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FIRM LEVEL DATA IN THE ERF REGION:
RESEARCH QUESTIONS, DATA
REQUIREMENTS AND POSSIBILITIES

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Abstract

This paper presents an overview of research that uses firm-level data. The paper organizes the various areas of inquiry where firm-level data are used under two broad headings: The first is the analysis of productivity, its evolution and determinants, including relation between productivity, trade and trade policy. The second general area relates to enterprise financial behavior, patterns of external finance across firms, and especially the existence and severity of financial constraints faced by different types of firms, and their impact on investment behavior. The paper also points out that there is an emerging literature that examines the relation between financial constraints and productivity. The paper provides some thoughts on research questions that would be fruitful for the ERF to address, discusses what sort of data can be used to address them and documents availability of firm-level data in the ERF Region.

ملخص

تعرض هذه الورقة لمحة عامة عن البحوث التي تستخدم بيانات على مستوى الشركات. وتنظم الورقة مختلف مجالات التحقيق حيث تستخدم بيانات على مستوى الشركات على مستوى واسع تحت عنوانين : الأول هو تحليل الإنتاجية وتطورها والمحددات، بما في ذلك العلاقة بين التجارة والإنتاجية والسياسة التجارية. والمجال الثاني يتعلق بالسلوك العام للمؤسسة المالية، وأنماط التمويل الخارجي عبر الشركات ، وخصوصا وجود وشدة القيود المالية التي تواجهها مختلف أنواع الشركات، وتأثيرها على السلوك الاستثماري. وتشير الورقة أيضا إلى أن هناك الأدب الذي يبحث في العلاقة بين القيود المالية والإنتاجية. وتقدم الورقة بعض الأفكار حول المسائل البحثية التي من شأنها أن تكون مثمرة لمنتدى البحوث الاقتصادية وتناقش نوع البيانات الذي يمكن استخدامها لمناقشاتها وتوثق مدى توافر البيانات على مستوى الشركات في منطقة منتدى البحوث الاقتصادية.

1. Introduction

The purpose of this paper is to present an overview of research that is done on the basis of firm-level data, to provide some thoughts on what sort of research questions would be fruitful for the ERF to address and what sort of data can be used to address them. The paper also aims to document availability of firm-level data in the ERF Region. Firm-level data is used for a variety of purposes and addressing a variety of research questions. It is not the aim of this paper to provide a comprehensive overview of these research areas, or to present conclusive literature reviews. Rather the references to the literature will be made on a selective basis, for the sole purpose of providing examples of research output that may guide ERF research activity based on the use of firm-level data.

I have found it useful to organize the areas of inquiry where firm level data is used under two broad headings. The first relates to the analysis of productivity, its evolution and determinants, including relation between productivity and trade/trade policy. The second general area relates to enterprise financial behavior, patterns of external finance across firms, and especially the existence and severity of financial constraints faced by different types of firms, and their impact on investment behavior. Hence at the risk of oversimplifying, while the first topic focuses on productivity aspect of growth, second focuses on an important barrier to factor accumulation.[1] I will also point out that there is an emerging literature that examines the relation between financial constraints and productivity. As will be discussed below, one of the main findings of the literature is that a high degree of heterogeneity exists among firms in terms of their productivity. Whether access to finance is an important determinant of productivity is therefore an important question with potentially important policy implications.

The paper is organized as follows: Section 1 reviews the literature that deals with productivity, its evolution and determinants. Section 2 focuses on research on corporate financial behavior. In both cases I try to provide examples of ERF research in the respective areas. Section 3 describes some additional research areas where firm level data is used. Section 4 discusses the availability and access to firm-level data in the ERF region. Finally section 5 provides recommendation on what the ERF can do.

2. The Productivity Nexus

A major research area that has expanded tremendously over the last few decades with increased utilization of firm-level data concerns the ability of firms to transform inputs into outputs, i.e. productivity. The focus on productivity occurs with good reason. Long term growth in per capita income can be decomposed into growth in inputs (factor accumulation) and growth in productivity. There are large differences across countries in per capita income, and it is generally accepted that these differences are largely explained by differences in productivity (e.g. Jones and Romer, 2009). This has naturally led researchers to examine patterns of productivity at the micro-level. Increased availability of firm-level data has facilitated this effort. As discussed in more detail below, empirical research has uncovered that there is substantial heterogeneity in firm-level productivity within individual countries and within individual industries or sectors as well. Firm level data has been used to describe the distribution of firm level productivity, and the micro foundations of productivity growth at a more aggregate (e.g. industry) level. Research has then shifted to examine the question of "why", that is, to identify factors at the level of the firm, industry and country that may explain the distribution of productivity and its evolution over time. The next natural question

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[1] This grouping is also inspired by the recent literature on growth diagnostics (e.g. Hausman, Rodrik and Velasco, 2005). This literature decomposes barriers to growth into factors that affect returns to investment, including productivity, and factors that influence access to and cost of finance.

to ask is whether these factors can be influenced by policy and, if yes, what sort of policies may be used to enhance productivity at the level of the firm, industry and country.

2.1. Patterns of productivity and firm demographics

The first important fact that has been established by the use of firm level data is that heterogeneity in productivity is both large and persistent. In a much cited paper, Syverson (2004) has shown that within 4-digit SIC industries in the US manufacturing industry, the total factor productivity (TFP) of 90th percentile plan is almost twice as much as that of the 10th percentile plant. Second, firm level productivity is found to be quite persistent. Regressions of current TFP on its one year lag yields coefficients close to 0.6-0.8 (Syverson, 2010, p.1). Finally, higher productivity firms survive longer than lower productivity firms. Hence, in the words of Syverson (2010) "productivity is quite literally a matter of survival for businesses." Finally, it also turns out that within industry differences across productivity of plants are much larger than between-industry differences (Haltiwanger, 2002).

One wonders, then, whether productivity dispersion is larger in developing countries and in what way. In his review carried out almost a decade ago Tybout (2000) had concluded that productivity dispersion is not larger in LDCs, and that there was not much evidence "for the view that LDC markets are relatively tolerant of inefficient firms" (p. 25). New evidence coming out seems to point to larger productivity dispersion in the case of developing countries. In the case of China and India (Hsieh and Klenow, 2009), the ratios of 90th vs. 10th percentile TFP are almost 5:1. These figures are based on revenue-based productivity estimates, i.e. they are derived by dividing nominal output values by an industry wide price deflator. Quantity–based productivity estimates show even more dispersion.[2] Furthermore, India seems to present a case where the low TFP firms constitute a fatter lower tail in the distribution of firms relative to the US (ibid. p. 1416).

Research has also focused on dissecting aggregate productivity growth into various micro-components. Change in industry-level productivity can be decomposed into four effects: change in productivity within the firm, reallocation of output from low productivity to high productivity firms ("between" firm or "reallocation" effect), the net impact of entry and exit (or turnover) and the "cross" effect (i.e. which combines changes in productivity with changes in market shares).[3] As a benchmark, in a much cited study Foster et. al (2000) calculated that in the US manufacturing industries, total reallocation of output (reallocation between surviving firms plus the contribution of entry and exit) seems to account for about 50 percent of total productivity. Hence the share of within-firm increase in productivity is also about fifty percent.

It is not straightforward to compare micro-level dynamics across countries from country-level studies because of variability in the methodology of decomposition and differences over the length of time that the decomposition is implemented. Studies also differ according to what notion of productivity they use. At the same time, it is clear that much can be gained from a consistent cross-country approach to productivity dynamics. For example, in a detailed cross-country comparison of the relation between reallocation and productivity Bartelsman et. al. (2007) find that labor productivity growth is largely driven by within-firm changes in productivity. As the time horizon over which the decomposition is calculated increases (e.g. from 3 to 5 years) the role of reallocation and entry components in explaining productivity growth increase. The size of the between effect varies substantially across countries, and in

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[2] This grouping is also inspired by the recent literature on growth diagnostics (e.g. Hausman, Rodrik and Velasco, 2005). This literature decomposes barriers to growth into factors that affect returns to investment, including productivity, and factors that influence access to and cost of finance.

[3] Ahn (2001) provides a very useful introduction to various methods of decomposition.

general it is small. The cross effect is often negative, i.e. firms experiencing an increase in productivity were also losing market shares. This means that firms with increasing levels of productivity were downsizing and restructuring rather than expanding. Finally, the contribution of net entry is generally positive, explaining between 20-50 percent of total productivity growth. As can be seen in the figure below, taken from Bartelsman et. al. (2007) cross-country variations are still quite large.[4]

Another interesting result is that in most countries, as the length of the time horizon increases, the contribution of net entry to productivity change increases, especially for transition economies. This suggests that there may be significant learning and selection effects taking place over time.

