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Ageing, productivity and wages in Austria ☆

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HIGHLIGHTS

- We study the relation between the age of employees and productivity as well as wages.
- Firm productivity is not negatively related to the share of older employees.
- We find a negative relationship between the young employees and labour productivity.
- We cannot find any hints for an overpayment of older employees.

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ABSTRACT

Current demographic developments in industrialized countries and their consequences for workforce ageing challenge the sustainability of intergenerational transfers and economic growth. A shrinking share of the young workforce will have to support a growing share of elderly, non-working people. Therefore, the productivity of the workforce is central to a sustainable economic future. Using a new matched employer–employee panel dataset for Austrian firms for the period 2002–2005, we study the relationship between the age structure of employees, labour productivity and wages. These data allow us to account, simultaneously, for both socio-demographic characteristics of employees and firm heterogeneity, in order to explain labour productivity and earnings. Our results indicate that firm productivity is not negatively related to the share of older employees it employs. We also find no evidence for overpayment of older employees. Our results do not show any association between wages and the share of older employees. Furthermore, we find a negative relationship between the share of young employees and labour productivity as well as wages, which is more prevalent in the industry and construction sector.

1. Introduction

Demographic change in industrialised countries will have profound consequences for economic sustainability in the years to come. Low levels of fertility, increasing survival at old age, accompanied by moderate levels of migration imply a pronounced ageing of the population. While individual ageing is argued to be a success story due to a rising number of years experienced in good health, population ageing is commonly associated with negative consequences for the financial sustainability of social security systems. This process of ageing becomes more apparent from a look at the population statistics for Austria in the year 2011, and their projection up to 2050 (VID, 2012). The median age of the population is expected to increase from 42.0 to 48.3 years, with the proportion of the population aged 65 and over rising from 17.6 to 30.2%. Thus, in less than 40 years from now, half of the Austrian population is projected to be older than 48.3 years and about one third will be

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at least 65 years old. Moreover, the old-age dependency ratio (defined as the population aged 65+ years divided by population aged 20–64 years) will rise from 28.5 to 58.1%. What are the consequences of ageing within the labour force itself, i.e. the economically supporting entity? Will an ageing workforce – in the light of shrinking size – be able to sustain economic well-being by increasing productivity?

Skirbekk (2008) finds that the development of cognitive abilities leads to a hump-shaped age–productivity profile at the individual level, whereby accumulated experience mitigates the decrease in the productivity potential at higher ages. Making use of cross-section data on Austrian firms in 2001, the findings in Prskawetz et al. (2007) and Mahlberg et al. (2009) confirm such a hump-shaped productivity profile over age. In contrast, however, recent panel data studies using firm-level data provide evidence against this age–productivity pattern. Aubert and Crépon (2006) and Göbel and Zwick (2009) show that the age–productivity relation is quite sensitive to the estimation method and indicate that controlling for unobserved time-invariant firm heterogeneity and endogeneity leads to a flattening of the age–productivity profile at higher ages.

Based on a yearly balanced panel dataset for Austrian firms ranging from 2002 to 2005, we analyse whether the age distribution of employees is systematically related to labour productivity. Our dataset is obtained by matching firm-level data from the structural business survey of Statistics Austria with data from the *Main Association of Austrian Social Security Institutions* (Hauptverband der Sozialversicherungsträger) of Austria. Our dataset allows us to account simultaneously for employee and firm characteristics. In addition, we analyse the relationship between the age structure of employees and average wages paid in the firm. Since seniority wage schemes are prevalent in certain sectors of the Austrian economy, one may expect that wages might not be an appropriate measure of labour productivity, since some (age) groups of employees may be under- or overpaid. However, the existing evidence in the literature concerning such a relationship is somewhat ambiguous (see e.g. Hellerstein et al., 1999; Crépon et al., 2002; Dostie, 2011).

Our results give some evidence concerning the fact that labour productivity is negatively related to the share of young workers (≤29 years) for firms in the industry and construction sector. Independently of the specific sector affiliation, we cannot find any association between the share of older workers (50+ years) and productivity. After controlling for a large set of potential determinants of productivity and wages, we find robust evidence that firms with employees whose age distribution is concentrated on relatively young age groups tend to pay lower wages.

The paper is structured as follows. In Section 2 we review the recent literature on ageing, productivity and wages. The theoretical framework is introduced in Section 3. The dataset is presented in Section 4 and the empirical analysis is discussed in Section 5. Section 6 concludes.

