



Social security and cross-country differences in hours: A general equilibrium analysis



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ABSTRACT

I develop a general equilibrium life cycle model with an intensive and extensive margin of labor supply and endogenous human capital accumulation. I use the model to assess the effects of changes to various features of social security on labor supply outcomes. Of particular interest are changes to the scale of the program and to the relevant eligibility rules. I find that the cross-country differences in social security programs account for at least 79% of the differences in employment rates of people aged 55–64 and 17–31% of the differences in aggregate hours worked between the US and continental Europe.

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1. Introduction

The differences in aggregate hours of work between the US and continental Europe are striking. In 2003, total time devoted to market work in Belgium, France and Germany was roughly 70% of the US level. Motivated by a roughly 20 percentage-point difference in effective labor tax rates between the US and the continental European countries, Prescott (2004) studies the role of taxes in accounting for the cross-country differences in aggregate hours. However, a more disaggregated analysis of the data reveals that differences in youth employment, female labor force participation, and the employment of older workers are important contributors to the lower market work in the aforementioned countries (see Rogerson, 2006). The focus here is on the lattermost. In 2003, the employment rate of people aged 55–64 in Belgium, France and Germany was between 47% and 65% of the US level. There are also sizable differences in social security programs between the US and the continental European countries—both in the scale of benefits and in the eligibility rules associated with collecting them. While spending is only one aspect of social security, it is illustrative to note that social security expenditure constituted just over 4% of GDP in the US in 2003, whereas countries such as Belgium, France and Germany spent between 11% and 13% of GDP on social security in the same year.¹ These motivating observations are summarized in Table 1.

While the focus of Prescott (2004) is on the role of taxes in accounting for differences in aggregate hours of work, namely the first two lines of Table 1, I focus on the role of social security in accounting for the cross-country differences in

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¹ A back-of-the-envelope calculation reveals that 15–20% of the differences in social security expenditure arise from demographic differences. While not insignificant, this is not the key determinant of the difference in retirement spending.

Table 1
Key motivating facts.

Fact/Country	Belgium	France	Germany	US
Aggregate hours (relative to US)	0.71	0.68	0.73	1.00
Implicit tax rate $1-(1-\tau_h)/(1+\tau_c)$	0.51	0.50	0.48	0.27
Social security expenditure (as % of GDP)	11.3	13.1	13.4	4.2
Employment rate ages 55–64 (relative to US)	0.47	0.62	0.65	1.00

Note: τ_h = labor tax (includes income and social security tax), τ_c = consumption tax. Tax rates based on [McDaniel \(2007\)](#), other statistics from OECD, 2003.

employment rates of older workers, and more generally aggregate hours of market work between the US and the continental European countries of Belgium, France and Germany.²

In order to analyze the importance of social security in accounting for labor supply patterns, a reasonable model of retirement is needed. This requires the development of a framework that captures the key forces driving retirement behavior. To this end, in this paper I build a general equilibrium model of life cycle labor supply that features both an intensive and extensive margin of labor supply and endogenous human capital accumulation. I parameterize the model to match US data on life cycle profiles for hours worked and wages. The inclusion of endogenous human capital accumulation is essential for a model of retirement with reasonably calibrated wages, because with exogenous wages people would postpone working until later ages when wages are highest. This is not what we observe in the data. Furthermore, the age-effects associated with human capital accumulation are potentially important for the retirement decision.

The findings of this paper are threefold. First, the differences in social security account for at least 79% of the differences in employment rates for people aged 55–64 in Belgium, France and Germany relative to the United States. This constitutes between 17% and 31% of the differences in aggregate hours worked between the US and the continental European countries. Second, I examine the extent to which different features of social security are important in accounting for the cross-country differences in labor supply. The key differences between the continental European and US social security programs are in the scale of benefits and in the eligibility rules associated with collecting social security. I show that these two features are of roughly equal importance in accounting for the cross-country differences in labor supply outcomes. The implication of this is that the differences in social security across countries cannot be summarized by one statistic. Third, when the entire difference in the labor tax wedge (not just the part driven by differences in social security) between the US and the continental European countries is fed into the model, I find that it is able to account for between 44% and 59% of the difference in aggregate hours worked between the US and Belgium, France and Germany.

My paper contributes to the literature on the role of tax and transfer policies in accounting for the cross-country differences in hours worked, pioneered by [Prescott \(2004\)](#) and extended by [Rogerson \(2006\)](#), [Ohanian et al. \(2008\)](#) and [McDaniel \(2011\)](#).³ Relative to these, the key difference is that I explicitly model social security, whereas they simply assume a lump-sum transfer.⁴ I show that this distinction matters for the labor supply implications of tax and transfer programs. Moreover, social security rules heavily influence the retirement age distribution, a feature of the data that has not been emphasized by the standard theories. Explicitly modeling social security also allows me to study the impact of particular features of social security, thereby studying the key driving forces behind retirement behavior. This in turn lends itself to policy recommendations germane to the ongoing debate on social security. There is an extensive literature on social security.⁵ As far as I know, however, this is the first paper to conduct a general equilibrium analysis of the cross-country differences in social security. Furthermore, the inclusion of endogenous human capital accumulation is a novel feature relative to the previous literature on retirement.

An outline of the paper follows. [Section 2](#) presents the model, while [Section 3](#) outlines the parameterization of the model. [Section 4](#) presents the results from the quantitative analysis. [Section 5](#) discusses the robustness of these results, and [Section 6](#) concludes.

2. Model

I consider a discrete time overlapping generations framework, in which a measure one of identical, finitely lived individuals is born every period. A model period is a year, and individuals live for 56 periods with certainty.⁶

² [Gruber and Wise \(1998\)](#) also comment on the link between social security and retirement behavior across countries.

³ Proposed explanations for the differences in aggregate hours also include labor and product market regulation, wage setting and preferences. See [Alesina et al. \(2005\)](#) for an analysis on the role of unions and [Bertrand and Kramarz \(2002\)](#), [Fonseca et al. \(2001\)](#), [Fang and Rogerson \(2011\)](#) and [Messina \(2006\)](#) for an analysis on the role of product market regulation in accounting for the cross-country differences in hours worked.

⁴ [Ljungqvist and Sargent \(2006\)](#) critique [Prescott \(2004\)](#), and others, for not modeling the explicit details of tax and transfer programs.

⁵ See for example [Gustman and Steinmeier \(1986\)](#), [Pozzebon and Mitchell \(1989\)](#), [Stock and Wise \(1990\)](#), [Berkovec and Stern \(1991\)](#), [Rust and Phelan \(1997\)](#), [French \(2005\)](#), [Gruber and Wise \(2004, 2010\)](#), [Coile and Gruber \(2007\)](#), [Coile and Levine \(2007\)](#), [Low et al. \(2010\)](#).

⁶ Uncertainty over life expectancy creates a potentially important insurance role for social security programs. However, given that life expectancy does not differ greatly across Western economies, it is not clear that it would be of first-order importance in a cross-country analysis of the role of social security in accounting for the differences in retirement behavior.

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