According to Bartelsman et al. (2007) there is also a sectoral dimension to the process of restructuring and reallocation. When they divide the sample into low and medium-high technology industries, Bartelsman et. al. find that the contribution of new firms to productivity growth is modest in low-tech industries, strongly positive in medium and high-tech industries. This result suggests an important role for new firms in an area characterized by stronger technological opportunities. It also suggests that industries matter in addition to cross-country variation.

Country studies in Sekkat (2010) make headway in assessing the role of within firm effects, reallocation and turnover in changes in productivity in the MENA region. The country studies calculate entry and exit rates, decompose productivity change into within, between and net entry effects and assess the determinants of entry-exit rates as well as the effect of entry and exit on productivity (in some cases output or changes in output) through regression analysis. One of the main results is that productivity increase within surviving firms is the major source of productivity change over time. Hence it seems the role of turnover and between firm effects on productivity may be lower than those observed in other countries. This is potentially important for policy, as a smaller role for turnover may reflect higher barriers to entry and exit, some of which may be due to existing policies and regulations that prevent entry or delay exit.

One should emphasize that overall, interpretation of results related to cross-country differences in decomposition of productivity change and deriving policy implications is not necessarily straightforward. The main idea is that cross-country differences in the characteristics of productivity growth is likely to be influenced by differences in market institutions and policies, however the exact modalities through which such differences influence outcomes are not yet clear. Bartelsman et. al. (2005) also emphasize the importance of measurement errors; not least due to problems in the longitudinal linkages (e.g. a firm may disappear from the data set but may continue to exist under a different name). More systematic and comparative analysis of decompositions productivity growth across emerging economies and developed countries seems to be a promising topic for future work.

As emphasized by Haltiwanger (2002), it would also be wrong to immediately conclude that economies that exhibit a higher degree of reallocation are more efficient. The reallocation process itself may suffer from market imperfections. In addition, the reallocation process generates losers, especially workers, hence any welfare comparisons should also take into account the increased job insecurity and earnings issues of displaced workers.

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[4] The data consists of ten OECD countries covered under the "OECD firm level project" (Canada, Denmark, Germany, Finland, France, Italy, the Netherlands, Portugal, United Kingdom and United States) and 14 countries covered by the World Bank (Estonia, Hungary, Latvia, Romania, Slovenia, Argentina, Brazil, Chile, Colombia, Mexico, Venezuela, Indonesia, South Korea and Taiwan (China)). More information on the construction of the data set is given in section 5 below.

Examining dispersions of productivity and decomposing aggregate productivity growth is often done on the basis of either manufacturing surveys/censuses or business registers (see Bartelsman et. al., 2005, Table 1). Especially calculation of entry and exit rates on an internationally comparable basis requires the data coverage to be comprehensive. The implications of this fact for ERF will be discussed in Section 5 below. But the examination of total welfare effects of reallocation and restructuring requires even more data. For this approach, in addition to measures of output and input reallocation (including the contribution of entry/exit) one needs data on unemployment/worker flows as well. In principle one would need to follow individual workers over time in order to be able to gauge the impact of turnover and displacement on wages. Relatively few countries have developed the requisite longitudinal matched employer-employee data that are needed for this type of analysis but this is an expanding area of research.

2.2. Productivity and competition

One of the prominent factors that may explain cross-sectoral and cross-country variations in productivity is the degree of competition faced by individual firms. Firm-level data is increasingly used to address this question. One of the pioneers in this regard is Nickell (1996). Nickell used a panel data of firms listed in the London Stock Exchange (147 firms, 978 observations) to explore the link between market structure and TFP as well as TFP growth. He used various indicators to measure the degree of competition, including market share, a measure of rents (profits normalized by value added), concentration, a measure of import penetration and answers to a survey question on the respondents' perceived degree of competition and found statistically and economically significant positive effects on productivity growth. It is worthwhile to underline that due to stock market transparency regulations the data set used by Nickell is of the type that is open to public and accessible in most countries where there is an active stock market. This provides a great advantage over manufacturing survey or census type of data, which is not readily accessible in many countries.

One problem with the Nickell study is that TFP as calculated in that paper may be negatively correlated with competition, because it may reflect efficiency as well as market power. This is a recurring theme in the literature on productivity, and ultimately has to do with the fact that in most cases firm or plant level prices are not available. Perhaps in the case of Nickell (1996) this is not a great problem, since if anything, mis-measurement of TFP would bias the coefficient of competition downwards. Isolating demand and market power effects from productivity estimates is further discussed below.

Oapina and Schiffbauer (2010) investigate the relation between the degree of competition and firm productivity. In this paper, competition is measured both in terms of firm level mark-ups, a continuous variable, and in terms of responses to a question (a discreet variable) contained in the World Enterprise Survey (WES) implemented by the World Bank. The World Enterprise Survey is potentially a very useful source of firm level data and discussed in detail in Annex 1.

Aghion et. al. (2007) use a variety of sources to examine the effect of competition on productivity in South Africa. They use two industry level panel data sets and firm level data on publicly listed companies from Worldscope (Thomson Reuters). The Worldscope data set is collected from 56 countries since the 1980s and contains stock market data, balance sheets, income statements, cash flow statements as well as additional data such as capital expenditures and number of employees.[5] Using this data set, the authors are able to compare

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[5] See http://thomsonreuters.com/products_services/financial/financial_products/products_az/worldscope_fundamentals

indicators of degree of competition (mark-ups) against other countries and conclude that company mark-ups in South Africa, aggregated to the industry level, are higher than the rest of the world. This is potentially valuable information and underscores the importance of international comparability: Showing that industries are not perfectly competitive is valuable information for policy, but showing that industries are less competitive then industries in other countries is likely to provide a more realistic benchmark for policy makers (in the sense that, for example, it may provide a more useful target for competition policy or it may provide a better sense of how much more competition is feasible). Of course, this is not to underestimate the need to control for other factors such as sectoral composition and market size before jumping to policy conclusions.

Among studies on ERF countries, the relation between productivity and competition in Morocco is examined by Achy and Sekkat (2008). They find that mark-ups have a negative effect on productivity (measured as log of output per worker) whereas the effect of squared mark-up is positive, thus suggesting a non-linear relationship between competition and productivity. In the same volume, the paper by Abdellatif and Ghoneim (2008) reports evidence on Egypt: They find a negative correlation between TFP and mark-ups. However, they conclude that "does not support the argument that higher mark-ups lead to lower efficiency". Ben Jelili (2008) also reports that import competition has a negative effect on imports.

2.3. Trade policy, margins and productivity

Numerous studies have examined the effect of trade on the degree of competition and productivity using plant level data. Regarding the effect of trade on competition, the general strategy is to regress a firm-level measure of price-cost mark-ups on measures of intensity of import competition (such as import penetration rates or effective rates of protection), controlling for permanent industry effects. Again, the problem here is that mark-ups may vary across firms due to differences in productivity as well, and this is often controlled by including firm market shares as a right-hand side variable (Tybout, 2001 p. 5). It is generally accepted that relatively high degree of foreign competition is associated with lower price-cost margins, and Tybout (2001, p. 24) states that it is not clear whether this is due to reduced market power (for example, because of an increase in the price elasticity of demand) or simply because of a fall in profitability (for example, relatively less efficient industries are less profitable and therefore are subject to more import penetration).

Earlier studies on the link between trade liberalization and productivity are summarized by Tybout (2000). The overall assessment is that trade liberalization is associated with an increase in average productivity (ibid. p. 34). Possible channels through which this may have occurred are increased scale efficiency, reallocation of market share towards more efficient firms and intra-firm increases in efficiency. According to Tybout (2000, 2001), increases in scale efficiency do not seem to be the main driving force behind the increase in average efficiency levels. If trade liberalization induced firms to increase scale efficiency then average firm size should increase in import-competing sectors as trade barriers are removed. However, as reported by Tybout (2000, p. 34), most studies actually find that increases in import penetration are associated with reductions in average plant size. Even if scale effects are present, it is argued that the size of these effects is probably not very large. According to Tybout, the association between efficiency gains and import penetration are more likely to result from intra-firm efficiency gains due to reduced managerial slack, a higher degree of

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Details on variables can be found at: http://bib.kuleuven.be/ebib/data/handleidingen/worldscope_datatype_ definitions_guide.pdf . According to this source (p. 341), Worldscope currently covers Egypt, Jordan, Morocco and Turkey.

technological catch-up and access to better intermediate and capital goods, but Tybout reports that evidence of these are still scarce.

