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Comment on: Prskawetz and Fent, “Workforce Ageing and Economic Productivity: the Role of Supply and Demand of Labor”

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1. It would have been useful to have had this paper several years ago when I prepared a review of economic impacts of population ageing. In prefacing these remarks,

a. I will discuss population ageing as a generic phenomenon, abstracting from the specific trends in Austria and

b. I will ignore my own advice and use the phrase “population ageing” sloppily to refer both to change in age structure and deceleration in aggregate rate of growth.

2. Throughout this paper, the authors abstract from capital. We are, in this paper, miles away from the neoclassical vision of an ageing society in which declining labor force causes the capital-output ratio to rise, corresponding to the declining productivity of capital (not enough workers to man the machines, i.e. the opposite to the situation that development economists worry about). The wage rate rises along with the marginal product of very scarce labor. The rate of return to capital declines as machines go looking for people to run them, in turn discouraging saving and encouraging net capital outflows, all of which combine to limit the rise in the capital-output ratio. It all sounds rather pleasant for us wage slaves: the only drawbacks of the ageing society, it would seem, are (i) the need to import foreign labor for those jobs, many of them unattractive, which cannot be compressed and (ii) the need constantly to remind the young that despite skyrocketing social contribution rates, their net wages are in fact rising.

3. To begin their argument, the authors assume first that individual worker productivity is equal at all ages. If the production function is additive, then average output per worker is a weighted average of (equal) age-specific productivity coefficients, so clearly age structure changes have no impact on average output per worker. What is less obvious (I confess that it had never occurred to me) is that even with a simple Cobb-Douglas production function, average output per worker

will be sensitive to changes in age structure. To see why, consider that output will be maximized when the marginal product of young workers is equal to marginal product of old workers, which would imply that the absolute number of workers in the two age groups is equal.

4. Starting with 2000:100, the authors calculate that in 2030, the average product of labor assuming a Cobb-Douglas production function might be 105; with a CES production function and an elasticity of substitution of $-0,5$ between workers of various ages, it would be closer to 115. This is because, disregarding a blip in the first decade, the index of dissimilarity of the labor force age distribution steadily declines until 2030. Parenthetically, this means that countries like Austria where workers are slow to enter the labor force and quick to leave it, are at a disadvantage.

5. The policy makers' nightmare, however, is not that an ageing labor force will give rise to a rising index of dissimilarity; it is that older workers may be less productive than young ones, thus damaging the competitiveness of their economies. Now, this immediately raises problems because it is firms, not countries, which compete, but let us leave that aside.

Age-profile of Productivity

6. Using reasonable individual age-productivity profiles, the authors find that, given a CES production function with an elasticity of substitution of $-0,5$ the difference between the most optimistic (constant age-productivity profile) and most pessimistic (monotonically decreasing productivity) scenarios is pretty constant over time at about 10%. In other words, once you are ten or fifteen years out, assuming individual productivity declines monotonically age with results in average labor productivity 10% lower than assuming that it is constant with age. The more likely assumption that individual productivity is hump-shaped, peaking at about 40, lies almost exactly in the middle, i.e. between the pessimistic assumption of a monotonic decrease and the optimistic one of a constant age-productivity profile.

7. A simple way of approaching the problem is to assume that old workers are just like young ones except they have to rest more. In a Cobb-Douglas economy, output would then be $Q = A K^\alpha (\beta L)^{1-\alpha}$ and the elasticity of output per worker Q/L with respect to β would be $(1-\alpha)$, just like its elasticity with respect to labor. Say that this is 0,67. Now, the mean age of the Austrian labor force, according to the most pessimistic projection given, will increase by 10 years between 2000 and

2050 and may increase far less. It is hard to imagine this change increasing the average “rest factor” by more than a quarter. So very roughly speaking, we might expect to see the average product of labor decline by perhaps 17%. Looked at differently and keeping in mind the 50-year time horizon, an increase in total productivity growth of 0.3 percentage points per year would be required to address this epidemic of idleness.

