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THE OTHER PRODUCTIVITY PUZZLE

BUSINESS DYNAMISM AND PRODUCTIVITY GROWTH BEFORE THE CRISIS

Albert Bravo-Biosca and Stian Westlake

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SUMMARY

New research published by Nesta looking at productivity growth in Britain from 1998 to 2007 at a very detailed level identifies four interesting findings about the state of the British economy before the crisis. Some of these findings are troubling, as they hint at deep-seated problems that are unlikely to be addressed by a cyclical recovery.

1. **Most start-ups were not particularly special from an economic point of view.** The average new British business was no more productive than the average existing business, either at its foundation or after five years of existence. While some new firms contributed positively to labour productivity growth during this period, this was offset by the negative contribution of other new firms.

2. **Many good companies went out of business.** A surprisingly high number of businesses that left the market were ones that showed above-average productivity. For every ten low-productivity firms that left the market, six high-productivity ones did too. Had the high-productivity exiting firms stayed in business, British productivity growth between 1998-2007 could have been up to 6 percentage points higher than it was.

3. **Existing businesses were by far the main contributors to productivity growth.** Productivity improvements in the existing population of firms contributed an estimated 15 percentage points to growth in labour productivity, accounting for over 90 per cent of Britain's productivity growth between 1998-2007.

4. **The British economy became significantly worse at allocating resources to the best businesses over the period.** This is complex but important. The research measured the so-called 'allocative efficiency' of the economy over the period – the extent to which the best (most productive) companies were larger than the worst (least productive) in each sector of the economy. This gives an idea of whether the best businesses are scaling up. The research showed that allocative efficiency fell sharply in Britain from 1998 to 2007 among firms with ten or more employees, due in large part to developments in prominent service sectors such as retail and hotels and catering. If Britain's productive resources were as efficiently allocated at the end of the period as they had been at the beginning, productivity would had been about 7.6 percentage points higher among firms of this size. This is equivalent to around £79 billion of lost GDP.

Evidence from other sources suggests that these patterns have not improved since the financial crisis.

There are a number of possible explanations for these findings, ranging from a poorly functioning financial system to unfavourable trading and regulatory conditions for innovative new entrants to the impact of technological change.

Whatever the reason, this research suggests that economic policymakers should, as a matter of priority, seek to make it easier for high-productivity businesses to scale up.

DETAILS OF FINDINGS

This brief summarizes some of the results from a research project funded by Nesta undertaken by Geoff Mason, Catherine Robinson and Chiara Rosazza Bondibene at the National Institute of Economic and Social Research.

This project examined the sources of labour productivity growth level at sector level in Great Britain between 1998 and 2007, analysing firm-level data from the Office for National Statistics to look at what types of businesses ultimately drive British productivity growth. To assess the drivers of productivity growth, the research distinguishes between continuing firms (those that were in existence throughout the 1998-2007 period) and firms that started up or went out of business during these years. For the full results, including tables of the productivity performance of different British sectors at a detailed level between 1998 and 2007, see Nesta Working Paper No. 14/09 and the tables released with it. (**www.nesta.org.uk/wp14-09**)

The findings of the research can help shed light on the so-called 'productivity puzzle': the question of why British productivity growth has been so low since the recession and what can be done about it. While many potential explanations have been put forward,[1] implicit in many of them is the idea that all was well and good prior to the recession. This new analysis of British productivity performance in the decade prior to the recession suggests that all was not well, and in fact that Britain was already experiencing a productivity problem in 2007, another productivity puzzle that we need to understand.

Before we begin to summarize the findings, it is helpful to understand the basis of the research. It rests on the idea that in well-functioning economies more productive firms will tend to displace less productive firms. Entrepreneurs with new ideas enter the market. If new firms are more productive than incumbent firms, they grow. Otherwise, they fail. Resources - labour and capital - flow over time from the least productive firms in the market towards more productive ones. This drives productivity growth. And competition forces unproductive firms to improve or else shrink and exit.