The topic has attracted continued attention in the last decade, in part driven by the theoretical literature on heterogeneous firms and the impact of trade on their behavior (e.g. Melitz 2003). In a much quoted paper, Pavcnik (2002) uncovers significant improvements in productivity. While most of earlier work relied on changes in productivity over time to identify the effects of trade liberalization, the paper also relies on productivity variation across sectors; namely it distinguishes between sectors that are affected directly by liberalized trade (import-competing and export-oriented sectors) and the nontraded-goods sector to separate productivity effects stemming from liberalized trade from productivity variation stemming from other sources. The paper shows that after trade liberalization, the productivity of plants in the import-competing sectors grew 3 to 10% more than in the non-traded goods sectors, a significant part of this comes from the within firm effect, i.e. plants improving productivity after trade liberalization. The overall effect of exit is important, as exiting firms are less efficient, but interestingly the exit effect does not change across the degree of trade orientation of industries. Fernandes (2007) also finds that both within and reallocation effects are important, but identifies some of the sources of within firm effects, namely imports of intermediate inputs, skill intensity, and machinery investments.

A number of papers identify different channels through which trade liberalization may affect aggregate productivity and summarizing all of them is beyond the scope of this paper. It would be useful to note, however, Eslava et. al. (2004), whose data set on Colombia contains plant level information on both quantities and prices. This allows them to estimate both productivity and demand shocks at the plant level. Among other things, Eslava et. al. find that both productivity and demand factors influence the allocation of market share across firms, and that the role of demand factors decreases after trade liberalization. The paper is interesting because the availability of plant level prices allows the researchers to isolate demand effects from the estimation of productivity, resolving the problem discussed above in the context of Nickell (1996). More on this problem is discussed below.

2.4. Productivity and exports

There seems to be a general agreement that there is a positive relation between exports and productivity: firms that export are on average more productive than firms that do not. The literature has developed two main hypotheses to explain this relationship: the selection hypothesis and the learning by exporting hypothesis. The selection hypothesis mainly argues that firms that enter export markets are more productive to begin with. By contrast, the learning-by-exporting hypothesis argues that exporters increase their productivity as a result of competitive pressures or information gained during the process of exporting. The literature has found evidence in favor of both hypotheses; however it seems that the selection hypothesis has found more widespread empirical support than the learning by exporting hypothesis. For example, Aw, Chung and Roberts (2000) find evidence of learning-by-exporting in Korea but not in Taiwan. Similarly, Bernard and Jensen (1999) found no evidence that exporting increases plant productivity growth rates. One extensive review of the literature concludes: "Details aside the big picture that emerges after ten years of microeconometric research in the relationship between exporting and productivity is that exporters are more productive than non-exporters, and that the more productive firms self-select into export markets, while exporting does not necessarily improve productivity" (Wagner 2007, p. 67).

Still, it seems too early to discard the learning by exporting hypothesis as new evidence about its existence seems to continue to surface. For example, Young and Mallick's (2010) study on Chinese firms finds that (in addition to self-selection) there is additional productivity

growth after entering the export market from the learning effect, in particular in the second year after entry. In his study of firm level data from 9 African countries, Van Biesebroeck (2005) also finds that exporting increases productivity. Other papers that find evidence of learning by exporting include Maggioni (2009) for Turkey and Silva et. al. (2010) for Portugal.

Regarding the selection hypothesis, one wonders what factors drive the higher productivity of exporting firms. For example, is higher productivity the result of a lucky draw, or is it the result of a deliberate strategy? Several papers have addressed this question. Hallward-Driemeier et al. (2002), López (2009) and Alvarez and López (2005) present evidence that self selection may be the result of a deliberate strategy to become exporters. Wagner (2010) finds that among German firms higher productivity of exporting firms is positively correlated with human capital intensity.

Fafchamps et. al. (2007) takes a further step and attempt to differentiate between two alternative models of selection into export: lower costs and better market familiarity. They hypothesize that while both are associated with learning by doing, learning to increase cost efficiency is probably the by-product of general experience (called "productivity learning") whereas learning to design products that appeal to foreign consumers ("market learning") depends primarily on export experience. They find evidence in favor of market learning but

little evidence in favor of productivity learning. They find that it is the young firms that export and that most do so immediately after creation. They also find that, among exporters, new products are exported very rapidly after production has begun. There is some learning by exporting as well, reflected in the fact that the share of exported output increases for 2-3 years after a new product is introduced.

An interesting aspect of this paper is that it uses two data sets: The first source is a census of manufacturers conducted every year by the Moroccan Ministry of Industry. The second source is Firm Analysis and Competitiveness Survey (FACS) conducted jointly by the Ministry of Industry and the World Bank from September to December 2000. This data set has detailed data on exports, including dates at which the firm began production and exports of up to six distinct products. The latter is what allows the authors to gauge the speed with which new products are introduced into the export markets.

By contrast, De Loecker (2007) concentrates on channels through which learning by exporting occurs. De Loecker hypothesizes that learning by exporting occurs through contacts with buyers, which is assumed to imply that firms exporting to more developed regions such as Western Europe and North America should record higher productivity gains. The findings in the paper support this hypothesis.

De Loecker (2010a) argues that the traditional approach used to examine the existence of learning by exporting may be misleading because it fails to allow for the possibility that productivity may be affected by whether the firm has exported before. The paper develops a methodology that allows for endogenous changes in productivity due to past exporting behavior. It shows that the proposed approach, applied to firm-level data from Slovenia, generates additional gains in productivity after entering export markets and that ignoring the effect of past exports my result in biases.

There is also some evidence about what type of firms are more likely to learn from exporting. Both Maggioni (2009) and Silva et. al (2010) find that learning effects are higher for new exporters that are also importers or start importing at the same time. The relative competitiveness of the industry that the firms belong to is also important: Both papers find that firms belonging to sectors that are relatively at a comparative disadvantage (index of

Revealed Comparative Advantage lower than one)[6] are engaged in higher learning by exporting relative to firms in sectors with higher comparative advantage.

2.5. Demand, market power vs. productivity

An interesting question that arises in the estimation of productivity using micro data is the following: Most frequently analysts do not observe actual quantities of production, and output and sales are recorded on the basis of nominal values.[7] As firm level output prices are not observable, any increase in output values, keeping inputs constant, could arise both because of improvement in "physical productivity" as well as because of increased in output prices, say due to an increase in market power. Put differently, when firm level output prices are not observed measured "revenue productivity" is calculated by dividing nominal output value by an industry price index. In that case, measured productivity includes the influence of within-industry price differences. If prices reflect shifts in demand or market power, then estimated revenue productivity may not reflect physical productivity. Indeed, Foster et. al. (2008) who have data on plant level prices and quantities, report significant differences between physical and revenue measures of productivity.

Consider the positive correlation between export status and productivity observed over many data sets, as described above in section 1.4. Since most studies documenting this correlation rely on revenues to proxy for output, what is measured as higher productivity could reflect higher quality and/or market power as well. Hence, differences in pricing behavior between exporters and non exporters could, at least partially, be responsible for the measured differences in productivity. De Loecker and Warzynsk (2010) develop a methodology that relies on estimating markups from production data. The procedure delivers estimates of both mark-ups and productivity and therefore it is possible to examine whether measured (revenue-based) productivity gains reflect improvements in (for example) costs, or price effects that may reflect higher quality or enhanced market power. They apply the model to Slovenian firms and find that part of the measured productivity differences between exporting and non-exporting firms are actually due to differences in mark-ups. Further, they find that mark-ups increase when firms start exporting.

A similar problem exists in examining the impact of trade liberalization on firm productivity. De Loecker (2010b) addresses this problem for the case of Belgian textile producers' response to a reduction in textile quotas. This paper combines a demand system with a production function and can estimate productivity after controlling for changes in prices and demand. The data that allows De Loecker to do this includes a matched plant-product level data set as well as detailed data on quotas at the product level. The results are quite striking: controlling for unobserved prices results in significant reductions in the estimated productivity gains following trade liberalization (2 percent as opposed to 8 percent). This leads De Loecker to conclude that estimates of impact of policy changes on productivity without controlling for changes in prices and demand can lead to erroneous results.

2.6. Productivity and managerial practices

Even though practitioners and business schools have long emphasized that management practices and/or high quality managers play an important role explaining productivity differences across enterprises, until recently these factors have rarely been incorporated in empirical analysis of productivity carried out by economists. The primary reason has been lack of data, as typical plant-level micro data generated, for example, in manufacturing

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[6] The index of RCA is defined as country industry export share in country's exports divided by the world industry export share in world's exports.

