

## Firm size and mobility: descriptive evidence from the Senegalese formal sector, 2008-2020

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*Since 2008, the 10% largest firms in Senegal have consistently accounted for 90% of the total revenue of the private formal sector. These firms are also more profitable on average, and much more likely to maintain their relative position than other firms are to move up the distribution. Further research should attempt to explore the role of such dominance on market distortions.*

### Introduction

A recently growing empirical literature has been emphasising the role of firms for low-income countries' development. Still, due to the lack of access to good quality data, little is known even about basic orders of magnitude characterising differences across firms and their recent evolution. Exploring a newly consolidated dataset of financial and tax statements declared by formal firms since 2008, we document a few stylised facts on the distribution of revenue, earnings and mobility patterns in the Senegalese private formal sector.

### Context and Methodology

Senegal is a sub-Saharan Africa lower-middle income country located on the Westernmost part of the continent, with notably stable institutions, a population of 17 million people and ranking 200<sup>th</sup> in terms of PPP-adjusted GDP per capita. Working in close collaboration with the Tax Administration (TA, henceforth) and the National Agency for Statistic and Demography (NASD, henceforth), we have created a firm-level panel dataset covering the universe of tax-registered firms spanning from 2008 to 2020. We have cleaned and combined several datasets which are the by-products of the tax administration's operational routine, and consolidated all financial statements submitted to the TA by Senegalese firms and digitised by the NASD. An innovative approach of the project was to set up a data unit directly within the TA, which allowed in depth and continuous exchanges about the data and dramatically improved its quality.

Our dataset is an unbalanced panel of firms ranging from 2008 to 2020. It is arguably the most comprehensive dataset on formal firms in Senegal one could get access to, and the government relies on this information to estimate the contribution of the formal (semi-) private sector in the national accounts. Nevertheless, the coverage is not yet perfect, and we cannot discard the possibility of some formal firms to be missing. In particular, a few firms appear in the dataset only a couple of years after they have started their activity. As the administration modernises and the economy becomes more formal, it is likely that the dataset's overall coverage of the Senegalese economy will improve over time. In line with this, we observe that in 2020 the total value added measured in our data accounts for 24.5% of the corresponding aggregate in the national accounts, up from 17.5% in 2008 (the rest coming from informal firms, the government, and households through auto-production).

## Main findings

The number of firms increases threefold during the observed period, from 5,788 firms in 2008 to 17,198 in 2020 – 11,410 firms gradually enter and only 2,611 cease activity. Aggregate gross revenue (henceforth revenue) increases by almost 100%. By 2020, firms that did not exist before 2008 represent about two-thirds of all active formal firms and their combined share in total gross revenue has reached almost 40% (Figure 1). Consistently with the general context of an expanding Senegalese economy since 2008 (total population and GDP per capita increased by 40% and 20% respectively), several new firms have been created and contribute to the growth of the formal private sector.

Despite these significant transformations, some stylised facts remain stable. Using revenue as a proxy for firms' size, Figure 2 shows that the largest 10% of firms account for about 90% of all revenues throughout the entire period, while the bottom 50% (6,880 firms in 2020) consistently capture less than 1%. Breaking down the top 1% further illustrates how concentrated revenues are, with the top 0.1% (i.e., 6 firms only in 2008, and 18 in 2020) generating about 27% of all revenues.

The largest firms are also more profitable on average (Figure 3). Profitability, measured as earnings (before interests, corporate income tax, depreciation, and amortization) over revenue, is systematically higher among the top 0.1% firms (except for 2010), with an average of 15% over the period. This earning rate gradually decreases with size and is negative on average among the bottom 50% (not displayed in the graph), a pattern that becomes more pronounced after 2015. Earnings, which on aggregate have increased by 140% since 2008, are thus even more concentrated than revenue: the top 0.1% share captures 40% of total earnings on average over the period.

