Chapter 10
Tax Incentives and Entrepreneurship: Measurement and Data Considerations

Herbert J Schuetze

Abstract Governments and economic actors around the world have instituted a vast array of programs to help foster entrepreneurship. Perhaps the most commonly utilized and complex policy tool available is the income-tax system. The interplay between tax policy and entrepreneurial activity has received a great deal of attention in the economics literature. While this literature has provided a great deal of knowledge regarding the effects of tax policy on entrepreneurship the work is far from complete. A number of the shortcomings in the literature result because of a lack of quality data focused on self-employment outcomes. The purpose of this chapter is to illustrate the current state of knowledge regarding the impacts of taxation on entrepreneurship, to identify areas in which additional research is particularly warranted and the data requirements necessary to fill in these gaps in the literature.

JEL classification: H24, H25, J23, H26

Keywords: taxations, entrepreneurship, compliance

10.1 Introduction

Citing the potential benefits of a more entrepreneurial labour market, economic actors around the world have established a number of programs and policies aimed at developing entrepreneurial activity. Broad-based institutions such as the European Parliament, OECD and the European Commission actively encourage countries under their influence to pursue policies to "foster entrepreneurship".[1] Likely as a result, most OECD countries have public policy programs designed to assist new business development. The policy tools utilized vary significantly across countries

Herbert J Schuetze
Department of Economics, University of Victoria, PO Box 1700 STN CSC, BC V8W
hschuetz@uvic.ca

[1] See, for example, European Commission (1998) and OECD (1998).

E. Congregado, *Measuring Entrepreneurship.*

© Springer 2008

and include the provision of start-up financial capital,[2] aid in the development of human capital or business skills, reductions in administrative burdens associated with starting and running a business, and self-employment training programs that target the unemployed in the hope of returning these workers to the ranks of the employed.[3]

Perhaps the most commonly utilized and complex policy tool available is the income tax system. Tax policies can affect the decision to become self-employed in various ways. In general, the tax system can make self-employment more or less attractive than wage and salary work—either pulling potential entrepreneurs into self-employment or pushing workers out of wage and salary jobs and into self-employment. Every tax system, including those that attempt to treat the self and wage-employed equally, influences the choice of employment sector. Thus, because all governments tax, it can be said that every government's policy portfolio influences the entrepreneurial decision. This fact highlights the importance of understanding the relationship between tax systems and entrepreneurship.

Given the important role of taxation it is not surprising that the interplay between tax policy and entrepreneurial activity has received a great deal of attention in the economics literature. While this literature has provided a great deal of knowledge regarding the effects of tax policy on entrepreneurship the work is far from complete. A number of the shortcomings in the literature are simply the result of the complexity of the issues. However, many of the gaps result because of a lack of quality data focused on entrepreneurial outcomes. The purpose of this chapter is to illustrate the current state of knowledge regarding the impacts of taxation on entrepreneurship, to identify areas in which additional research is particularly warranted and the data requirements necessary to fill in these gaps in the literature.

To this end, Section 2 of the chapter provides a survey of the theoretical literature. The focus is on identifying the likely impacts of the key elements of income tax policy (as indicated by economic theory) on the entrepreneurial decision. Section 3 provides a discussion of the empirical literature related to the impacts of tax policy on self-employment. Section 4 includes an examination of the literature on the impacts of income tax non-compliance on self-employment rates and the factors that influence this type of "self-employment". A discussion of the key gaps in the empirical literature resulting from a lack of quality data and the data requirements necessary to overcome these closes the paper in Section 5.

An underlying issue which I will return to throughout the chapter is the distinction between the terms "entrepreneurship" and "self-employment". Thus, before beginning I will attempt to define these terms and discuss their use in the context

[2] Given the critical need for such funds it is not surprising that most developed countries have small business financing programs. For example, the US Small Business Administration invests billions of dollars annually to help new firms get started and SME policies in Europe typically include financing for small business.

[3] Such programs are offered across OECD countries. For a general discussion of these programs among OECD countries, see OECD (1998), and for an exhaustive review of this and similar programs in the US, see Vroman (1997).

of the impacts of income-tax incentives. Entrepreneurship, despite its importance, is an elusive concept. Often definitions refer to the creation of a new, usually small, business. The emphasis appears to be on individuals who are enterprising or innovative in their approach and who assume some degree of risk in their business venture. Indeed, it is likely that these are some of the attributes that policy-makers seek out when they advocate the development of a more entrepreneurial economy. The "self-employed", in comparison, are individuals who simply work for themselves. This is the measure used in most of the empirical studies in the literature.