[7] Of course, exceptions exist. For example, as mentioned above, Eslava et. al. (2004) have both plant level quantities and price data.

surveys, have rarely (if ever) contained information on managerial inputs. Such data at most provide distinctions between blue collar and white collar workers, or between employees engaged in production and those employed in administration. However, variability of management practices across enterprises could not be captured by these distinctions.

This has started to change and recently a number of papers have come out that try to systematically measure, on an internationally comparable basis, different components of managerial practices that are likely to affect productivity. Bloom and Van Reenen (2007), possibly the pioneer paper in this line of research, compiled a data set of about 700 firms from the US, Germany, UK and France on distinct managerial practices. The data was collected through surveys (carried out by MBA students) with managers conducted over the phone. The researchers took several precautions to ensure the accuracy of the data that were being collected: Managers were not told that they were being scored. Questions were open ended[8]. In order to prevent biased assessments by the interviewers, interviewers were kept uninformed about the performance of the firm they interviewed. Each interviewer made over 50 interviews on average, and this allowed the researchers to remove interviewer fixed effects.[9]

The managerial practices on which the questions were based were organized under four broad groups: operations (lean manufacturing techniques), monitoring (tracking and reviewing performance of individuals), targets (setting goals) and incentives (promotion criteria, treatment of poor performers, etc).

Bloom and Van Reenen first establish that the indexes constructed from the collected data indeed correlate positively with firm several indicators of performance such as productivity, Tobin's Q, sales growth, return on capital employed and probability of survival. They then examine the factors that explain the dispersion in management quality. Two factors stand out: the first is the degree of competition in the firm's market.[10] The second is family ownership *and* the determination of CEO succession through primogeniture (i.e. the new CEO is the eldest son of the firm's founder). Interestingly, family ownership alone does not cause low quality management.

This research project has been expanded to cover additional countries, including emerging market economies. Bloom and Van Reenen (2010) summarize some of the results. It turns out that management practices in countries like China, Brazil and India get lower scores than their counterparts in developed countries. Another interesting result is that the difference comes not so much from lower scores across the board (though this is present to some extent), but in particular by a large share of very poorly managed firms. This is interesting because it may suggest a few things about policy design. For example, perhaps policies designed to support modernization efforts should be broad based and help improve management practices of a large number of firms rather than encourage the establishment of a smaller number of "jewels". It may also suggest the existence of exit barriers.

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[8] For example managers were asked "can you tell me how you promote your employees?", whereas a closed question would ask "do you promote your employees on tenure [yes/no]?" (Bloom and Van Reenen, 2007, p. 1361).

[9] Bloom and Van Reenen also discuss the steps that were taken to convince managers to be interviewed, and interestingly one of these steps was the following: "the written endorsement of the Bundesbank (in Germany) and the Treasury (in the United Kingdom) and a scheduled presentation to the Banque de France helped demonstrate to managers that this was an important exercise with official support".

[10] They use three measures of competition: degree of import penetration, measured as the share of total imports relative to domestic, the Lerner index of competition, which is $(1 - \text{profits/sales})$, calculated as the average across the entire firm population (excluding each firm itself) at the three digit industry level, and a survey question on the number of competitors a firm faces.

How do we know that better management practices actually cause higher productivity? Bloom et. al. (2010) reports what amounts to a controlled experiment. The researchers provide consultancy services to a randomly selected group of Indian textile firms. They find that these firms record significant improvements in productivity and profitability relative to the control group. Economists normally think of firms as profit maximizers hence if there was a managerial improvement that would enhance profits, one wonders why it was not adopted in the first place. The paper inquires about the reasons for poor management practices and the most important factor seems to be lack of information about the existence of better management practices, or any information they had was not correct.[11] Procrastination and lack of managerial incentives were also important. Interestingly, Bloom et. al. find that financial constraints did ***not*** play an important role in hindering the adoption of better management techniques.

3. Credit markets and financial constraints

It is generally accepted that imperfections in financial markets may seriously constrain firm performance and growth. Under perfect capital markets, externally raised financing through such instruments as bank credits, bonds or outside equity and funds raised through retained earnings are perfect substitutes for each other. In the real world, financial markets, not only in emerging markets, but in developed countries as well, are expected to suffer from problems of imperfect information (adverse selection and moral hazard) and incomplete contracts, which generate a wedge between the costs of internal and external finance. Such problems may limit the amount of external funds firms can raise, and therefore constrain firm output, investment and growth. This section reviews the literature on the existence and patterns of financial constraints.

3.1. Financial constraints

Theoretical work in this area has developed a number of testable predictions (Gertler 1988). The first is that real outcomes such as investments and output may depend on the balance sheet position (i.e. the ratio of net worth to total liabilities) of firms. This is because higher net worth may both indicate higher collateral (and lower cost of external funds and higher borrowing capacity) and also more sources of internal funds that can be used to finance investments. Second, the severity of financial constraints may depend on firm characteristics such as size and age. Age may be important because older firms are likely to have longer credit histories, may have already entered repeated relations with borrowers, and established a reputation. These reduce the severity of problems of asymmetric information. Size maybe important both because larger firms are often more mature, and also because lending may entail fixed information and monitoring costs making it cheaper to lend to larger firms.

Imperfections in the operation of financial markets have important macroeconomic implications as well, an issue that has raised renewed attention as a result of the recent global financial crisis. The problem is that a negative shock that deteriorates balance sheet positions may reinforce contractionary consequences of that shock, similar to a financial accelerator mechanism. In other words, contraction of credit may lead firms to cut output and employment more than they would have in the absence of financial fragility. Hence in the latest global downturn much attention has been devoted to the causes and consequences of credit squeezes, and policies that may alleviate such squeezes. This has led researchers to examine whether there is a "bank lending channel" that may help explain macroeconomic fluctuations.

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[11] For example, Bloom et. al. report that managers did not think that preventive maintenance of machinery was efficient, and instead they waited until machines broke down and then repaired them.

Firm level data has been extensively used in this literature. The traditional way of measuring the severity of financial constraints (following the seminal paper of Fazzari et al, 1988) is to examine the sensitivity of fixed capital or inventory investment to cash flow, controlling for other determinants of investment (such as Tobin's Q). Since cash flow may also partly represent profitability of investment, firms are often grouped according to some a priori criteria that captures financial constraints, and the hypothesis would be that cash flow sensitivity of investment would be higher for firms that are a-priori expected to suffer more severely from financial constraints. This approach has been criticized by Kaplan and Zingales (1997) who argued that the sensitivity of investment to cash flow does not have to be monotonically increasing in financing constraints. The literature since then has provided different indicators of financial constraints as well as different criteria that can be used to group firms.[12]

It might be stressed that this line of research has important policy implications. There is widespread belief among development economists and practitioners that lack of finance poses a significant barrier to the development of the private sector in emerging economies, especially among small and medium sized firms. Many countries have designed directed credit programs to alleviate these constraints. These programs have been largely discredited since the 1980s, though it seems that there is a comeback. Examining exactly how these financial constraints affect firm behavior may provide significant inputs about whether such programs may be useful and if so how they should be designed.

Another way to assess financial constraints is suggested by Johnson, McMillan and Woodruff (2002). The question they ask is whether firms are constrained by weak property rights or access to finance. The argument is that if finance is a significant constraint, then, whenever a profitable investment is available, firms should deplete retained earnings first. From a survey of new firms in a sample of Central and Eastern European countries they find that weak property rights discourage firms from reinvesting their profits, even when bank loans are available. They state: "where property rights are relatively strong, firms reinvest their profits; where they are relatively weak, entrepreneurs do not want to invest from retained earnings" (p. 1335). The measures of security of property rights also come from the survey, as answers to questions such as whether firms make extra legal payments for protection, whether they make unofficial payments for tax inspection, and whether they make payments for protection.

Another application that is of relevance to emerging economies is the study of conglomerates. Conglomerates or "business groups" are widespread in emerging markets and anecdotal evidence suggests that they are widespread in the MENA region as well. One of the most important benefits of business groups (especially when the group also owns a bank) is supposed to be that they may resolve asymmetric information problems and operate what amounts to an internal capital market (for example, Hoshi et. al, 1991). If this is correct, then firms affiliated with industrial groups should be less financially constrained than independent firms. Hence the approach can be used to test for the internal capital markets hypothesis.

