

Topics In International Economics

Referee Report

Research Proposal (very preliminary)

Jose Ignacio Lopez
 Department of Economics, University of California, Los Angeles

"Policy distortions and aggregate productivity with heterogeneous plants" by Diego Restuccia and Richard Rogerson (2008) NBER Working Paper 13018.

1. Introduction

To a large extent the growth literature has focused on policy distortions that take place at the aggregate level. The usual assumption of constant returns to scale provides a useful framework to characterize an aggregate production function through a representative firm but leaves, nonetheless, unaddressed the question of how differences in productivity at the firm-level matter when allocating resources. Restuccia and Rogerson proposed a model where misallocation of resources across heterogeneous production units does have an impact on the overall efficiency of the economy and that may be helpful to understand across-country differences in per capita incomes.

The idea that allocation of production from less productive firms to more productive units improves aggregate output and efficiency has been recently brought up in the context of trade models with heterogeneous firms -see Meltiz (2003), Guironi-Meltiz (2005) based on previous works by Hopenhayn (1992)-. Restuccia and Rogerson framework follows the same way of reasoning but allows for distortions that prevent resources to flow to the best productive firms.

The model is simple and broad enough to account for policies that distort output or capital and labor at the firm level. Some recent empirical literature has been devoted to analyze cases where government's policies interfere in the optimal allocation of inputs across firms either be-

cause the government taxes firms based on their size or because some firms get special financing or treatment (corruption can be also thought of as an example of idiosyncratic distortions). Moreover, new empirical studies have shown that TFP differences at the aggregate level can be explained to an important extent by distortions in the size distribution of firms. (Hsieh and Klenow(2006) find that misallocation at the firm level in manufacturing in China and India translates into a lower TFP around 40%). Restuccia and Rogerson model's motivation rests on these empirical findings.

2. Model

The household side of the economy is the typical one. A representative household seeks to maximize the present discounted value of an infinite stream of consumption subject to a budget constraint. The household gets income from labor services and for renting physical capital to the firms. In addition, households own the firms and receives profits from them, once they optimally decide production and their input's requirements.

On the production side, there is large number of firms that perfectly compete in the consumption-investment good market but differ in productivity. Each firm faces a decreasing-returns -to -scale technology and a idiosyncratic parameter of productivity. Each firm takes input and output prices as given and faces an ex-

ogenous probability of death, which is iid across plants and time. In addition, there are fix costs of production measured in each of the firm's output. There is an unbounded number of potential entrants, who after paying an entry cost withdraw from a known distribution a value for the productivity parameter. The combination of the exogeneous death probability and fix costs allow the model to have entry and exit in the steady state. At the aggregate level, the resource constraint of the economy is such that consumption by households and investment in capital and new firms should be equal to the aggregation of each firm's net output, which is production minus fix costs.

Up to here the model presents no novelty. The innovation comes from the fact that Restuccia and Rogerson allow for exogeneous distortions to the output of each firm. The distortions are introduced as either in the form of a tax or a subsidy to final output collected by the government (for the calibration part the authors also consider distortions to physical capital and labor). A characterization of a firm, then, should include a joint distribution over the distortion and productivity parameters.

The paper focuses on the steady-state competitive equilibrium where rental prices are constant as well as the aggregate capital stock and there is a stationary distribution of firms across type. In the steady-state equilibrium consumer's preferences will determine the rental of capital and therefore the capita-labor ratio. Profits, which will be a function of the rental rate and wages will appear in the zero profit free entry condition in which wages will be pinned down as long as labor is supplied inelastically. In addition to this, the steady-state equilibrium includes as objects the budget constraint of the government and the invariant distribution of firms. This model is fairly simple and tractable. Most of the insights of the paper will come from the calibration part in which the authors compute the effect of various types of distortions on the aggregate level of TFP and output. We devote the next part to comment on the quantitative part of the paper.

3. Calibration and Results

Restuccia and Rogerson pick the parameter values aiming to match some moments of the US data. The discount factor is chosen in order to match a real interest rate of 4% while the parameters of the production function target a capital income share of 30% and a labor income share of 60%. The depreciation rate is chosen to aim at the observed investment-output ratio of 20%. In the model, the relative size of one firm –measured by the number of workers- compare to a different firm is a function of the differences in the productivity parameter. Therefore, one can back up the range of productivity differences from the range of firm sizes observed in the data. For the US, the number of workers per firm ranges from 1 to 7,090. Using these numbers, Restuccia and Rogerson calculate a productivity interval from 1 to 243.

With these numbers the authors calculate a baseline scenario in which there are no entry costs and no distortions. Note that without distortions the optimal capital-to-labor ratio is equal across firms. Then, they proceed to calculate the loss in output and TFP associated to a tax rate of 50% to the output of all firms. Their numbers suggest that an aggregate distortion of 50% , translates into a reduction of output of 11% all caused by a decline in TFP. In a different exercise, if entry costs double , the measure of aggregate productivity falls by 7% relative to the benchmark economy.

The most interesting experiments, nonetheless, are related to firm- specific distortions, in other words, idiosyncratic distortions which take the form of taxes or subsidies but leave unchanged the aggregate variables. In this case, we can have two cases: the idiosyncratic distortions can be correlated to the size and production of each firm or they may be completely random. When distortions are uncorrelated to the size of the firm, the drop in TFP relative to the base case model is quite modest. Even with a 40% random tax to half of firms, TFP declines only 6%. The correlated case, in contrast, shows relative large num-

bers. Correlated here means that small firms receive a subsidy and large firms are taxed. In this case, if 50% of the plants with low productivity receive a subsidy while the rest are taxed, TFP declines as much as 28%. This number can be even higher, if one allows for distortions in wages or the capital rental rates. The problem with these experiments is that given that the aggregate labor supply is fixed, any distortions to wages, for instance, changes the level of the capital stock at the aggregate level. Therefore, the numbers reported from this exercise are not strictly comparable to the previous ones, but suggest, however, that distortions to the input markets can translate into a decline in TFP of as much as 40% compare to the benchmark case.

4. Conclusions

Distortions at the firm-level could help to explain to an important extent differences in TFP across countries. Policies intended to re-allocate resources among firms may hurt the overall efficiency of the economy. This paper presents a relative simple and tractable setup to explore and calculate the potential impact of such policies. The fact that this particular framework is general enough leaves room for further research on specific types of distortions..

5. Research proposal

One question that the model here presented cannot answer is the impact of potential spillovers on the distortion of one firm into related companies. Along a production chain, distortions to one firm may have a negative spillover effect on the rest of firms involved in the line of production . Spillovers can amplify the negative effect of distortions at the firm level and can blow up the numbers here presented without requiring larger taxes or subsidies. For instance, it may interesting to explore the potential effects of misallocations in the tradable sector on the exporting firms. The presence of the informal sector in some developing countries may be an interesting case to analyze under this framework.

6. References

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