2. Previous studies on age, wages and productivity

During recent years several studies have been conducted at various levels of aggregation (e.g. firm, plant) to estimate both age–productivity and age–wage profiles. This section provides a brief overview of selected studies and their results (see also Börsch-Supan et al., 2005; Gelderblom, 2006; Skirbekk, 2008).

A study of the relationship between age, productivity and wages requires data at the level of the firm rather than at the individual level, since labour productivity is shaped by the interaction of individual productivity, team work and firm environment. It has became common in the literature to make use of so-called matched employer–employee datasets for such a type of analysis. These datasets contain firm characteristics as well as attributes of employees working for the respective enterprises.

Several empirical studies based on cross-sectional data indicate that a larger share of old workers has a detrimental effect on firm productivity (e.g. Haltiwanger et al., 1999; Lallemand and Rycx, 2009; Mahlberg et al., 2009; Prskawetz et al., 2007). Recent studies (e.g. Malmberg et al., 2008; Göbel and Zwick, 2009) are often based on longitudinal matched employer–employee datasets and tend to find that a larger share of older workers does not necessarily affect firm productivity.

The studies referred to so far concentrated exclusively on the link between age structure and firm-level productivity, without assessing its relation to the wage profile. An early study on this issue is the work of Medoff and Abraham (1980), who document a positive association between pay and experience which is independent of the individual performance on the job (as rated by the supervisors). These results are consistent with Lazear (1979)'s theory of deferred compensation, which assumes that workers and firms want to be engaged in long-term relationships and concludes that rising earnings do not necessarily fully reflect increased productivity.

The first study focusing on comparing age–productivity and age–wage profiles is Hellerstein and Neumark (1995). Relying on matched employer–employee data from Israel, they build up two structural equations to estimate the relationship between age and productivity, as well as the link between age and wages. Their findings indicate that the upward sloping age–wage profile mirrors the upward sloping age–productivity profile. Similar results were obtained by Hellerstein et al. (1999), while Hægeland and Klette (1999) find that the wage premium for workers with higher experience (more than 15 years) exceeds their relative productivity, whereas the opposite is true for workers with 8–15 years of experience.

The need to base the empirical work on longitudinal data, so as to control more effectively for relevant firm characteristics (including unobserved time-invariant characteristics), is now widely agreed upon (Hellerstein et al., 1999). Productivity shocks at the firm level (which are by definition time-varying and therefore not captured by firm fixed-effects) might influence the results if inference is based on cross-sectional datasets. Some firms may have more difficulties in adjusting some types of labour than others due, for example, to employer/works council agreements. In such cases, the bias in the estimation of the productivity older workers would be caused by the fact that changes in input shares are endogenously determined by firm performance. Attempts to overcome of this problem include the use of dynamic panel data methods such as those proposed by Arellano and Bond (1991) (see also Aubert and Crépon, 2006; Cardoso et al., 2011; van Ours and Stoeldraijer, 2011) and two-stage regression methods (Dostie, 2011).

Recent studies report different outcomes with respect to the age–productivity and age–wage relationship. Aubert and Crépon (2006) find that the average contribution of particular age groups to the productivity of firms increases with age until age 40–45, and remains constant. They show that the age–productivity profile is similar to the age-labour cost profile, which does not support the idea of overpayment of older workers, although the evidence with regard to ages above 55 is inconclusive. Ilmakunnas and Maliranta (2007) examine the connection of an ageing workforce and firm performance using information on hiring and separation of employees. Their evidence shows that separations from older workers are profitable to firms, especially in the manufacturing ICT-industries.

Dostie (2011) uses Canadian matched employer–employee data at the workplace level to estimate production functions which explicitly take into account the age composition of the workforce. Using similar methods as Hellerstein et al. (1999) and Aubert and Crépon (2006) but controlling for individual and firm unobserved heterogeneity, as well as for unobserved time-varying productivity shocks, Dostie (2011) finds that both wage and productivity profiles are concave, but productivity is diminishing faster than wages for workers aged 55 and over. Van Ours and Stoeldraijer (2011) perform their analysis using a matched employer–employee dataset from Dutch manufacturing covering the period 2000–2005. Their findings are closely related to Aubert and Crépon (2006) and Dostie (2011).