0.510 (0.80)
Foreign	-0.247 (-0.54)	1.185 (1.99)	0.056 (0.11)	0.994 (0.89)
Female	-0.025 (-0.80)	-0.555 (-2.74)	0.012 (0.18)	-0.262 (-0.57)
<b>Workers' Education:</b>				
High School	0.058 (1.38)		0.040 (0.47)	
University	-0.048 (-0.51)		-0.117 (-0.62)	
Technical Assistance Number	0.065 (1.99)	0.044 (1.22)	0.035 (0.88)	-0.003 (-0.04)
N		1052		807
R <sup>2</sup>	0.095	0.018	0.089	0.008

Note: T statistics based on robust standard errors are in parentheses. Though not reported here, the fixed effects regressions include the firm's age, dummies for acquisitions and spin-offs, two size-category dummies, and year dummies. Besides these, the OLS regressions also include the population of the municipality, a dummy for reorganized firms, six sector dummies, and five regional dummies.

**Table 12: Determinants of Growth: Alternative Specifications of Financial Factors**

Equation Number	Variables of Interest	Employment Growth				N	Sales Growth				N
		OLS		Fixed Effects			OLS		Fixed Effects		
		Coeff.	R <sup>2</sup>	Coeff.	R <sup>2</sup>		Coeff.	R <sup>2</sup>	Coeff.	R <sup>2</sup>	
1	Amount of Loans	0.027 (2.03)	0.095	0.065 (4.17)	0.017	1052	4.46 (1.55)	0.089	8.298 (2.97)	0.007	807
	Proportion of Reinvested Profit	0.010 (0.35)		-0.025 (-0.54)			-0.032 (-0.50)		-0.156 (-1.62)		
2	Amount of Loans	0.027 (2.04)	0.095	0.064 (4.15)	0.017	1052	4.447 (1.56)	0.089	8.004 (2.86)	0.008	807
	Proportion of Materials Bought with Trade Credit	0.017 (0.45)		-0.070 (-0.40)			0.035 (0.45)		0.166 (0.39)		
3	Amount of Loans	0.027 (2.03)	0.095	0.065 (4.18)	0.017	1052	4.489 (1.57)	0.089	8.355 (2.98)	0.008	807
	Proportion of Reinvested Profit	0.010 (0.34)		-0.026 (-0.57)			-0.032 (-0.50)		-0.154 (-1.59)		
	Proportion of Materials Bought with Trade Credit	0.017 (0.44)		-0.078 (-0.45)			0.035 (0.44)		0.012 (0.28)		

Note: T statistics based on robust standard errors are in parentheses. The fixed effects regressions also include the firm's age, dummies for acquisitions and spin-offs, two size-category dummies, and year dummies. Besides these, the OLS regressions include the population of the municipality, a dummy for reorganized firms, six sector dummies, and five regional dummies.

