

# TECHNOLOGICAL PROGRESS AND THE EARNINGS OF OLDER WORKERS

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## Introduction

This paper examines whether the earnings of older US workers track overall increases in total factor productivity (TFP) as closely as those of their younger colleagues. The US population is aging: longevity is increasing, while fertility is, if anything, trending in the opposite direction. If the marginal product of younger workers rises proportionately with TFP but the marginal product of older workers lags behind, then innovation will, in effect, tend to diffuse more slowly as the labor force ages. Retirement timing may be influenced as well. In general, as longevity rises, we expect both work lives and retirement spans to increase. Workers' optimal allocations of extra years of life between career and retirement will presumably depend upon the rate of pay available. In fact, we find that the pay of older US employees does not follow TFP growth quite as closely as the remuneration of younger workers — though the difference is, perhaps, surprisingly small — and we attempt to provide quantitative assessments of the likely impact on the economy.

## Model

We use an earnings dynamics model. The basic framework is familiar from a large literature.

## Data

We utilize an unusually rich set of data on worker earnings, the Social Security Administration's Continuous Work History Sample (CWHS), 1950–2004. The data provides annual earnings from administrative records, for thousands of workers, providing many observations at each age. Our analysis is limited to working males. We also use Census data on worker education by year and age, and Bureau of Labor Statistics (BLS) data on wages per efficiency unit of labor and TFP growth.

We present an earnings dynamics model that allows technological progress to affect workers' marginal products, hence, their earnings, differentially at different ages. We use a standard BLS measure of TFP growth as a regressor.

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## Results

Our results show that the earnings of aging workers do not grow one-for-one with TFP, yet the difference is quite modest. Our results imply that the earnings of a 60 year old follow TFP growth 85–90 percent as well as those of a 26–30 year old. About one half of the decline with age seems to run its course by age 45. Thus, we do not see evidence that workers abruptly cease to invest in knowledge as they approach retirement. By age 65, an average worker will have lost about 2.6 years' worth of TFP-induced wage growth, reducing his annual earnings by about 5 percent.

In all cases, however, simulated aging of the labor force through slower population growth yields net gains in aggregative labor efficiency: the growth in earnings from accumulating experience more than compensates for declines in ability to benefit from improvements in technology. In the end, the greater experiential human capital of older workers seems to outweigh their declining linkage to the TFP level. Hence, an aging labor force continues to be a productive one — in fact, more productive than a younger one.

Our analysis examines only one aspect of how a worker's marginal productivity is likely to fare as the individual ages. We do not study participation rates, which may depend not only on earning ability but also on health. Increases in longevity presumably encourage workers to consider longer careers, though the slight decline with age in ability fully to benefit from TFP gains will tend to be one adverse factor in workers' decisions of whether to work longer or not.

## Conclusion

While it may be easy to suspect that older workers lose their ability to benefit from TFP growth, we find little evidence that this is strongly evident in practice. Using earnings data from the Continuous Work History Survey, we find that workers 60 years old track TFP changes about 90 percent as well as workers aged 25–30.

On the one hand, this suggests that falling wages due to obsolescence is unlikely to be a major factor preventing workers from working until later ages in the future. On the other hand, it implies that efficiency gains with age from accumulated human capital will be able to more than counterbalance declines in ability to keep up with new technologies — hence, if demographic change leads to an aging labor force, the latter's overall productivity will tend actually be higher than before.

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