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Career length: Effects of curvature of earnings profiles, earnings shocks, taxes, and social security ☆

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ABSTRACT

The same high labor supply elasticity that characterizes a representative family model with indivisible labor and employment lotteries also emerges without lotteries when self-insuring individuals choose interior solutions for their career lengths. Off corners, the more elastic is an earnings profile to accumulated working time, the longer is a worker's career. Negative (positive) unanticipated earnings shocks reduce (increase) the career length of a worker holding positive assets, while the effects are the opposite for a worker with negative assets. By inducing a worker to retire at an official retirement age, government provided social security can attenuate responses of career lengths to earnings profile slopes, earnings shocks, and taxes.

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1. Introduction

To accompany the labor supply indivisibility, incomplete markets, and overlapping generations life-cycle structure featured in the Ljungqvist and Sargent (2007) time-averaging model of career lengths, this paper adds a specification of how labor earnings depend on accumulated working time.[1] We study how career lengths depend on the shape of the earnings

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[1] A labor supply indivisibility or, more generally, a nonconvexity in the mapping from hours of work to labor services, impels individuals to divide their lifetimes into periods of work and periods of leisure/retirement. Rogerson (1988) supports optimal allocations with employment lotteries and complete consumption insurance. When markets are incomplete and there are no employment lotteries, Ljungqvist and Sargent (2007) coin the term 'time averaging' to describe a process whereby individuals trade a risk-free asset to smooth consumption across periods of work and periods of retirement. Identical aggregate outcomes and expected utilities prevail under these two alternative market structures in a continuous time model if there is no exogenous uncertainty, the market interest rate equals the subjective discount rate, and the earnings–experience profile is flat.

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profile, earnings shocks, taxes, and aspects of government financed retirement schemes. We obtain sharp outcomes by assuming preferences that are consistent with balanced growth[2] and analytically establish findings that shed light on forces also at work in more complicated settings that can be studied only with numerical simulations.[3] These are our principal findings:

1. The more elastic are earnings to accumulated working time, the longer is a worker's career. This result suggests the possibility that it is a higher *slope* of the earnings–experience profile of high wage workers, and not the *level* of the wage *per se*, that explains why people with higher wages and higher educations are more likely to retire later in life. Stark evidence for such a relationship is provided by a study of married women's labor force participation by Eckstein and Wolpin (1989) that we revisit in Sections 7.1–7.2.
2. The sign of a worker's accumulated savings determines how planned career length responds to an unanticipated multiplicative shock to earnings, a shock that leaves unchanged the elasticity of earnings to accumulated working time. Specifically, a negative (positive) earnings shock reduces (increases) the career length of a worker holding positive assets at the time of the shock, while effects are opposite for a worker with negative assets. In light of increased variability of both transitory and permanent components of labor earnings observed in recent decades to have confronted U.S. workers, the finding that negative permanent earnings shocks shorten careers for workers in mid- and late-age who have positive savings identifies a force that can help to explain the increased incidence of early retirement in the OECD in recent decades, as we discuss in Sections 7.3–7.5.
3. When tax revenues are returned as lump transfers to households,[4] the elasticity of aggregate labor supply with respect to the net-of-tax wage rate is high in the time-averaging model, as it also is in an employment-lottery model. Advocates of high labor supply elasticities can appeal to this finding.
4. Social security tax and benefit rules put a kink into a worker's budget set that can lead to a corner solution for career length at an official retirement age. That effect extinguishes the high labor supply elasticity that would prevail at an interior solution. Consequently, proposals to reform social security can substantially alter the labor supply elasticity, a point that we elaborate in Sections 7.6–7.7 in the context of recent changes in the U.S. social security rules.

Section 2 describes a lifetime labor supply problem in which a finitely lived worker confronts a labor supply indivisibility, chooses when to work, and smooths consumption by trading a risk-free bond. How career lengths are affected by the shape of an experience–earnings profile, unanticipated earnings shocks, taxes, and social security are studied in Sections 3, 4, 5, and 6, respectively. Implications for social security reform are discussed in Section 7, where we also indicate how the constellation of forces identified by our experiments may have balanced out in ways that can help explain variations in labor market outcomes across time and space. We also show how mechanisms in our stylized analysis shed light on forces at work in more complicated models that can be studied only numerically. Concluding remarks are offered in Section 8. Appendix A compares our time-averaging model to a corresponding employment-lottery model with complete markets. Throughout, we focus exclusively on the extensive margin and exclude movements along an intensive margin.[5]

A sign of remarkable progress in macroeconomics during the last few years is that closely related life-cycle models of career lengths now unite economists from camps whose members use diverse data to infer either high or low aggregate labor supply elasticities. The opposing camps now at least agree about a basic framework and the main forces at work, with major disagreements being confined to judgments about the balance among these forces. Advocates of high labor supply elasticities appeal to institutions and inferences about parameters that put workers at interior solutions for their career lengths.[6] Advocates of low labor supply elasticities believe that career lengths are at corner solutions.[7] We indicate in detail

[2] Such preferences are widely used in macroeconomic models because they are consistent with the fact that only modest changes in per capita hours of work have accompanied large increases in per capita incomes in the U.S. since the World War II. The European employment experience differs, as discussed in Section 7.4.

[3] For example, see Imai and Keane (2004), French (2005), Low et al. (2010), Heathcote et al. (2010), Erosa et al. (2010), Kitao et al. (2008), Guvenen et al. (2011), Manuelli et al. (2012), and Wallenius (2012).

[4] This assumption is an important ingredient of Prescott's (2002) explanation of depressed European employment outcomes. We recast a version of his explanation in terms of our time-averaging model in Section 5.

[5] Prescott et al. (2009) extend the Ljungqvist and Sargent (2007) time-averaging setup by adding an intensive margin to the individual's labor supply decision. They reaffirm Ljungqvist and Sargent's results about the elasticity of equilibrium employment to a labor tax rate under that extension. Rogerson and Wallenius (2009) also introduced human capital, but instead of making human capital endogenous as Ljungqvist and Sargent (2007) did, they assume that workers face an exogenously given age-specific labor productivity that induces the young and the old to work less because their productivities are lower.

[6] Two published versions of Edward Prescott's Nobel lecture indicate how advocates of a high labor supply elasticity have come to adopt the life-cycle framework. In the first version, Prescott (2005) relied on the aggregation theory of Rogerson (1988) based on employment lotteries (see footnote 1). In the second version, Prescott (2006) embraced the same Ljungqvist and Sargent (2007) time-averaging setup with finitely lived individuals and incomplete markets that Prescott (2007) had discussed earlier at the 2006 NBER Macroeconomics Annual Meeting.

[7] James Heckman (1993) advocates a low labor supply elasticity based on microeconometric evidence. In an aggregate analysis of human capital and life-cycle labor supply, Heckman et al. (1998) assume an exogenously given retirement age, after which individuals are unable to supply any labor. But Heckman (1993) also acknowledges estimates of a relatively high labor supply elasticity of married women that is mainly due to a higher elasticity of their labor force participation rate, as we discuss in terms of our model in Section 7.1.

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