**Table 13: Determinants of Growth: Alternative Specifications of Technical Assistance**

Equation Number	Variables of Interest	Employment Growth				N	Sales Growth				N
		OLS		Fixed Effects			OLS		Fixed Effects		
		Coeff.	R <sup>2</sup>	Coeff.	R <sup>2</sup>		Coeff.	R <sup>2</sup>	Coeff.	R <sup>2</sup>	
1	Dummy for Technical Assistance	0.066 (1.32)	0.093	0.030 (0.50)	0.017	1052	0.026 (0.35)	0.089	-0.057 (-0.43)	0.007	807
2	Number of TA Paid by Firm	0.054 (1.39)	0.092	0.036 (0.63)	0.017	1052	0.071 (1.20)	0.089	0.049 (0.44)	0.009	807
3	Number of Training Services	0.094 (1.42)	0.093	-0.058 (-0.64)	0.017	1052	0.177 (1.98)	0.090	0.011 (0.06)	0.008	807
4	Training for Workers	0.142 (1.73)	0.093	0.032 (0.26)	0.017	1052	0.132 (1.46)	0.090	-0.060 (-0.23)	0.008	807
	Training for Managers	0.033 (0.28)		-0.168 (-1.22)			0.231 (1.35)		0.087 (0.32)		
5	Dummy for Membership in a Business Association	-0.009 (-0.35)	0.094			1048	-0.035 (-0.68)	0.090			803
6	Number of TA from Government	-0.122 (-0.76)	0.095	-0.248 (-1.52)	0.019	1052	0.275 (1.60)	0.093	0.265 (0.69)	0.009	807
	Number of TA from NGOs	0.019 (0.20)		0.024 (0.21)			-0.095 (-0.93)		-0.167 (-0.62)		
	Number of TA from Foreign Source	0.259 (2.08)		-0.047 (-0.19)			0.395 (2.80)		0.209 (0.41)		
	Number of TA from Int'l Organization	0.106 (1.80)		0.160 (1.73)			-0.144 (-0.98)		-0.089 (-0.44)		

Note: T statistics based on robust standard errors are in parentheses. The fixed effects regressions also include the firm's age, dummies for acquisitions and spin-offs, two size-category dummies, and year dummies. Besides these, the OLS regressions include the population of the municipality, a dummy for reorganized firms, six sector dummies, and five regional dummies.

**Table 14: Determinants of Growth: Alternative Specifications of the Business Environment**

Equation Number	Variables of Interest	Employment Growth				N	Sales Growth				N
		OLS		Fixed Effects			OLS		Fixed Effects		
		Coeff.	R <sup>2</sup>	Coeff.	R <sup>2</sup>		Coeff.	R <sup>2</sup>	Coeff.	R <sup>2</sup>	
1	Proportion of Permits not Obtained	-0.008 (-0.05)	0.095	-0.256 (-0.73)	0.018	1052	0.231 (0.90)	0.090	0.950 (1.38)	0.008	807
2	Number of Permits in First Year of Operation	-0.006 (-0.24)	0.103			1019	0.047 (0.78)	0.094			779
3	Number of Inspections in First Year of Operation	0.035 (1.09)	0.101			1035	0.082 (1.14)	0.096			793
4	Disputes per Year	0.003 (0.49)	0.095			1052	0.006 (0.61)	0.089			807
5	Payment for a Clean Environment	-0.036 (-0.59)	0.095			996	0.013 (0.11)	0.090			762
6	Unofficial Payment	-0.014 (-0.83)	0.097			1042	-0.046 (1.26)	0.093			798
7	Dummy for Private Protection Payments	-0.044 (-1.03)	0.097			1042	-0.138 (-1.19)	0.094			798
	Dummy for Police Payments	-0.040 (-0.90)					-0.083 (-1.01)				
	Dummy for Payments to Governmental Officials	0.009 (0.29)					0.007 (0.10)				
8	Proportion of Sales Sold with Trade Credit	0.046 (1.15)	0.096	0.354 (1.35)	0.021	1052	0.113 (1.42)	0.091	0.065 (0.12)	0.009	807
9	Proportion of Sales Sold with Trade Credit	0.035 (0.72)	0.096	0.257 (0.85)	0.020	1052	0.095 (0.99)	0.091	0.301 (0.49)	0.008	807
	Overdue Receivables as Proportion of Sales	0.032 (0.50)		0.255 (0.70)			0.047 (0.29)		-0.677 (-0.88)		
	Proportion of Materials Bought with Trade Credit	0.008 (0.19)		-0.011 (-0.05)			0.015 (0.19)		0.091 (0.21)		

Note: T statistics based on robust standard errors are in parentheses. The fixed effects regressions also include the firm's age, dummies for acquisitions and spin-offs, two size-category dummies, and year dummies. Besides these, the OLS regressions include the population of the municipality, a dummy for reorganized firms, six sector dummies, and five regional dummies.



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