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The demographic deficit☆

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ABSTRACT

There has been a slowdown in growth in the world's most advanced economies. In this paper we argue that changing demographics, in particular aging populations combined with increased life expectancy, may be part of the explanation for why we observe slower growth, falling interest rates and falling productivity growth. Using Japan and the U.S. in the years prior to the financial crises as a case study, we provide estimates of the growth deficit that arises from an aging cohort structure and increasing life expectancy. We also provide projections of the impact of predictable demographic changes on future growth in the U.S. and Japan.

1. Introduction

How much of the slowdown in growth among the world's most advanced economies is due to demographic factors? In this paper we estimate the extent to which aging of the population, both changes in life expectancies and shifts in cohort distributions, may account for the slowdown in growth and productivity. In many economies these demographic changes are substantial. They affect both the labor supply and savings decisions of households and how these decisions are aggregated. In this paper, we identify the channels through which changes in demographics may affect aggregate economic growth, and we show that a substantial fraction of the slowdown in growth and productivity are due to demographic factors.

The recovery from the Great Recession in both the U.S. and Europe has been anemic. There are two popular accounts of why current and expected future growth rates are low. One view, articulated by Gordon (2016), holds that aggregate supply may be impaired because the opportunities for technological change that exist in the future are not going to provide the dramatic increases in productivity that important innovations in the past have delivered. That is, the set of blueprints

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available to us now and in the future are not as transformative as those we have had in the past.[1] An alternative view, the secular stagnation hypothesis associated with former Treasury Secretary Larry Summers, is that future growth is likely to be constrained by insufficient investment demand. On this view our current slow growth is more than just a hangover of the financial crisis. It is a consequence of the fall in the real interest rate that prevails in equilibrium. If the real interest rate is well below zero, then monetary policy is going to have a hard time delivering a real rate that is consistent with long term growth as we have experienced it in the past.[2]

The common element in these accounts is that the growth slowdown will be persistent. We do have other examples of persistent stagnation in previously fast growing economies, the most notable being Japan. Japan has been stagnant since the early1990's in spite of aggressive monetary and fiscal stimulus. Similarly, in both Europe and the U.S. growth rates were below the trend in the period leading up to the financial crisis. After the crisis, the growth rates have been below that in previous recoveries from recessions despite aggressive monetary and fiscal stimulus.

The challenge is to identify factors that can account for the persistence of the slowdown. One low-frequency factor is the demographic structure of an economy. It is widely recognized that demographic changes have important implications for economic growth. But the channels through which these changes work are less well understood. In this paper we make them precise in the context of a life cycle model with rich demographics.

There is increasing recognition that demographic changes are an important driver of many economic phenomena. In the years prior to the Financial Crisis there was a lot of concern about global current account imbalances and capital flows. A number of papers recognized that changing demographics could account for much of the observed decline in real interest rates and the magnitude and persistence of cross-border capital flows. Henriksen (2005) and later Backus et al. (2014) showed the effect of demographic changes on capital flows and interest rates in the U.S. and Japan. Feroli (2003) explored the role of demographics for capital flows among the G7 nations. Krueger and Ludwig (2007) studied the consequences of demographic changes for rates of return on capital, wages, and wealth in the OECD Countries. More recently Gagnon et al. (2016), Carvalho et al. (2016), and Ikeda and Saito (2014) have shown the impact of demographic changes on the real interest rate and investment in the U.S. and Japan as a consequence of the exogenous impact of these changes on the aggregate labor supply. All these papers have focused on how demographic change affects the supply of and demand for capital.

Demographic change affects factor supplies through changes in life expectancy and changes in the age-cohort distribution of the population. Changes in life expectancy impact not only individuals' life-cycle savings decisions but also their labor-supply decisions. Changes in cohort distributions affect the aggregation of these individual decisions. We distinguish analytically between these two channels of demographic change. The general equilibrium effect of demographic change is also important. The wage rate and the real rate of interest change as a results of changes in the relative supply and demand for labor and capital. The effects on aggregate factor prices may magnify or dampen the individual life-cycle decisions shaped by demographic change.

Growth accounting shows that that growth differentials both across countries and over time are not only driven by TFP and capital accumulation, but labor supply on the extensive margin, labor supply on the intensive margin, and (obviously) population growth. One straightforward way in which demographics impact changes in aggregate economic activity is through their impact on aggregate factor supply. Data show that households steadily decrease labor supply both on the intensive and extensive margin in the latter part of their working lives. This is in contrast to the usual assumption in overlapping-generations models, that households supply labor inelastically until retirement age. Changes in life expectancy and cohort distributions will therefore affect both labor market participation and average hours worked. Faced with increases in life expectancy individuals need to provide for more years in retirement during their working life. In addition, aging populations means more people will be in their highest savings years. This may lead to changes in aggregate capital supply. Lastly, demographic change affect the composition of the work force and its productivity. Changes in the average efficiency of the individuals working will manifest itself in changes in TFP.

Economists have struggled to reconcile labor supply elasticities estimated from micro-economic data and elasticities implied by macro-economic adjustments. But one key to reconciling these two is to distinguish all the margins of adjustment of labor supply.[3] The assumption common in life-cycle models that labor is supplied inelastically when individuals enter the labor market in their early 20s until they exit the labor market at retirement age is at odds with the evidence that labor supply on the extensive margin (labor-market participation) and on the intensive margin (hours worked conditional on being in the labor force) have a pronounced hump-shape over the life cycle (see e.g. Bick et al., 2016).[4]

[1] The more nuanced statement of this view argues that the period from 1970 to 1994 when total factor productivity grew at an average annual rate of 0.5% (compared to 1.89% from 1920 to 1970) is likely to be characteristic of the future largely because the potential for technological innovation is unlikely to offer the opportunities for the kind of big increases in productivity that we experienced in the past.

[2] See e.g. Summers (2014); 2016).

[3] Keane and Rogerson (2011) and Prescott et al. (2009) discuss the biases in the estimates of labor supply elasticity that result from ignoring the margins of adjustment.

[4] In the U.S. two thirds of the labor market adjustment over the business cycle occur on the intensive margin, meaning that changes in employment dominate changes in hours (Cho and Cooley, 1994). Llosa et al. (2012) show, in countries with employment protection laws, large fraction of the adjustment takes place on the intensive margin.