1. The average British start-up made a negligible contribution to productivity growth

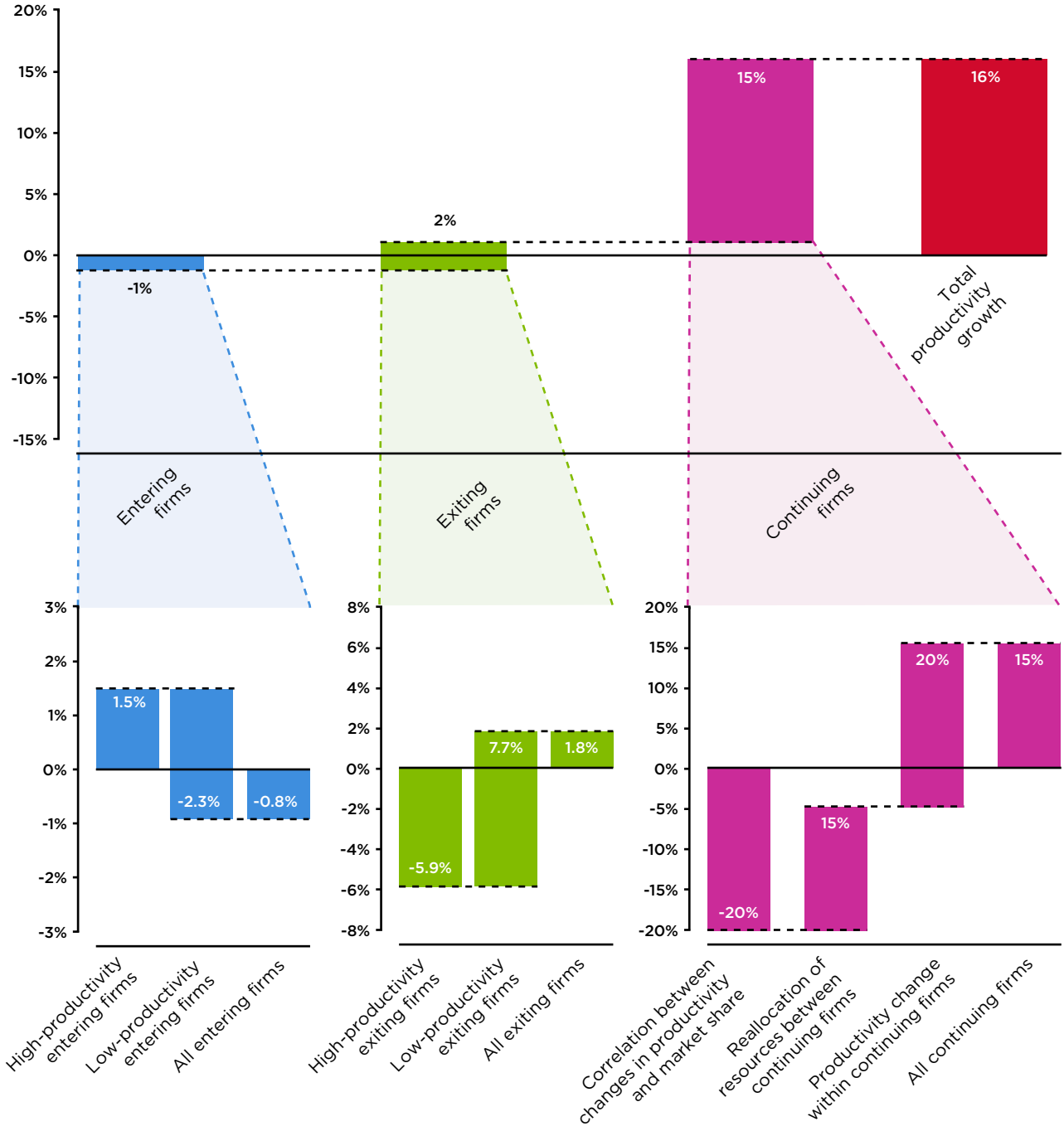
Figure 1 shows the contribution of different groups of firms to British productivity growth between 1998 and 2007.[2] According to this analysis, the average contribution of new firms to British productivity growth during this period was negligible, actually marginally negative (-1 per cent). In other words, the productivity of new firms at the end of the study period (2008) was not higher than the productivity of surviving incumbents.

It is normal for new firms to display low productivity when starting up. All new businesses take time to get going, to start making money and to improve their business models. But even if we look at new entrants that have been operating for at least five years, by which time they should have overcome some of these challenges, the same finding emerges. In 2007 new firms that had entered the market between 1998 and 2002 were not more productive on average than surviving incumbents.[3]

This is not to say that entrepreneurs and founders are not important. Not all new businesses in the period exhibited low productivity. A minority of higher-productivity start-ups can be identified (they are highlighted separately in Figure 1), and these did make a positive contribution to the productivity of the economy. But they are in the minority.