Figure 1: aggregate figures on the evolution of the formal sector

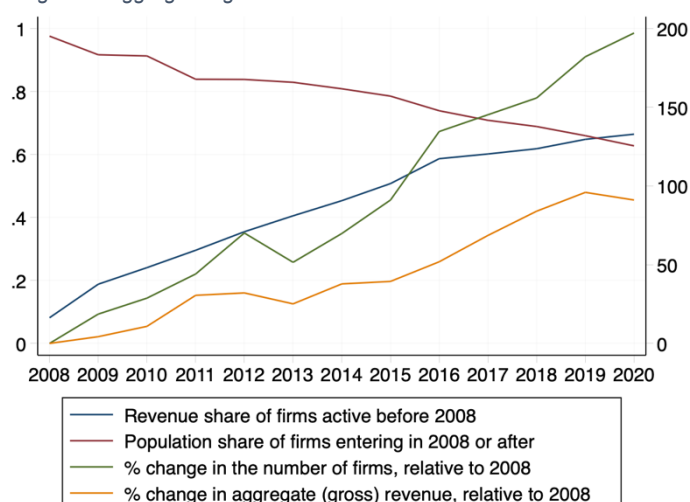


Figure 2: the evolution of revenue share by quantile of revenue

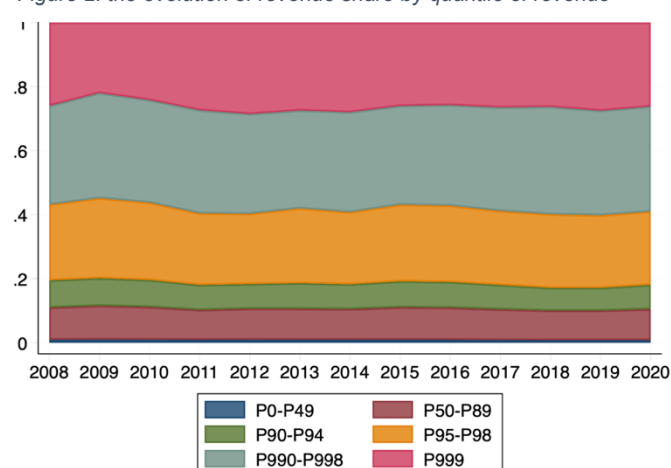
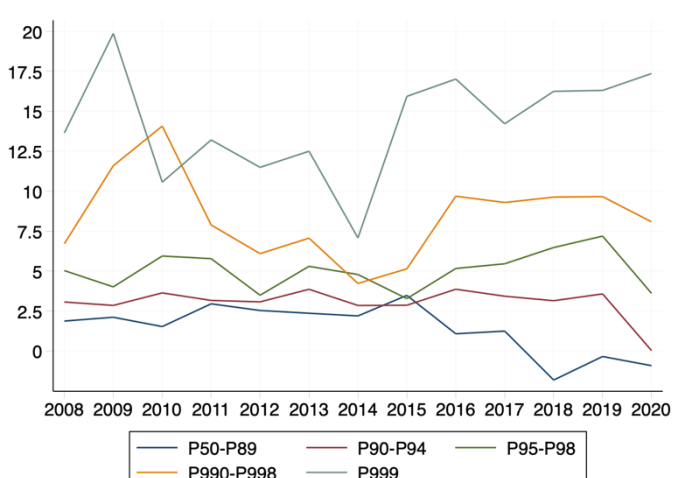


Figure 3: the evolution of average earnings rate by quantile of revenue



To reconcile Figure 2's stability with the transformations in Figure 1, we then looked at where new firms start off in the revenue distribution in their first year. Figure 4 illustrates a stable, unsurprising pattern: most new firms start small compared to incumbents ones. About 45% of new firms start in the bottom 30% of the revenue distribution, a little more than 30% land in decile 4 to 6, almost 20% in decile 7 to 9, and less than 5% start at the top 10%.