Research into the nature and extent of financial constraints in the corporate sector seems quite limited in the MENA region. Bahlous and Nabli (2005) examine the impact of financial liberalization on financial constraints on a set of Tunisian firms. Bolbol and Omran (2003) examine the effect of stock returns on investment in a set of 83 firms listed in the IFC index. They find that investments are not sensitive to cash flow, and if anything, more constrained firms with low payout ratios have less investment-cash flows sensitivity as well as higher

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[12] See Carreira and Silva (2007) for a survey.

leverage. They interpret their results as suggesting that the pecking theory of finance does not necessarily hold for Arab firms.

It is worthwhile to report here also the work of Banerjee and Duflo (2008) who use a different approach to examine the existence of credit constraints. They focus on firms' use of credit from a directed lending program in India to assess the existence of credit constraints. Their reasoning is that while both constrained and unconstrained firms may try to obtain all the directed credit they can (because, for example, the interest rate on these loans may be lower than market rates), constrained firms would use the credit to expand production whereas unconstrained firms would use it as substitutes for other borrowing. The authors use data on firms which are clients of a public bank that implements a directed credit programs. They concentrate on a set of firms that became eligible in a program in 1998 as a result of a policy change and lost eligibility as a result of policy reversal in 2000. To control for time trends, they use firms that were eligible before 1998 and retained eligibility after 2000. Using a difference–in-differences approach, they find no evidence that directed credit was used as a substitute for other firms of credit and that it was used to expand production. They conclude that these firms must have been credit constrained. The interesting aspect of this paper is that they also provide an example of how to measure the impact of a specific policy tool, this time of a directed credit program, on firm behavior.

3.2. Financial constraints, productivity and exports

It would be reasonable to conjecture that financial constraints have an impact on firm-level productivity. For example, limited borrowing ability may prevent firms from adopting new technologies or hiring consultants that would transfer required know how on improved manufacturing operations. A number of recent papers address this question, reaching different results. In their study on Bulgaria, Gatti and Love (2008) find that access to credit (captured by whether firms have a credit line or an overdraft facility) has a positive effect on productivity. Moreno-Badia and Slootmaekers (2010) use a data set from Estonia. They construct an index of financial constraints and find that this index has no effect on productivity, except in industries with high research and development content. Finally, Chen and Guariglia (2010) find that especially for illiquid firms productivity is constrained by the availability of internal finance. One can expect more work in this area in the future.

A number of papers examine the link between financial constraints and export activities. Two questions that come to mind in this context are first, whether financial constraints play a role in deterring firms from starting to export, and second, whether the act of exporting has any impact on the severity of financial constraints. In their analysis of French manufacturing firms, Bellano et. al (2010) find that firms that export in the future exhibit financial advantage compared to their non-exporting counterparts one and three years *prior* to exporting. This is consistent with the hypothesis that financial constraints may deter firms from exporting. Second, they find that exporting firms do not develop better access to finance after they start to export relative to non-exporters. Finally, Bellano et. al (2010) examine the decision to export and find that firms that are less financially constrained find it easier to start exporting. These results are in contrast to those obtained by Greenaway et. al. (2007), who find that firms enjoying better financial health ex-ante are not more likely to start exporting and that participation in exporting improves firms' financial health.

Gorodnichenko and Schnitzer (2010) test the interaction between financial constraints, exporting and innovation activity. They use the BEEPS data set[13]. Instead of trying to

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[13] The Business Environment and Enterprise Performance Survey (BEEPS), is a joint initiative of the European Bank for Reconstruction and Development (EBRD) and the World Bank Group. These are large surveys of 6,500 firms in 2002 and 7,900 firms in 2005 in 27 transition countries. Among countries covered by ERF, only

measure financial constraints through financial or other firm specific variables, they use responses to two specific questions that BEEPS contains on financial constraints: The first asks respondents how problematic access to financing is for the operation and growth of the firm's business and the second asks about the cost of financing. In their econometric analysis, Gorodnichenko and Schnitzer (2010) find that financial constraints have a negative effect both on innovation and exporting. We may thus conclude that there is some evidence that firms may be deterred from exporting due to financial constraints, but that more work needs to be undertaken in this area.

Another paper worth citing in this context is Dabla-Norris et. al (2010). This paper also uses firm-level data contained in WES. It examines the impact of financial constraints and of financial development on the relation between innovation and productivity. The authors use responses to several survey questions on innovation as indicators of innovative activity. They find that innovative activity has a positive effect on (labor) productivity and perceived financial constraints have a negative effect on productivity. They then interact measures of innovation with measures of country-level development of financial markets and find that the interaction term has a positive and significant coefficient, suggesting that the productive effect of innovation works through financial markets and is higher in countries with more developed financial markets.

3.3. Patterns of external finance

The literature on financial constraints becomes more meaningful if placed in the context of analysis of variations in patterns of finance across different types of firms. For example, one interesting question is whether in countries where the financial system is less developed and where firms' formal credit histories are relatively scarce lending and borrowing activities between sellers and buyers may substitute for the absence of formal external finance. The idea is that firms engaging in trade may naturally develop better information about their counterparts and this may alleviate problems that arise in the presence of asymmetric information.

Demirguc-Kunt and Maksimovic (2001) directly assess the question of whether trade credit is a substitute or complement to other forms of external finance. They find that the development of a country's banking system and legal infrastructure predict the use of trade credit. Firms' use of bank debt relative to trade credit is higher in countries with efficient legal systems but firms in countries with larger and privately owned banking systems offer and use more trade credit. They conclude that these findings suggest that the provision of trade credit is complementary to the development of financial intermediaries. However, the firms in their data set are relatively large and therefore their results may not be representative of relatively smaller firms.

Beck et. al. (2008) present evidence from about 3000 firms from 48 countries included in the World Business Environment Survey (WBES).[14] The database includes small and medium firms and data on a broad spectrum of financing sources, including leasing, supplier, development and informal finance. They find that indeed small firms and firms in countries with poor institutions use less external finance, especially bank finance. Protection of property rights increases external financing of small firms significantly more than of large firms, mainly due to its effect on bank and equity finance. Regarding the question of whether different forms of external finance are substitutes, they find that small firms do not use disproportionately more leasing or trade finance compared to larger firms. Financing from

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Turkey is included in the BEEPS data set. As discussed in Annex A, the BEEPS data set is simply WES implemented in the countries from Eastern and Central Europe and former Soviet Union.

[14] The WBES is a precursor to the WES and was collected by the World Bank in 1999-2000.

these sources is positively associated with the financial development and does not compensate for lower access to bank financing of small firms in countries with underdeveloped institutions.

3.4. Finance research at ERF

Research on the financial sector is quite active among ERF researchers. There have been quite a number research papers on bank efficiency, efficiency tests regarding stock prices, and the relation between stock prices and macroeconomic fluctuations. There have been a few papers on firms' capital structures as well. It may be that ease of data availability has attracted researchers to these topics. There has been relatively less effort diverted to directly measuring the role of external versus internal finance on firm growth, or the extent to which firms can use different instruments of external finance, including bank debt, bonds or trade credit. My assessment is that we do not have a good grasp, for example, of firm-level flow of funds, the role of external vs. internal equity and debt in investment, and the role of working capital. Finally, even though there is widespread perception that access to finance is a major problem especially for relatively younger and smaller firms, and that lack of finance may inhibit firms from exploiting scale economies and undertaking productivity improving investments, research in these areas is quite limited. One would expect that financial constraints are more severe in countries where financial development is more limited.

Another reason that makes research in the area of financial constraints rewarding is that many governments in the region are already engaged in various forms of interventions to reduce perceived barriers of especially small and medium firms' access to external finance. However, there is very little if any information on the effectiveness of these policies in the region.

The type of data that is necessary to explore issues of financial instruments and access is various. For some questions, such as the incidence of different types financial instruments used to raise external finance, and the special role of trade credit, requires detailed data on financial liabilities. Regular manufacturing surveys would normally lack such data. Data from WES, or from the financial statements of firms listed in stock markets are more likely to contain such data.

4. A Few Additional Research Areas

This section provides a brief overview of additional research areas where firm level data can be put to good use.

Productivity differences between firms may also be due to differences in the quality of inputs used. Standard input measures may fail to capture these differences. For example, the quality of the labor input is an important determinant of productivity but manufacturing surveys rarely contain sufficiently detailed information on the quality of labor. This quality may be influenced by various factors such as innate ability, education, in-house training, experience and tenure at the firm. To capture these effects, researchers are increasingly using employee-employer matched data sets that follow workers over time and as they switch jobs or even become unemployed.[15] In the ERF area, the only example of research using such a matched data set is Nordman and Wolff (2006) which examines gender wage gaps in Morocco using the Firm Analysis and Competitiveness Survey mentioned above.