Putting together these findings with other research published by Nesta suggests that new firms make a much more important contribution to job creation[4] than to productivity growth.[5] While they create both jobs and value added, only some of them lead to higher productivity. This should come as no surprise, since a large majority of start-ups never grow. Out of all the new firms created in Britain in 1998, only 37.5 per cent survived for a decade, and only 3.9 per cent reached 10 or more employees in 2008.[6]

FIGURE 1: **CONTRIBUTION TO PRODUCTIVITY GROWTH IN BRITAIN, 1998-2007**



This is a troubling finding given the emphasis being placed on entrepreneurship as a means of tackling Britain's current economic predicament. The experience of 1998-2007 suggests that promoting new business formation in a general way will not do much on its own to increase productivity.

2. Many high productivity firms are exiting the market

The entry of new firms is only one aspect of how productivity increases. Productivity also increases when underperforming (low-productivity) firms go out of business, completing the Schumpeterian cycle of creative destruction. Figure 1 shows that, on average, firms that exit have lower productivity than surviving incumbents.

What was surprising from the research is that a large number of high-productivity firms also exited the market in the 1998-2007 period. For every ten low-productivity firms that left the market, six high-productivity ones did too.[7] The effect of high-productivity businesses leaving the market is shown separately in Figure 1: if these firms had managed to stay in business, average British productivity growth could have been up to six percentage points faster during the period.

Of course, it is to be expected that some high-productivity businesses will go bust even in the best of circumstances. But the sheer number of high-productivity firms leaving the market gives some cause for concern about business conditions such as access to credit and the market for trade sales.

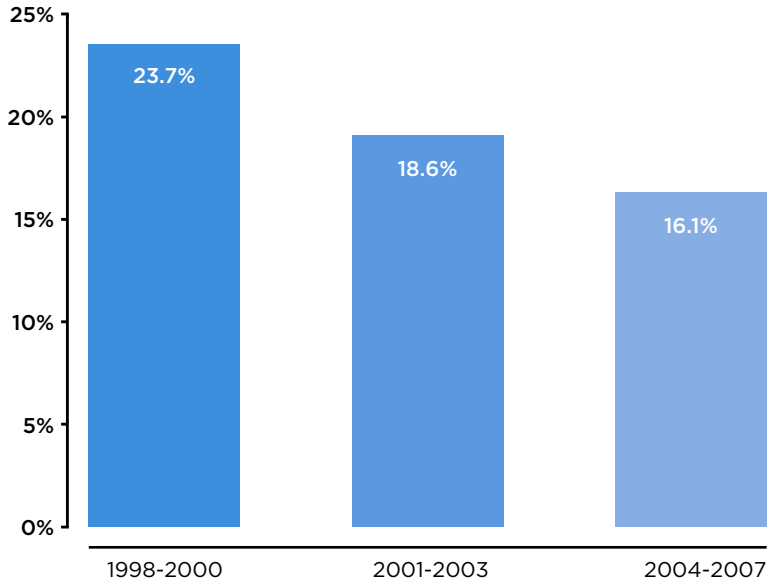
3. Existing businesses were by far the main contributors to productivity growth.

Figure 1 shows that British productivity growth was 15 percentage points higher as a result of improvements in productivity in the population of firms that neither entered nor exited the market during this period, accounting for over 90 per cent of Britain's productivity growth between 1998-2007.

It is possible to decompose the contribution of continuing firms into three components, reported separately in Figure 1. Improvements in productivity within continuing firms, that is, businesses improving their own performance, contributed an estimated 20 percentage points to growth in average labour productivity in the total economy between 1998-2007. The reallocation of resources between continuing firms, as some of them gain market share and others lose it, contributed another 15 percentage points.[8]

However, actual labour productivity in the total economy grew by only 16 per cent over this period, as these contributions were partly offset by the negative contribution of the 'cross-term' effect. The negative correlation between changes in productivity and market share reduced productivity growth by 20 percentage points. In other words, on average firms with the fastest productivity growth were downsizing, while firms growing fast in employment saw their productivity worsen.

FIGURE 2: **ALLOCATIVE EFFICIENCY IN BRITAIN, 1998-2007, FIRMS WITH TEN OR MORE EMPLOYEES**



4. The aggregate allocation of resources in Britain has been worsening over time

The research also measured the allocative efficiency of the British economy between 1998 and 2007 for firms with ten or more employees. Allocative efficiency refers to the extent to which resources such as labour and capital are skewed towards more productive companies. An economy in which highly productive businesses scale up and less productive ones shrink is one in which allocative efficiency is increasing. When allocative efficiency increases, so does productivity.

