



Income underreporting among the self-employed: A permanent income approach



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ABSTRACT

The consumption based method to estimate underreporting among self-employed, introduced by [Pissarides and Weber \(1989\)](#), is one of the workhorses in the empirical literature on tax evasion/avoidance. We show that failure to account for transitory income fluctuations in current income may overestimate the degree of underreporting by around 40 percent. Previous studies typically use instrumental variable methods to address the issue. In contrast, our access to registry based longitudinal income measures allows a direct approach based on more permanent income measures. This also allows us to evaluate the performance of a list of instruments widely used in the previous literature. Our analysis shows that capital income is the most suitable instrument in our application, while education and housing related measures do not seem to satisfy the exclusion restrictions.

1. Introduction

Recent years have seen an increase in the application of indirect measures of tax evasion. [Slemrod and Weber \(2012\)](#) even describe it as an “explosion in empirical research on tax evasion”, and entreat researchers on tax evasion to enlist in the “credibility revolution” ([Angrist and Pischke, 2010](#)) in empirical econometrics.

One of the modern workhorses in empirical research on tax evasion is the [Pissarides and Weber \(1989\)](#) method (henceforth PW). It is a clever indirect method of estimating the degree of income underreporting by self-employed individuals, who arguably have much better opportunities to evade taxes than wage earners do. In a nutshell, the method is based on using excess food consumption among self-employed as smoking gun evidence of income underreporting. Based on survey data on consumption (and income, if the researchers do not have access to registry based income measures), the consumption and income relations (Engel curves) may shed light on the true incomes of self-employed.

In this paper, we address one of the key methodological problems of the PW method: researchers typically only have access to current income measures, while theory suggests that a more permanent measure of the household’s consumption potential may be more relevant. We remain agnostic to which income measure that is the most empirically relevant. It seems unlikely that current consumption would only be related to total lifetime income. Theory would only suggest this when we abstract from credit restrictions, uncertainty and other realistic features. However, it is also unlikely that consumption would only be related to current income. Our presumption is that the truth lies somewhere in between these two extremes – i.e. we presume that the most relevant income measure is not yearly (current) income but a more permanent measure, which we, for expositional convenience, simply denote permanent income.

It is hard to account for the fact that current income is a noisy measure of permanent income, without access to permanent

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income. Transitory income fluctuations attenuate the estimate of the income elasticity of food consumption which in turn may lead to overestimation of underreporting among the self-employed. Previous studies acknowledge the importance of using more permanent income measures when modeling food consumption, but given the typical cross-sectional design of survey data, it has proven difficult to come up with a good measure of permanent income. [Pissarides and Weber \(1989\)](#) try to account for this through instrumental variable (IV) techniques, which has subsequently become the standard way of approaching the problem. However, the IV solution relies on somewhat arbitrary exclusion restrictions; it is very hard to find variables that are closely correlated with permanent income but have no independent association with consumption.

We try to solve this problem in a more direct way by using a unique feature of our consumption data. By merging the survey data on consumption to rich panel data from official tax and income registers, we can move towards a measure of permanent income by averaging household income both forward and backward in time. We then investigate how the estimate of underreporting is affected as we extend the time window over which we aggregate income. Specifically, does the PW method overestimate underreporting due to transitory income fluctuations, and if so, by how much?

Our approach is closely related to the analysis in [Hurst et al. \(2014\)](#) who exploit the panel dimension of the Panel Study of Income Dynamics to mitigate the effects of transitory income fluctuations. In line with a potential story of reduced attenuation bias, they document an increase in the food income elasticity as they move from current income to a three-year average income measure. The increased income elasticity, however, does not carry over to a lower estimate of underreporting. Having access to longer panel data, we take a more systematic approach to investigate this issue. We isolate the effects of transitory income fluctuations on the estimate of underreporting by keeping the sample of households intact across all income definitions.

Our results are highly consistent with a substantial degree of attenuation bias. The estimated food income elasticity increases by more than 40 percent as we move from current income to a 7-year average measure of household income. As a result, the estimated degree of underreporting falls by more than one-third.

The second part of our paper addresses the usual way to deal with transitory income fluctuations, namely IV estimation.¹ Most previous studies in the literature have used IV ([Apel, 1994](#); [Engström and Holmlund, 2009](#); [Schuetze, 2002](#); [Kim et al., 2009](#); [Pissarides and Weber, 1989](#); [Kukk and Staehr, 2014](#); [Johansson, 2005](#); [Martinez-Lopez, 2013](#)).² Given the difficulty to find instruments that satisfy the exclusion restriction, we believe that finding a relevant measure of permanent income is a better way to deal with transitory income fluctuations than IV. However, in cases where data limitations rule out the former strategy, the researcher must decide on the most suitable set of instruments. So far, we know very little about the relative performance of different instruments.

Since we have access to a good measure of permanent income, we are in a unique position to evaluate the performance of different sets of instruments that have been used in the literature. To our knowledge, this is the first paper that systematically does so. Our results show that capital income appears to be the best available instrument in terms of satisfying the exclusion restriction and producing estimates of the food income elasticity and income underreporting that are close to the “true” estimates using OLS and multiple-year averages of household income. Variables related to education and housing yield unreasonably large income elasticities and seem to belong both in the income and food equations. The result that education is not a suitable instrument for income is in sharp contrast to [Hurst et al. \(2014\)](#). They conclude that education performs well in the US context. We hypothesize that this discrepancy may, at least partly, be due to the relatively low private returns to education in Sweden compared to the US.

The remainder of the paper is organized as follows. [Section 2](#) explains how we account for transitory income fluctuations in the PW method. [Section 3](#) describes the data and the key variables that relate to food consumption, income and self-employment. [Section 4](#) discusses the OLS and IV results. [Section 5](#) provides some robustness checks and [Section 6](#) concludes.

2. Estimating underreporting of income of the self-employed

This section briefly describes the expenditure-based estimation approach, originally developed by [Pissarides and Weber \(1989\)](#). We then show how we account for the effects of transitory income fluctuations by using panel data on household income. We borrow notation from [Engström and Holmlund \(2009\)](#).

2.1. The basic model

The PW approach is illustrated in [Fig. 1](#). Let c denote log food consumption, $c = \ln C^F$, and y log disposable income, $y = \ln Y^D$. The figure shows two log-linear Engel curves, one for self-employed households and one for wage earners. The intercept difference, γ , between these two curves reflects the degree of income underreporting among the self-employed.

Pooling the data for self-employed households and wage earners, we can estimate the degree of underreporting among the self-employed by estimating an equation of the following form:

¹ Due to the high quality of our registry based income data, we assume that the transitory fluctuations can be fully attributed to true transitory variation in household income, and not to classical measurement error in reported income.

² [Kukk and Staehr \(2014\)](#) is, however, in some ways similar in spirit to our paper since they have access to “regular income” which they interpret as a more permanent income measure. In a recent paper, [Nygård et al. \(2016\)](#) use Norwegian register data and find that more permanent measures of income increase the slope of the Engel curve, which is consistent with our findings. However, their main focus is to investigate the distributional implications of joint tax evasion. [Lyssioutou et al. \(2004\)](#) develop a related demand system approach, extending the basic PW model that also relies on an instrumental variable approach.

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