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Essays on Misallocation

Export-Import Bank of India (India Exim Bank) instituted the International Economic Research Annual Citation (IERA Citation) in 1989. The objective of the Citation is to promote research in international economics, trade, development and related financing, by Indian nationals at universities and academic institutions in India and abroad. The study titled 'Essays on Misallocation' is based on the IERA Citation 2023 winning thesis by Dr. Rahul Rao, who received his doctorate from the Indian Institute of Management, Bangalore in 2023.

One of the key questions in economics is, “Why are some countries richer than others?” The extant research in development literature suggests that the main reason for differences in income levels is a country’s total factor productivity (TFP), which reflects how efficiently it uses its resources. This leads to the crucial question: why does TFP vary between countries? Researchers have identified different reasons for low TFP in poorer countries. These include slower adoption of new technologies or businesses not using available technology effectively. Such factors explain why companies in poorer countries are less efficient compared to those in richer countries, which lowers overall TFP. However, even if two countries have similar distribution of firm-level productivity, their TFP may still differ based on how resources are allocated across firms.

For this, TFP can be seen as the weighted average productivity of individual firms. It can be low either because the firms themselves are less productive, or because weights are not optimally allocated amongst them. Misallocation refers to the latter case which occurs when more efficient firms get fewer resources, while less efficient ones get more. This allocative inefficiency can be caused by financial barriers, trade limitations and policy regulations, among others. Studies have found that these distortions negatively impact overall productivity and economic output of a nation.

Over time, the role of micro-level heterogeneity in economic growth has gained more attention, particularly in the context of resource misallocation. Seminal works by Restuccia and Rogerson (2008) and Hsieh and Klenow (2009) highlight how the suboptimal allocation of inputs across different production units contributes to a reduction in total factor productivity (TFP). This study examines two distinct aspects of such resource misallocation across three chapters.

The first chapter addresses how much agricultural land could be freed for non-agricultural use in India if it were allocated more efficiently. This is significant because agriculture uses about 60% of India’s land, yet crop yields remain below the global average. The chapter suggests that Indian farmers often grow unsuitable crops, requiring more land to produce the same output, leading to lower yields per hectare. By using a novel agronomic dataset called Global Agro-Ecological Zones (GAEZ), the analysis calculates the minimum land required to achieve current crop outputs if agricultural land were optimally allocated. The results show that up to 13 million hectares, or 20% of agricultural land during the Kharif season, could be released in a conservative baseline scenario. With more advanced inputs and access to finer land heterogeneity, a social planner could potentially free up as much as 70% of agricultural land.

The second chapter examines the welfare effects of the above increased agricultural productivity due to better land allocation. Using a two-sector model (agriculture and manufacturing), the chapter explores how land and labor shift between these sectors, given certain barriers to movement of both factors. The findings show that with improved agricultural productivity: (i) land and labor move from agriculture to manufacturing, (ii) land prices fall while wages rise, (iii) output in both sectors increases, (iv) agricultural prices decrease, and (v) real income in the economy rises by 11.69%. Additionally, welfare gains from factor reallocation diminish if mobility barriers increase, and conversely, the effects are amplified if these barriers are reduced. This indicates that not only is optimal land use necessary for improving productivity, but reducing the barriers to resource movement is equally crucial for enhancing overall welfare.

These findings reinforce the notion that India's crop-land mismatch leads to inefficient use of agricultural land and lower crop yields. The analysis provides valuable insights into how land acquisition challenges hinder the country's economic development, and it offers a framework for policymakers to explore ways to improve crop yields and release agricultural land for other uses.

The third chapter shifts focus to borrowing constraints in the U.S. credit market, examining their micro and macro-level implications. At the micro-level, the chapter compares earnings-based borrowing constraints (EBC) with collateral-based constraints (CBC) to explain the empirical characteristics of U.S. manufacturing firms. Debt-constrained firms are found to (i) have a higher debt-to-earnings ratio, (ii) have a lower debt-to-asset ratio, (iii) be more productive, (iv) not necessarily be small, and (v) have lower net worth. The chapter also reveals that the size of a firm is not strongly correlated with its marginal revenue product of capital.


Using a static input choice model, the analysis shows that EBC better captures these observations than CBC. Under CBC, borrowing is primarily determined by firm size, leaving small firms credit constrained and larger ones relatively unconstrained. In contrast, under EBC, borrowing depends on both size and productivity, allowing small but highly productive firms access to financial capital while potentially constraining larger firms. As a result, larger firms may face constraints under EBC, while smaller firms may not.

At the macro level, the chapter links capital misallocation to the type of borrowing constraint, finding that TFP losses are about 40% lower under EBC compared to CBC. This is because, under EBC, credit access is tied to a firm's productivity, reducing the dispersion of marginal revenue products across firms and leading to higher aggregate productivity. In contrast, CBC allows larger firms to borrow more, regardless of productivity, leading to greater dispersion and lower TFP. The chapter empirically confirms that during the 1997-2015 period, U.S. manufacturing firms

faced more earnings-based borrowing constraints, meaning prior literature may have overestimated TFP losses by focusing on collateral-based constraints.

Overall, this chapter highlights how different borrowing constraints affect firms' capital allocation and demonstrates that earnings-based constraints were more relevant for U.S. firms, potentially leading to lower-than-expected productivity losses due to credit frictions.

In conclusion, the different chapters in the study offer various perspectives on misallocation. First, in terms of the type of misallocated input, the first chapter focuses solely on land misallocation, while the second chapter expands to include both land and labor misallocation. In contrast, the third chapter deals with the misallocation of physical capital. Secondly, the first two chapters examine sectoral-level misallocation, specifically between different sectors of the Indian economy. The third chapter, however, looks at capital misallocation between firms within the U.S. manufacturing sector. Thirdly, both direct and indirect methods are used to calculate misallocation. In the first chapter, an indirect approach is employed to measure the overall extent of land misallocation between the agricultural and non-agricultural sectors in India, without focusing on specific causes. In the third chapter, the focus shifts to the misallocation of physical capital due to two types of credit market distortions: collateral-based and earnings-based borrowing constraints.

The contents of the publication are based on information available with India Exim Bank. Due care has been taken to ensure that the information provided in the publication is correct. However, India Exim Bank accepts no responsibility for the authenticity, accuracy or completeness of such information. 

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