It turns out that allocative efficiency fell significantly in Britain between 1998 and 2007, as reported in Figure 2, due in large part to developments in prominent service sectors such as retail and hotels and catering. If Britain's productive resources were as efficiently allocated in the later part of the period (2004–07) as they had been in the earlier part (1998–2000), aggregate productivity in Britain would have been 7.6 per cent higher among 2007 among firms with ten or more employees. This represents around £79 billion of foregone GDP.[9]

The research measured allocative efficiency across 32 sectors as well as at the level of the economy as a whole. This detailed analysis showed that allocative efficiency fell within a large number of sectors as well as at a national level.[10] To put it another way, what we are seeing is more people working in lower productivity firms within each sector.[11] Much of the decline in allocative efficiency was concentrated in service sectors such as the retail, wholesale, hotels and catering, and post and telecommunications sectors.[12]

Therefore, in many sectors of the British economy the most productive firms struggled to gain market share at the expense of less productive firms, while large firms that had lost their productivity advantage managed to maintain their market share.[13]

This finding suggests that, even before the financial crisis, Britain didn't offer a sufficiently good environment for the best businesses to scale up. This has worrying implications for the economy today, not least because there is evidence that resource allocation in Britain has suffered in the recession too.[14] It suggests policy makers need to implement policies to make it easier to grow good businesses if productivity is to increase.

CONCLUSION

This research shows that there would be substantial productivity benefits if Britain made it easier for the best businesses to grow. Reducing barriers to growth and reversing the decade-long decline in allocative efficiency could contribute to a significant increase in British productivity growth.

It is also important to understand why a large number of above-average productivity companies are exiting the market, which may be a significant drag on British productivity, and whether anything can be done to mitigate this trend.

Finally, this research is a useful reminder of a known but yet often forgotten fact. Quality matters more than quantity when looking at entrepreneurship. Therefore, policy makers should focus on supporting high-impact entrepreneurship rather than on increasing the overall number of entrepreneurs, which are often low productivity businesses.

METHODOLOGY AND DATA

The research uses a variety of approaches and data sources to explore the sources of British productivity growth. Specifically, it undertakes both a static and a dynamic decomposition at a detailed sector level, including manufacturing but also services (data for 32 sectors is provided).

Dynamic decomposition

Aggregate labour productivity can grow due to new firms entering the market, unproductive firms exiting the market, high productivity incumbents expanding and gaining market share from less productive firms, or firms improving their productivity performance. The dynamic decomposition examines how much of British productivity growth between 1998 and 2007 can be accounted for by each of these factors. Specifically, it uses two methods to do that, the Foster, Haltiwanger and Krizan (2001) and Melitz and Polanec (2012) decompositions.[15]

Static decomposition

The productivity performance of a sector at a particular point in time can be decomposed in two components: the average productivity level of a firm in that sector and 'allocative efficiency', a term that captures how much higher (or lower) productivity is as a result of not all firms having the same size or market share. In other words, if firms with higher than average productivity are also larger, then allocative efficiency is positive. In contrast, if the most productive firms are smaller than average, then allocative efficiency is negative. Therefore, allocative efficiency captures whether there is a positive or a negative correlation between size and productivity. In a well-functioning economy, the most productive companies grow and capture a larger market share, and therefore allocative efficiency is positive. This method is known as the Olley-Pakes (1996) decomposition.[16]

Data

Two different ONS datasets are combined to perform this analysis. First, the Annual Respondents Database, a detailed financial survey (including value added information) of all firms with over 250 employees, and a sample of firms employing less than 250 employees. Second, the Business Structure Database, a census of all firms that are VAT and PAYE registered in Great Britain, extracted from the Interdepartmental Business Register.