Another important research area in the productivity context is the role of R&D and technology, especially the role of information technology (IT). This of course is also a huge

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[15] See Syverson (2010, section 3.2) for a discussion of quality of inputs, Ahn (2001, section III.2.2) for references on human capital and training. As mentioned in section 1.5 such data is also important to examine the welfare effects of firm dynamics.

area of research, but so far very little research seems to have been undertaken within the ERF. This is possibly because standard firm level data from manufacturing surveys rarely contain data on R&D, innovation and technology. The only paper I have come across using firm level data is Karay and Kriaa (2009), and they use data collected on a special survey on R&D and innovation.

The impact of job training on various measure of firm performance is another expanding area of research. Achy and Sekkat (2010) use firm-level data on Morocco and find that investment in job training and new equipment has a positive effect on employment. Sekkat (2011) also uses data from Morocco[16] and finds that training has a positive effect on productivity for firms with less than 100 workers.

There is also an expanding literature measuring the impact of the business environment on firm performance. Many of these papers use data from the World Enterprise Surveys (WES) mentioned above. Dethier et. al. (2010) provides a detailed survey of this literature. Not surprisingly, they report overwhelming evidence that improvements in the business climate lead to better firm performance. Dethier et. al also discuss why and how using firm-level data to study the impact of the economic environment on performance may help researchers overcome some of the methodological difficulties that arise when more aggregate data are used. As far as I can see, such studies have not been carried out it the MENA context. Given the availability of WES, this is likely to be a rewarding area of research.

Corporate governance is another potentially important determinant of firm performance in general and firm-level productivity in particular. The analysis of corporate governance in both developed economies and emerging markets is a burgeoning area of research.[17] Corporate governance in emerging markets raises special interesting issues such as weaker protection of property rights, the predominance of family firms, underdeveloped managerial markets, weak takeover threats, importance of conglomerate groups, and stronger role of political access and rent-seeking. On top of these there is the important question of whether Western-style corporate governance reform would be feasible or effective in emerging markets especially in MENA countries. Many of these research questions need to be addressed by firm level data. In addition to standard firm level data needed to measure firm characteristics and performance, research in the corporate governance area requires detailed information on ownership structures, owners and managers. In principle these data can be obtained from the financial statements and reports of firms listed in stock markets and more generally from Business Registers. There has been some work in ERF on corporate governance issues (e.g. Bolbol et. al 2004, Omran 2009) but this is potentially a very fruitful are of research as well.[18]

5. Availability of Firm Level Data in ERF Countries
This section reviews the availability of firm level data in the ERF region, based on papers published by the ERF and a questionnaire that was sent to a sample of ERF researchers expected to be knowledgeable about the existence of firm level data in the countries they are familiar with.

Morocco has an annual survey of manufacturing establishments with 10 workers or above or having sales of more than 100,000 Moroccan Dirham (about 12,900 USD). The survey has

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[16] Both papers combine manufacturing survey data with the FACS data set mentioned above.

[17] See, for example, Claessens (2003) and Fan et. al. (2010).

[18] Actually, this is possibly an understatement. Given the less than arm's length distance between politics and business in the region, one could speculate that understanding corporate governance is possibly critical for understanding the behavior of the corporate sectors in many MENA countries.

data on output, sales, employment, wages, exports, investments, and ownership. It also contains city, region and establishment codes. It seems the data should be accessible to ERF upon a letter to the Ministry of Trade and Industry. The data has been collected since 1984.

In addition to the establishment data, there are additional data sets that have been used by various researchers. The Firm Analysis and Competitiveness Survey (FACS) has been collected between October 2000- February 2001 through a collaboration of the Ministry of Trade and Industry and the World Bank. This survey, implemented to about 860 firms in seven industries has additional information on areas such as a variety of issues directly or indirectly related to public policy, such as export incentives and performance, technological improvement, upgrading of human capital and functioning of the labour market, government-business relations, or the pricing and quality of public services for industry (Wolff and Nordman, 2006). More importantly, it has detailed data on about 10 workers per firm so this is a matched worker-firm data that allows the researcher to conduct research on more detailed labor market conditions.

Finally, Morocco is also covered under the World Enterprise Survey undertaken by the World Bank for the year 2007. Information on the WES dataset is provided in Annex 1.

Tunisia is another country on which quite a number of papers have been written using firm-level data. Several ERF publications have used the Annual Survey Report on Firms (NASRF). The survey looks at economic accounts of enterprises[19] and at some ICT use indicators, such as hardware and software investment at the firm level. Goaied and Jendoubi (2007) are able to identify firms that have participated in the Tunisian Government's Upgrading Program, which provides financial support to enterprises, to assess the impact of this program. To estimate entry and exit rates, Ben Jelili and Goaied (2010) combine administrative files including the National Repertory of firms in Tunisia, which is based on continuous report of fiscal affiliation of firms, with the quarterly register of employees taken from the Tunisian National Social Security Fund (CNSS). Finally, Karray and Kriaa (2009) use survey data provided by the Ministry of Scientific Research and Competences Development in Tunisia. The survey was conducted during the period 2002-2005 on a sample size of 300 firms. Manufacturing firms, with at least 10 employees, answered questions primarily concerned with R&D activities and expenditures, innovation projects (products, process, abandoned, unfinished), objectives of innovation, obstacles to innovation, principal activities of in-house R&D, and, finally, public incentives to R&D and innovation activities.

However, it seems there are no clear rules regarding access to these data sets. The main method to access the data has been personal contacts and networking.[20] Hence Tunisia seems to present a case where data exists but not straightforward to access. Tunisia has recently been included in the WES.

The Central Agency for Public Mobilization and Statistics (CAPMAS) of Egypt carries out a census of manufacturing firms every ten years which covers all establishments. However, I have not found any ERF papers which use firm level data for Egypt hence it seems that the data is not publicly available at the firm level. However, Egypt is also covered in WES.

The Turkish Statistical Institute (Turkstat) carries out an annual survey of manufacturing enterprises that contains basic variables such as output, value added, employment, investment and capital stock. Even though carried out since the 1980s, there is discontinuity in the data set since 2001 because the basic recording unit was changed from plants to firms. The data set is available to academics, on the basis of a signed protocol between universities and

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[19] The data set includes: value added, capital stock, number of employees decomposed into skilled and unskilled labour (Mouelhi, 2008).

[20] Phone conversation with Dr. Riadh Ben Jelili.

Turkstat provided the research is carried out on Turkstat premises in Ankara. Several ERF papers have been written by Turkish economists on that basis. It may be worthwhile to inquire whether the authorities would be willing to make available the data set to ERF, especially if the ERF would be willing to finance the cost of such an effort. Turkey is also included in the WES data set.

I have not been able to gather information regarding manufacturing surveys from other countries. I understand that it is not likely that Lebanon has a manufacturing survey. Syria undertakes a survey but access conditions are likely to resemble those in Tunisia.

There are a number of ERF papers that use firm level financial data to examine issues such as the relation between ownership and control. Bolbol et. al (2004) use financial data on 304 firms from the following sources: Jordan, Amman Stock Exchange: Jordanian Shareholding Companies Guide; Egypt, Kompass Egypt Financial Yearbook; Oman, Muscat Securities Market (MSM): Shareholding Guide of MSM Listed Companies; and Tunisia, Bourse de Tunis. From these sources they are able to obtain variables such as return on assets, market value, and return on equity as well data on the structure of ownership. Omran (2009) uses detailed data on 52 newly privatized firms in Egypt to study their post-privatization ownership structure as well as the relation between ownership structure and performance.[21] Hence, at least for relatively large and listed firms, it seems possible to collect financial and ownership data, in particular for Jordan, Oman, Egypt and Tunisia.

Mention should also be made of the Micro and Small Enterprises Dataset for MENA Countries (Egypt, Lebanon, Morocco and Turkey) collected for the ERF Research Programme on Promoting Competitiveness in the Micro and Small Enterprise (MSE) Sector in the Middle East and North Africa. The data set contains information on enterprises and entrepreneurs as well as the household associated with the enterprise. Information on the enterprise includes growth performance, access to credit, financial and business services, relations with business associations, status of registration, level of technology, value of assets, output, sales, costs, energy use, main customers, exports, linkages with other enterprises, constraints to business activity, the problems specific to women entrepreneurs and characteristics of the work force. There was a follow up implementation of the enterprise survey as well after a year, so for enterprises there is in fact a short panel. Information on households includes structure of expenditures, income by source, and ownership of consumer durables.[22] It seems given the nature of the information it entails, this data could have been used more by ERF researchers.