Last, in figure 4 we present an analysis of the evolution of relative mobility across deciles. For each year  $t$  and decile  $d$ , we compute the probability for a firm to reach a decile superior to its own in the next year (or remain in decile 10 if its decile at year  $t$  is already the top one). The empirical probability to make an upward relative move in a given year is very similar across deciles below the 70<sup>th</sup> percentile and ranges between 20% and 40%. This probability goes below 20% (resp. 15%) for firms in the 8<sup>th</sup> (resp. 9<sup>th</sup>) decile, but suddenly reaches 90% in the top 10% (with the exception of 2012). In other words, small firms are mobile within the bottom 70% of the distribution, but moving up becomes much harder in the upper part of the distribution, as absolute steps in terms of revenue sharply increase, and firms within the top 10% are much more likely to maintain their top position than other firms to come and replace them. Summarising Figure 4 and 5, most new firms are small and will most likely remain so, while very large firms either started large or have already been large for a long time. As an illustration, by the end of the period, among firms in the top 10% in 2020, 25% were already in the top 10% in 2008 (they represented 72% of the top 10% at the time) 10% were already in decile 9, and 40% are new firms which started either from decile 9 or 10 during the observed period.

Figure 4: the evolution of the distribution of new firms by decile of revenue

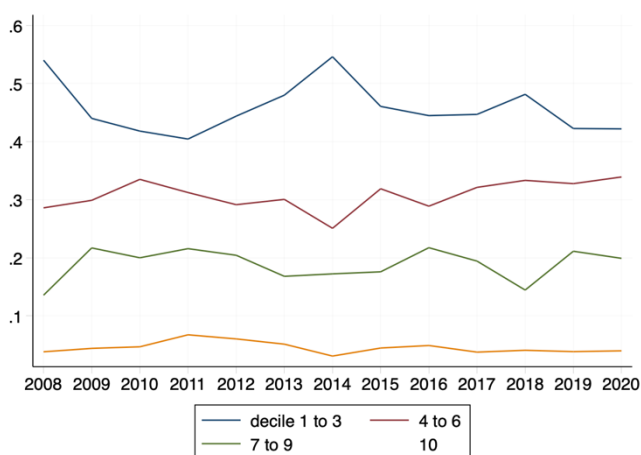
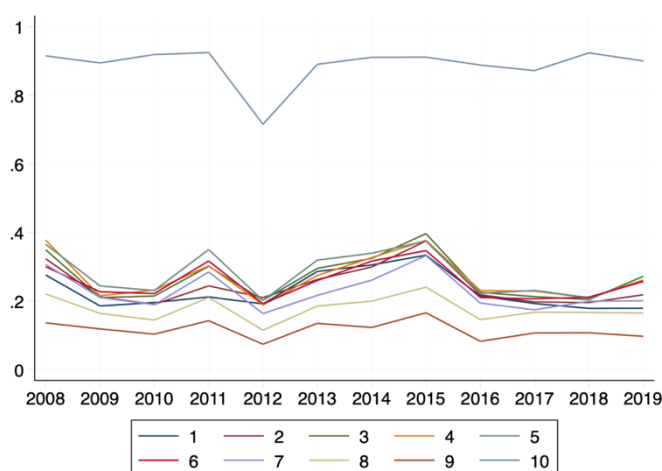


Figure 5: probability to yearly move up by decile of revenue



### Implications and next steps

Our results demonstrate how extreme the heterogeneity across firms in a developing country can be, and how crucial the largest firms probably are for development at the national scale. Considering this, researchers, as well as policy makers, should be careful when possibly extrapolating lessons learned from smaller firms. This also suggests that studying the largest firms might be strategic for policy impact. It would however be hazardous to draw more precise conclusions at this stage. Such seemingly extreme levels of concentration may be indicative of market distortions due to monopolistic or monopsonic positions, but nothing excludes this allocation from being optimal, that is for example reflecting heterogeneities in firms'

productivity. In follow-up work, we will attempt to explore such issues, for instance testing whether firms in potentially dominant positions behave as expected when some parameters of their environment change.

*This note is based on research conducted as a part of PEDL [ERG 8063](#).*