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Does the growth process discriminate against older workers?

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ABSTRACT

This paper seeks to gain insights on the relationship between growth and employment when considering heterogeneous agents in terms of their working horizon. Using an OECD database, our empirical estimations suggest that growth positively influences the employment rate of workers having a long working horizon (young workers) while negatively influences the employment rate of workers having a short working horizon (senior workers). We then provide theoretical foundations to this result by means of an endogenous job destruction framework à *la* Mortensen and Pissarides (1998) where we introduce life cycle features. We show that, under the assumption of homogeneous productivity among workers, growth negatively affects the employment rate of workers having a short working horizon before retirement (senior workers) while it positively affects the employment rate of workers having a long working horizon (young workers). Numerical simulations confirm these results, however a non-standard calibration is required to reproduce the elasticity values obtained in our empirical estimations.

1. Introduction

The relationship between growth and unemployment has been largely analyzed in the economic literature. In his seminal work, Pissarides (1990) claims that an acceleration of growth improves the employment rate, because growth increases "freely" the expected profits, as in the Solow model, and then provides incentives to open new jobs (the capitalization effect). In contrast, Aghion and Howitt (1994) argue that growth fosters a "creative destruction" process inducing more job destruction and less job creation, yielding lower employment rates.[1] What effect (creative destruction vs. capitalization) prevails in case of an acceleration in the growth rate? If the capitalization effect is dominant, we should observe an improvement in the employment opportunities when growth increases. Conversely, if the creative destruction effect dominates, employment opportunities should deteriorate.

Even if the link between growth and employment is ambiguous from a theoretical point of view, empirical studies report clearer results. Using a traditional econometric approach, *i.e.* a panel of OECD countries, Blanchard and Wolfers (2000) or Pissarides and Vallanti (2007) show that an increase in growth pushes down unemployment. Similarly, using several measures of co-movements in the frequency domain, Tripier (2007) shows that the long-run co-movement between unemployment and productivity is strongly negative in the US and Europe. Moreover, the simultaneous slowdown in productivity

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[1] Note though, that in Aghion and Howitt (1994), depending on the parameters, it is possible to have a non-linear relationship (an inverted U-shape) between growth and unemployment.

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growth and the rise in the unemployment rate in OECD countries support the positive correlation between these two phenomena. Empirical evidence suggests that the capitalization effect offsets the creative destruction effect, leading to a decrease in the long term aggregate unemployment rate (non-participation issues are not considered). Does this mean that the creative destruction effect of Aghion and Howitt (1994) associated with an acceleration of growth is always dominated by the capitalization effect? We believe the answer is negative as long as we consider heterogeneous agents.

In this paper, we show that the relative magnitude of the capitalization and the creative destruction effects depends on the working horizon of the worker, which is tightly correlated with her age. For simplicity, we consider that young workers have a long working horizon, whereas older workers have a short working horizon.[2]

When dealing with old workers we can adopt either a "backward" or a "forward" looking point of view. The backward point of view implies that when getting old, all workers suffer from skill obsolescence or simply get used. This view then predicts the same reduction in the employment rate of seniors at the same age in all countries. However, this biological perspective is not supported by the data.[3] In the second case, from the forward looking point of view, the heterogeneity across workers comes from the distance to retirement. Ljunqvist and Sargent (2008); Hairault et al. (2010) and Saint-Paul (2009) support the view that the short distance to retirement is the key feature to understanding the economics of older worker's employment.[4] Because our paper seeks to underline the role of the distance effect (or horizon effect) on the relationship between the employment rate and the growth rate, we consider as old workers those having less than ten years before retirement (when the distance effect applies) whereas young workers have more than ten years before retirement. We believe that the effect of growth on employment evolves along the life cycle, having a positive effect during the earlier period (when the worker is young) and a negative effect when approaching the legal retirement age.