For a full description of methods and the data used, see the paper underlying this brief: *Sources of labour productivity at sector level in Britain, 1998-2007: a firm-level analysis* by Geoff Mason, Catherine Robinson and Chiara Rosazza Bondibene, Nesta Working Paper No. 14/09 (**www.nesta.org.uk/wp14-09**)

These decompositions are undertaken at detailed levels of sectoral disaggregation (a combination of 2 and 3 digit level, up to 32 sectors) also available in an online visualization as well as for download **(www.nesta.org.uk/wp14-09)**

ENDNOTES

1. For an excellent discussion of some of the potential explanations, see Barnett, Batten, Chiu, Franklin and Sebastiá-Barriel (2014) 'The UK productivity puzzle'. Bank of England Quarterly Bulletin 2014 Q2 (**http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q201.pdf**)
2. Figure 1 is based on a decomposition of labour productivity growth proposed by Melitz and Polanec (2012). However, the productivity breakdown for continuing firms into three separate categories is based on the decomposition of labour productivity growth proposed by Foster, Haltiwanger and Krizan (2002). Note that the original analysis reports productivity growth measured in log points, so this is a close approximation. See Nesta Working Paper 14/09 for additional details. (**www.nesta.org.uk/wp14-09**)
3. These results are in contrast with earlier findings in the literature, which typically found that entry of new plants made an important contribution to productivity growth on average. However, note that most of this prior analysis was undertaken at the establishment level, while the analysis here is done at the firm level. What does this mean in practice? The opening of a retail branch or a new factory by a large firm (e.g., for instance, by a multinational) constitutes a new establishment, typically with higher productivity than average. Establishment-level analysis would count this as entry, while firm-level analysis will count this as overall improvements in surviving incumbents' productivity (via resource reallocation).
4. See Anyadike-Danes, Bonner and Hart (2014) 'Exploring the incidence and spatial distribution of high growth firms in the UK'. Nesta Working Paper 13/05. (**www.nesta.org.uk/wp13-05**)
5. One caveat is in order. This analysis likely underestimates the contribution of entrepreneurs to British economic growth, since even if they don't end up being successful, the ideas resulting from the experimentation that they undertake, and the competition pressure that they create for incumbents, can create productivity gains that prevail. An economy with fewer high-growth entrepreneurs would be definitely a poorer one.
6. Nesta (2011) 'Vital Growth'. (**http://www.nesta.org.uk/publications/vital-growth**)
7. Although market exit can be caused by being acquired as well as by ceasing trading, the absolute number of businesses exiting is sufficiently high that acquisitions are unlikely to account for most of them.
8. The importance of business growth dynamics for productivity growth is consistent with other research published by Nesta, which shows that a 5pp larger share of static firms, that is, firms that neither grow nor shrink, is associated with 1pp lower productivity growth. See Nesta (2010) 'Growth Dynamics'. (**http://www.nesta.org.uk/publications/growth-dynamics**)
9. This estimate is obtained by multiplying market sector GVA (i.e., GVA excluding the government sector) accounted by firms with ten or more employees by the fall in allocative efficiency (7.6 per cent among firms with ten or more employees).
10. In general, sectors with high allocative efficiency tend to be more productive. Similarly, sectors where allocative efficiency increased most rapidly are also those that experienced the highest productivity growth over the period. A few subsectors in the British economy, mostly within services, even have negative allocative efficiency, that is, the most productive firms are the smallest rather than the largest.
11. Note that in addition the research also suggests that more people were working in lower productivity sectors at the end of the period than at the beginning (although these results include only firms with ten or more employees). Specifically, a fall in allocative efficiency can decomposed into two components: (1) more resources being allocated to lower productivity firms within a sector, and (2) more resources being allocated to lower productivity sectors. The research finds that the total change in allocative efficiency in the UK economy over the period was -11.9 per cent if both these components are included. Given the structural shifts occurring at that time, such as the declining share of manufacturing, we prefer to focus the discussion on the change in allocative efficiency within sectors (-7.6 per cent), a better proxy of the potential benefits of reducing barriers to growth to the most productive firms in each sector.
12. Overall, there are significant differences across aggregate sectors, with allocative efficiency improving in manufacturing (3 per cent) and falling dramatically (-12.4 per cent) in services.
13. The working paper shows as well that falling allocative efficiency is not due to differences in productivity levels within sectors having narrowed, since they haven't fallen consistently. Note however that SIC classifications may fail to fully distinguish between different types of subsectors within a particular sector, treating them as if they were all competing for the same customers.
14. See Barnett, Batten, Chiu, Franklin and Sebastiá-Barriel (2014) 'The UK productivity puzzle'. Bank of England Quarterly Bulletin 2014 Q2. (**http://www.bankofengland.co.uk/publications/Documents/quarterlybulletin/2014/qb14q201.pdf**)

Nesta

1 Plough Place
London EC4A 1DE

research@nesta.org.uk
@nesta_uk
www.facebook.com/nesta.uk

www.nesta.org.uk

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