Finally one could mention the data sets constructed by the Global Entrepreneurship Monitor (GEM). The GEM data sets are based on surveys carried out on at least 2000 individuals per country, and have entrepreneurship related questions, including information on firms established by those surveys and interesting variables such as start-up capital requirements. The GEM has recently published a GEM-MENA Regional Report 2009 which includes 14 countries from the region (see Annex 2 for details). While this is not directly firm-level data, it contains valuable information that can be used in firm-level research especially when research entails international comparisons.[23]

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[21] The data was collected from the following sources: Ministry of Investment on the details of privatization transactions, Capital Market Authority and the Egyptian Exchange, on accounting and market performance measures. Data on corporate governance was obtained from the General Authority for Investment, and Misr for Clearing, Settlement and Central Depository were consulted to build the database on the board of director compositions, and ownership structure and identity.

[22] See Appendix 3 of Ozar (2004).

[23] As a simple example, the GEM surveys contain variables that would be very useful in assessing the level of entry barriers.

6. What Should the ERF Do?

This survey has identified a large number of quite interconnected research questions that have been addressed through firm level data. These include:

1. dispersion of firm-level productivity,
2. micro-foundations of aggregate productivity dynamics,
3. possible determinants of productivity, including competition, trade policy environment, exports, and managerial practices,
4. financial constraints
5. interaction between financial constraints and productivity
6. patterns of external finance across different types of firms

Although not covered by this survey in much depth, there are additional topics which would require firm level data for in-depth analysis, including issues such as corporate governance and innovation/R&D, which presumably also have important effects on productivity. All of these research questions are potentially valuable. Therefore it may be useful to prioritize on the basis of data requirements and access.

Research projects on the different questions listed above would not require the same type of data. Questions 1 and 2 are likely best handled through data sets with extensive coverage of the population of firms. If available, and if arrangements with statistical offices can be made so that access to such data is possible, then such data from individual countries can be "stacked", harmonized by ERF and made available to ERF researchers. In principle this would allow researchers to address questions (1) and (2).

Statistical offices may be unwilling to disclose the original data sets. Another approach that can be useful under these circumstances, used by Bartelsman et. al. (2007) is to create a "distributed" micro-data set. This approach entails developing a common protocol that is used to extract information necessary for the research question from the raw data of detailed indicators. The protocol is then implemented on the micro-level data sets in each country by experienced researchers. This is the sort of data set that was created in the OECD-World Bank project that Bartelsman et. al. (2007) relies on. In their case, the information that was extracted was related to firm demographics (e.g. entry, exit, job flows, size distribution and survival) and productivity (distribution of productivity, decomposition of productivity growth into within-firm and reallocation components).[24] This approach still used data generated by the authorities in the respective countries through some sort of annual surveys of establishments (or business registers or tax offices in some countries). Of course, such an approach requires a very well-defined research question.

At this point, however, based on information presented in section 4, it seems availability of data sets with comprehensive coverage of firm level information through manufacturing surveys or censuses is not widespread in the ERF region.

In the case of ERF, a concerted effort to generate firm-level data sets can be waged on more than one front. On the basis of the information compiled in this study, the following may be recommended:

ERF should encourage researchers to make more systematic use of the WES data set. At the same time, the ERF can use its relations with local researchers and authorities as well as the World Bank to extend the coverage of the WES to ERF countries not currently covered (such as Iran). The WES can be used to carry out research on a wide variety of issues, as discussed

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[24] To the best of my knowledge, this data collection effort in the OECD has not been continued.

in this study (see also Annex 1). Especially in the short run, this would likely yield very high payoff.

There is much use also in collecting data of firms listed in the stock exchanges in individual countries. This study has cited a number of papers that have used financial data of firms listed in the stock market to examine interesting questions such as the effect of competition on productivity (e.g. Nickell, Aghion et. al. 2007) and interesting questions related to the effect of corporate governance or change of ownership on firm performance (e.g. Bolbol et. al. 2004, Omran 2009). Collecting such data on a systematic basis, harmonizing them and making them available to the ERF community would be e relatively low cost exercise. In principle, this activity could be outsourced to a company like Thomson (already collecting data on a number of ERF countries, see section 1).

Admittedly, firms listed in stock markets are not representative of all firms in their respective countries. They are likely to be larger, more modern, with better access to external finance. Nevertheless well designed research projects based on such biased samples can still be very useful, at least for two reasons: First, often such firms' total sales constitute a significant portion of sectoral output and therefore while research results would not be representative of an "average firm", they would capture a significant portion of the sectoral dynamics. Second, there may be quite a few research questions where research results conditional on data selection criteria (e.g. conditional on being large, listed in stock markets, etc.) are still useful. Third, such data may be more easily combined with firm level data from other countries (again perhaps obtained through companies such as Thomson) and therefore enhance the international comparability and benchmarking.

To the extent possible, the ERF could also play a very useful role in collecting corporate governance data for these companies as well. Again, such data would be publicly available and this would be a relatively low cost activity with high returns.

It would still be worthwhile to contact statistical institutes of member countries to ask for access to manufacturing surveys, knowing that such an effort would take time to bear fruit. This can be done to access the whole data, or to create a "distributed" data set of the sort described above. As described above, some ERF research has already addressed some of the questions (1-3), but there is room for more work to answer different research questions, perhaps to address some of the measurement and estimation issues raised in the recent literature, to improve estimates of productivity (and, for example, isolate demand and market power elements), and last but not least, to make more direct international comparisons. Morocco, Turkey, Tunisia (and perhaps Syria?) would be countries to start with.

ERF should also weigh launching an effort to generate large scale manufacturing survey/census-like data sets from scratch, but here I am not totally convinced that it should. This would be a very costly endeavor. I would have urged the ERF to take that route had the WES data not existed, but it does. True, the WES data likely will not allow researchers to address questions of broad industry dynamics at the micro level, but they do allow addressing a wide scope of other interesting research questions. On the other hand, the fact that some ERF countries may not even have a manufacturing survey may reflect insufficient capacity in the statistical offices, and here the ERF may play a role. I would recommend giving priority to systematize the WES effort and only then consider the possibility of launching an effort with very broad coverage.

Specific research questions may require data not covered in the WES, or in regular financial statements. But such data generation activity can be financed through various research instruments that ERF makes available to researchers.

Regarding the research on the relation between managerial practices and productivity summarized in section 1.5 above: I see this as a very important area of research, especially in emerging economies. The issue of likely effects of different managerial practices has long been out of the reach of economists, most probably because of unavailability of data. On the other hand, anecdotal evidence does suggest that managerial practices are likely to be important. Many SME policies (certainly those in Turkey) have started to include policies that address capacity building at the firm level, hence the importance of managerial practices has attracted the attention of policy makers. Whether such attention is warranted, and whether such support is complement or substitute for, for example, enhancing access to finance is likely to be a fruitful area of research. It may be worthwhile for the ERF to think about whether to contact pioneers of this work (Nick Bloom at Stanford or Van Reenen at LSE) and to discuss the possibility of extending this work to countries of the region.

I would also strongly recommend that if ERF is going to encourage ERF researchers to do research using firm level data, then it would be worthwhile to launch a parallel effort to generate qualitative, historical and political-economic analysis of main business groups in the region. Such qualitative research would help put micro evidence into a context. It would also generate research questions and hypotheses that go beyond transposition of research questions developed on the basis of experience in other parts of the world.

