



The labor-supply elasticity and borrowing constraints: Why estimates are biased

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Abstract

The intertemporal labor-supply elasticity is often a central element in macroeconomic analysis. We argue that assumptions underlying previous econometric estimates of the labor-supply elasticity are inconsistent with incomplete-markets economies. In particular, if the econometrician ignores borrowing constraints, the elasticity will be biased downwards. We assess this bias using artificial data generated by a model in which we know the true elasticity and real-world data from the Panel Study of Income Dynamics. When applying standard econometric methods on the artificial data, we estimate an elasticity that is 50 percent lower than the true elasticity. We find evidence of a similar bias when using real-world data.

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1. Introduction

Intertemporal substitution of labor is often a central element in macroeconomic analysis.¹ But it is not clear that individuals and households are willing or able to substitute labor supply and leisure over time in response to fluctuating wages. If intertemporal substitution were important for labor–leisure choices, individuals anticipating higher future wages would tend to work little

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¹ The classical article emphasizing the role of intertemporal labor supply is Lucas and Rapping (1969).

today and more in the future. And similarly individuals anticipating lower future wages would work hard today and little in the future. Most empirical studies however find that anticipated wage fluctuations only lead to small changes in hours worked. For men, most estimates of the intertemporal labor-supply elasticity are between 0 and 0.5.²

The microeconomic evidence thus suggests that the elasticity is small. We argue, however, that previous estimates of the elasticity may have been biased downwards since liquidity constraints have been ignored.³ To understand this bias, consider an individual with little wealth that is hit by a temporary negative wage shock. If there are no liquidity constraints, this individual will reduce hours worked and borrow to smooth consumption. But if borrowing is not possible, consumption smoothing can only be achieved by an increase in labor supply. The labor-supply response of liquidity-constrained individuals is therefore smaller or of the opposite sign than what is predicted by an analysis that ignored such constraints.

Although previous estimates of the elasticity may reflect the average labor-supply response to wage fluctuations even in the presence of liquidity constraints, these estimates may be misleading in many settings and applications. For example, the labor-supply response to business cycle fluctuations or a tax reform may differ between wealth groups. Careful policy analysis therefore requires that such heterogeneity as well as liquidity constraints are modeled explicitly, and using a labor-supply elasticity that can actually be mapped to preferences.⁴

The goal of this paper is to quantitatively assess the bias generated by liquidity constraints. We do this by first applying standard econometric methods on synthetic data generated by an economic model in which we know the labor-supply elasticity. We then estimate the elasticity using data from the Panel Study of Income Dynamics (PSID), with and without controls for liquidity constraints.

In the next section we describe the model that is used to generate the synthetic data. The model economy is populated by a large number of infinitely lived households that face uninsurable idiosyncratic wage risk, supply labor elastically and trade a single asset. We impose an exogenous no-borrowing constraint implying that negative asset holdings are ruled out. The model results in that households self-insure against income fluctuations by accumulating a buffer stock of savings when income is high. Variations in labor supply both enhance households' possibilities to avoid low income and their possibilities to self-insure. Households that are borrowing constrained and have unusually low wages can avoid having low income by increasing labor supply. Self-insurance is facilitated since households with unusually high wages can increase labor supply and quickly accumulate large buffer stocks of savings.

Section 3 outlines the most important estimation procedures that have been applied in the empirical literature. We put particular focus on MaCurdy (1981) and Altonji (1986) because they used the PSID data set which occasionally contains detailed wealth data, and because their papers were the first, and still are among the few, that explicitly focus on the intertemporal elasticity rather than on some static elasticity. In this section, we also demonstrate how the presence of

² See for example MaCurdy (1981), Altonji (1986), Blundell and MaCurdy (1999), Ziliak and Kniesner (1999), and French (2004). Heckman and MaCurdy (1980) find higher elasticities for women.

³ A large fraction of US households hold virtually no wealth and many households do not even have a bank or checking account (see Deaton, 1991 and Diaz-Gimenez et al., 1997). It seems unlikely that these households can use credit to smooth consumption. Jappelli (1990) reports more direct evidence of liquidity constraints.

⁴ Browning et al. (1999) similarly note that microeconomic estimates often are incompatible with macroeconomic models.

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