8. In the UK, about one-third of the adult population is now over 50; in 2020, about half will be. Say that the same applies to the labor force. Assume that productivity is flat until 50 and then falls to zero ... in other words, workers under 50 shovel and workers over 50 simply lean on their shovels. (I should add that there is also the Sala-I-Martin thesis that older workers actually REDUCE the productivity of young ones!) Then the projected age structure change would reduce the average product of labor by precisely 25%.

9. These extreme and simplistic examples help to explain the gist of the results presented here: that age patterns of productivity, combined with the evolving age structure of the labor force, do not have much impact on average output per worker. And the most important variable appears to be the elasticity of substitution between workers of different ages.

10. To be added to this is uncertainty over whether individual productivity really does decline with age, a subject on which Vegard Skirbeck is an expert. As I read his synthesis, there is a fair bit of evidence that it does, but the case is not overwhelming.

Substitutability of Older and Younger Workers

11. The situation is likely to differ by sector. There are jobs for which physical strength or stamina are important; construction, for example. It seems clear that older workers will be at a disadvantage here. Note that in others, the balancing factor in the equation may not be productivity, but physical wear and tear ... the elderly bus driver drives just as many passenger kilometers, but suffers more for it. In the former case, younger and older workers will be very poor substitutes and we can expect average output per worker to decline with aging. In the latter case, average worker productivity will not decline with ageing, just the satisfaction of the average worker. In neither case will worker training be of the slightest use. Note that I make the very restrictive assumption that there is no inter-sectoral mobility. In fact, the question of how many older workers will willingly take a step

down – IT workers becoming bartenders, for example – is an interesting one.

12. At the other end of the spectrum are jobs where physical strength or stamina are irrelevant but mental acuity and being up on the latest techniques are crucial – “knowledge jobs.” Here, just as in the case of construction workers, older workers will be poor substitutes for younger ones because their skills will be out of date. But,

- a. Subject to some limitations, training can address the problem.
- b. Firm-specific knowledge, “networks,” etc. are likely to be very important assets.
- c. Sorting of workers into the functions they perform best is likely to occur very effectively.

For all three reasons, I conclude that ageing is unlikely to be a problem in “knowledge sectors.” This is particularly true since there is an infinitely elastic supply of Third World workers to the “knowledge sectors,” and with outsourcing – a much more revolutionary phenomenon than I think it is usually given credit for being – you do not even have to let them in the country.

13. Somewhere in between lies the great bulk of jobs, where stamina, mental faculties, acuity, networks, etc. are all somewhat important but not decisive.

Labor Market Rigidities

14. Whatever the age-profile of productivity, it would seem assured that countries with flexible labor markets are better adapted to respond to ageing. Those with seniority-based wage systems will find themselves in trouble, and it is a great irony that (in my casual observation) the more rigid the labor market, the louder the cries for “active ageing.” I am, in fact, a critic of active ageing: Who WANTS old people in the labor force?

- a. Not the old themselves, who show a marked inclination to retire as fast as they can unless they are in jobs with amenity value,
- b. Not labor unions, whose membership is older than the labor force itself,
- c. Not young workers, who see their chances for advancement choked off and who reply to surveys that they themselves hope to retire young,
- d. Not governments, who operate under the “lump of labor” fallacy.

15. Issues that need attention:

- a. *Baumol’s “cost disease.”* Will ageing lead to concentration of labor in relatively low-productivity sectors (low-end personal services, health care, etc.).

This is related to immigration and distribution.

b. *Impact of ageing on human capital formation decisions.* Do young workers, facing spiraling real wages, forgo human capital formation?

c. *Impact of ageing on technical progress / TFP and labor productivity.* Was Habbakuk right that necessity is the mother of invention (as Cutler et al.'s famous regression appears to indicate)? Or was Julian Simon right – vitality and so on will be lacking in a stagnant population?

d. *How does ageing bias technical progress?* Or will technical progress be absorbed into the health sector?

e. *Will labor scarcity and resistance to immigration draw less productive workers into the labor force?* This may be the dark, Ricardian side of policies to stir up potential workers.

These are just speculations. In closing, do not interpret what I said at the beginning, about ignoring capital, as a criticism; I think you have done quite the right thing to start off looking at a pure labor economy.