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FHK Decomposition Shares
Medium Low, Medium High and High Tech Industries
Labor Productivity - Five-Year Differencing, Real Gross Output
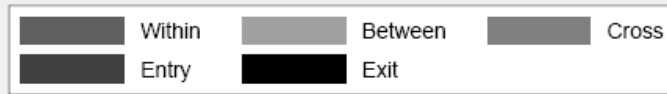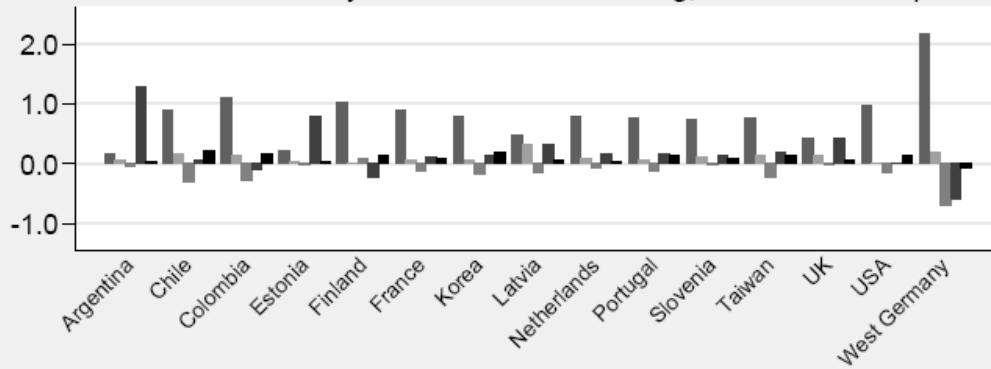
Argentina: 1995-2001. Chile: 1985-1999. Colombia: 1987-1998. Estonia: 2000-2001. Finland: 2000-2002. France: 1990-1995. West Germany: 2000-2002. Korea: 1988 & 1993. Latvia: 2001-2002. Netherlands: 1992-2001. Portugal: 1991-1994. Slovenia: 1997-2001. Taiwan: 1986, 1991 & 1996. UK: 2000-2001. USA: 1992 & 1997. Excluding Brazil and Venezuela.

Source: Bartelsman et. al. (2007).

Annex 1 - World Bank Enterprise Surveys

The World Enterprise Survey (WES) data prepared by the World Bank is potentially an important and rich source of data.[25] Compared to most surveys of manufacturing industry carried out by state statistical institutes, the coverage of WES is most likely to be smaller in terms of number and diversity of firms. Moreover, even in cases where the same firms are followed over time, panels are typically short (two or three points over time). This would create problems, for example, in reconstituting capital stock values using the perpetual inventory method. However the WES also has some clear advantages:

First, the data it is easily accessible through the website. In order to access the data researchers need to register with the Enterprise Analysis Unit (GIAEA) of the World Bank and complete an Enterprise Surveys Data Access Protocol whereby users commit to protect its confidentiality. Stone (2010) states that there is effort to develop a "software to allow statistical and econometric analysis without revealing individual firm data".

Second, the scope of the WES in terms of issues and topics on which information is gathered is much larger than regular manufacturing surveys. Hence the typical WES questionnaire includes questions on firm characteristics, gender participation, access to finance, annual sales, costs of inputs/labor, workforce composition, bribery, licensing, infrastructure, trade, crime, competition, capacity utilization, land and permits, taxation, informality, business-government relations, innovation and technology, and performance measures. The typical WES has enough economic variables (e.g. sales, labor, book value of capital, investment, costs etc.) so as to allow the calculation of various productivity estimates. Moreover, surveys are not restricted to manufacturing but covers services as well. There is a "core questionnaire" that is applied to all surveyed firms, and additional manufacturing and retail modules implemented towards firms in these sectors.

Third, for some countries, there already is some panel data (see Table below), i.e. same firms have been surveyed more than once over time.

According to information available[26] on the website for the data sets the surveys have already been applied to the following countries: Algeria, Egypt, Jordan, Morocco, Oman, Syria, Turkey, West Bank and Gaza and Yemen.

The dataset is already being used extensively in papers that address a wide variety of issues.[27] To give just a few examples:

- Escribano et. al. (2010) examine the relation between the investment climate (IC) and firm performance as measured by total factor productivity, employment, wages, exports and foreign direct investment. In a companion document, Escribano and Guasch (2008) document a robust methodology proposed to be used in estimating the impact of IC variables on firm performance.
- Oapina and Schiffbauer (2010) presents empirical evidence on the impact of competition on firm productivity. In this paper, competition is measured both in terms of firm level mark-ups, a continuous variable and in terms of responses to questions in the WES, a discrete variable.
- Gorodnichenko and Schnitzer (2010) investigate how financial constraints affect a firm's innovation and export activities. In this paper, the severity of financial constraints are

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[25] Dethier et. al. (2010) provide a history of World Bank work with firm level data.

[26] See https://www.enterprisesurveys.org/documents/datadetails.xls

[27] An updated list of papers that use the enterprise survey data can be found at http://www.enterprisesurveys.org/documents/Research-used-in-different-studies.xls. See also Stone (2010).

also measured through firms' responses to questions about difficulty of access to external finance and cost of external finance.[28]

- De Rosa et. al. (2010) examine the impact of corruption, constructed as a discrete variable from survey responses, on productivity.

World Enterprise Surveys: What countries have been covered in the MENA region?

Country	Status
Algeria	2 Rounds Complete
Egypt	3 Rounds Complete, 4th in preparation*
Iran	Planned
Iraq	Initiated
Jordan	Complete
Kuwait	Proposed
Lebanon	ICA Completed, Update Complete
Libya	Survey Complete, Analysis Underway
Morocco	3 Rounds completed*
Oman	Complete, 2nd round under discussion
Saudi Arabia	2 Rounds Completed (confidential).
Syria	Complete, Update Complete.
Tunisia	Survey only completed, no data access.
Turkey	4 rounds complete
West Bank/Gaza	Complete
United Arab Emirates	Proposed
Yemen	Complete, Update underway.

Notes: (*) substantial panel component
Source: Stone (2010)

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[28] The data set used in this paper is called Business Environment and Enterprise Performance Surveys (BEEPS). This is the name given to enterprise surveys implemented in Central and Eastern Europe and countries from the former Soviet Union, jointly conducted by the World Bank and the European Bank for Reconstruction and Development.

Annex 2 - Global Entrepreneurship Monitor (GEM) Datasets

The Global Entrepreneurship Monitor (GEM) undertakes an annual assessment of level of entrepreneurial activity in the countries covered. It started as a partnership between London Business School and Babson College. It was initiated in 1999 with 10 countries, while GEM 2009 Global Report covers 56 countries.

The basic aim of the research program is to measure differences in the level of entrepreneurial activity between countries through harmonized surveys undertaken in each country. The basic research tool of GEM is the Adult Population Survey (APS). This is a comprehensive survey of at least 2000 adults in each country, selected from a nationally representative sample of 18–64 year-olds. To ensure consistency and cross-country comparability, each country conducts the same survey of its adult population at the same time of the year using methodologies approved by GEM. The individual country surveys are then harmonized into one master dataset.

The APS collects information on the percentage of the population that: "(1) is engaged in activities to start a business (nascent entrepreneurs); (2) is involved as an owner in a new business that is less than 42 months old; (3) owns an established business that is more than 42 months old; (4) has had a business in the past but discontinued it for some reason (exiting entrepreneurs); or (5) has invested in someone else's business sometime during the past three years (informal investors). The rates for (1) and (2) are combined to produce the Total Entrepreneurial Activity (TEA) Index, which is used to rank participating countries on their level of early-stage entrepreneurial activity, and combined with (3) to produce a score for the overall level of entrepreneurial activity." (GEM-MENA Regional Report, p. 7).

The APS also gathers information attitudes and perceptions regarding entrepreneurial activity, as well as demographic data on the persons surveyed. On the cultural aspect, there are questions, for example, regarding the perceived status of entrepreneurs in the society and whether entrepreneurship is a good career choice. There is also demographic data on the gender, age, education level, labour force status, annual household income, and urban–rural breakdown of survey respondents. Finally information is collected on the characteristics of the enterprises being launched by nascent and new entrepreneurs or managed by established entrepreneurs (e.g. sector, employment, innovativeness, use of technologies, location of customer base, growth expectations, etc.), as well as the financial and non-financial support that might be available to them.

Currently GEM data sets contain information on 13 MENA countries: Algeria, Jordan, Lebanon, Morocco, Syria, Palestine, Yemen, Egypt, Iran, Saudi Arabia, Tunisia, Turkey, and the United Arab Emirates. The GEM-MENA Regional Report 2010 reports data on these 13 countries with more in depth analysis of Algeria, Jordan, Lebanon, Morocco, Syria, Palestine, Yemen that were included in the GEM effort specifically for this report.

The GEM-MENA report provides some interesting data which can be useful for ERF research. Naturally the data is entrepreneurship-focused and the landmark statistic that the report provides is the TEA Index described above, which is taken as a measure of the general entrepreneurial orientation of the country. However, in the GEM-MENA Report and the GEM Global Report 2010 there are interesting information on start-up capital requirements, employment impact and sources of financing (including the availability of informal investment and venture capital).

GEM data set are made available to public from the GEM website (www.gemconsortium.org) with some delay. Currently GEM data for 1999-2006 is available and data for 2007 will be

available in 2011. The website lists an impressive list of academic papers that have been published using the GEM datasets.[29]

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[29] http://www.gemconsortium.org/about.aspx?page=pub_gem_articles