Our paper distinguishes then between individuals at the beginning of the life cycle (young individuals) and individuals at the end of the life cycle (old individuals). The formers have a long working horizon[5] whereas individuals at the end of the life-cycle have a short working horizon. Following the related literature (Aghion and Howitt (1994) or Mortensen and Pissarides (1998)), we assume that when the technological frontier grows at a faster rate, the rate of job obsolescence accelerates. The firm can then destroy the job and create a new one at the technological frontier (creative destruction) or she may renovate the technology associated with an already existing job. The decision of the firm will be based on the comparison between the renovation cost and the cost associated with a vacancy (when a new job is created it takes some time to fill the vacancy). As pointed out by Mortensen and Pissarides (1998), if the cost of adopting the new and more productive technology in an already existing job is higher than the cost of creating a new job, the firm will not renovate and growth will yield a pure creative destruction effect (more unemployment). Conversely, if the renovation cost is below the creation cost, the firm prefers updating the technology associated with the job when growth accelerates. For a sufficiently low renovation cost, the expected net profits increase which promotes the opening of more vacancies. In this case, growth leads to a capitalization effect (employment opportunities are increased).

Our intuition (confirmed by the empirical evidence presented in Section 2) is that the capitalization effect only dominates for young workers. When the worker's horizon is long (for young workers) the time horizon during which a firm can recoup the updating cost of renovating an existing technology is longer than when it is short (for old workers). So, the optimal policy for the firm is to renovate more frequently jobs occupied by young workers than those occupied by old workers. When growth accelerates, the increase in the speed of obsolescence offsets the long-run positive impact of growth on the actualization factor if the time horizon during which the firm can recoup its renovation cost is short, *i.e.* if the job is occupied by a senior. At the limit, it could be optimal for firms not to renovate jobs occupied by old workers, separation becoming the best choice. It seems then to be intuitive that the creative destruction effect is likely to dominate in the old segment, whereas in the young segment, we may find that the capitalization effect dominates.

The effect of growth on the employment rate of heterogeneous agents has traditionally been analyzed using theoretical or empirical frameworks where the source of heterogeneity arises from the individual's skill level (see for example Berman et al. (1994); Machin and Van Reenen (1998) or Moreno-Galbis et al. (2007)). However, to our knowledge, few studies analyze whether a given individual is equally exposed to the consequences of growth along her life-cycle.[6] Our paper focuses on this issue. More precisely we analyze the conditions under which the acceleration of growth fostered by the diffusion of technological progress is biased against short working horizon workers. We consider here old workers, but we believe that for very young workers (with high turnover) conclusions would be similar.

[2] For very young workers the turnover is higher than for less young workers (not yet old). So, from the firm's point of view, the actual working horizon of very young workers may be as short as that of old workers. We should therefore consider three different worker categories, very young, less young (or middle age) and old workers. However, since the economic mechanisms at work for very young and old workers (short working horizon workers) are similar, and since introducing the very young category of workers implies considering on-the-job search issues, we adopt a simplified representation of the labor market by distinguishing only between two categories of workers: young and old.

[3] The employment rate of men aged between 55 and 59 are: 50% in Belgium, 60% in France, but 70% in the UK, 75% in the US and 80% in Sweden, whereas in the same countries, the employment rates of the 35–54 are around 90%. Divergences in institutions inducing heterogenous working horizons for senior workers may help explaining these differences.

[4] According to the empirical works of Hairault et al. (2010), the shorter the distance to retirement (whatever the age of the worker), the lower the probability of being employed. This distance effect becomes active from the tenth year before retirement.

[5] We neglect on-the-job search issues so as to focus exclusively on the role of the working horizon.

[6] For an empirical study, see Aubert et al. (2006) who analyze the effects of new technologies on the French labor flows (exits and entries) by age or the paper of Bartel and Sichermann (1993) who work with US data and analyze the impact of a technological change (permanent or transitory) on the retirement decision of employed workers.