Because the group of workers defined as self-employed includes individuals engaged in widely varying activities, it likely mis-measures the amount of entrepreneurial activity. For example, included in this group are individuals who operate chain stores. Chain store operators may encounter some degree of risk but we might not think of these workers as innovative given that they typically follow a stylized approach that is common across all establishments in the chain. More directly pertinent to the current study, this measure also includes individuals who "contract out" their wage employment jobs by establishing businesses (which is often undertaken, as is discussed below, to avoid taxation). While this type of re-labeling might expose the worker to greater risk of layoff, because the worker is doing the same job the activity carried out in the business would not be characterized as innovative. For reasons such as these the self-employment measure likely overstates the amount of entrepreneurial activity. On the other hand, this measure leaves out individuals engaged in enterprising or innovative behaviour in more established firms. This mismatch between the activity which policy makers aim to encourage, "entrepreneurship", and the activity which is measured in most empirical studies, "self-employment", highlights the importance of the distinguishing between these two activities. Given the potential impacts of the tax system on self-employment for the purpose of tax avoidance this distinction is perhaps of the utmost importance in the current discussion. I will return to this issue throughout the chapter.

10.2 Theory: Taxation and Entrepreneurship

This section provides a survey of the theoretical literature that investigates the relationship between income tax policy and entrepreneurship.[4] Two separate strains of the literature are highlighted. The first examines how tax policy affects the choice between wage employment and self-employment. The focus in this literature (as I will show) has been on how the tax system affects the relatively higher risk associated with entrepreneurship and, therefore, the relative attractiveness of self-employment vis-à-vis wage employment. Given the distinction in definitional terms highlighted above and this focus on risk, one might argue that this literature

[4] The literature surveys in this and subsequent sections are adopted from Bruce and Schuetze (2004). Here, however, the discussion is focused on the many data and measurement issues that arise in the literature.

relates more closely to the "entrepreneurial" than the "self-employment" decision. The second strain of the literature examined in this section looks at the issue of income tax noncompliance and how the relative ease of noncompliance in self-employment affects sector choice. This literature likely relates more closely to the "self-employment" decision given that these individuals enter the self-employment sector for the purposes of hiding income and not because they are innovative.

10.2.1 Impacts of Taxation on Choice of Sector

It is relatively straightforward to show that a system of differential taxation across sectors can make the choice to become an entrepreneur more or less attractive. Indeed, in most countries business income is taxed differently from wage earnings on a paid job. Income from incorporated businesses is typically taxed under an altogether different tax system than income from wage employment and the operation of an unincorporated business. However, even when taxed under the same system businesses are taxed differently. Various business expenses are typically tax deductible and often include the costs of items such as vehicles and housing that provide non-business consumption benefits. That differential taxation can influence the decision to invest in self-employment is not at all surprising. Less intuitive are the results that emerge from models which recognize that entrepreneurship, more so than wage employment, offers an uncertain return.

Underlying many models of entrepreneurship choice is the notion that entrepreneurship offers an uncertain return. In particular, it is argued that workers allocate their fixed amount of labour between the safer wage sector and the relatively risky self-employment sector to maximize the return on their labour portfolios. In this setting taxation can be shown to have somewhat counterintuitive impacts on entrepreneurship. For example, Domar and Musgrave (1944) are among the first to show that the taxation of risky investments such as entrepreneurship (with liberal loss offsets) can increase investment in these risky assets. The intuition behind Domar and Musgrave's argument proceeds as follows. The imposition of a proportional income tax system with full loss offsets[5] has two effects on investment in risky assets. First, the tax reduces the expected yield of the investment and this will discourage investment (implicitly assuming constant relative risk aversion). Second, the tax is such that the government will share in the risk—collecting more tax revenue if the venture is successful and refunding revenue to the risk-bearer if it fails. They show that the net effect is such that private investment in the risky asset (that of the entrepreneur in this context) may decrease but that total investment (that born by the entrepreneur and the government) will increase.

It is important to emphasize that this result relies on the strong assumption that losses can be fully offset. Under conditions of partial loss deduction, Domar and

[5] Full loss offset is a tax clause that allows entrepreneurs with operating losses to apply these losses against income subject to taxation from other sources.

Musgrave (1944) show that the two opposing effects described above continue to operate and the impact on investment in risky ventures is uncertain. One's ability to reduce income tax liabilities by deducting net business losses from other taxable income depends on tax law and the individual's income situation. Even when full loss offsets are permitted by tax law, an individual's ability to take advantage of the law may be limited by the amount of taxable income from other sources. Tax laws that allow individuals to carry losses forward over a number of years are more likely to result in full loss offsets in practice. Thus, tax rules relating to losses likely influence the level of entrepreneurial activity.

Indeed, Gentry and Hubbard (2000) suggest that tax systems do not typically offer full loss offsets for entrepreneurs. Thus, they argue, greater progressivity of the tax schedule (aside from decreasing average returns) reduces the returns of those who succeed disproportionately to those who do not. In a model without the risk reducing benefits of full loss offsets they show that increasing convexity of the tax schedule discourages entrepreneurial activity even among workers who are risk neutral.

The result that taxation can lead to increased investment in risky assets such as self-employment, under certain conditions, is later confirmed in more general settings by Mossin (1968), Stiglitz (1969), Ahsan (1974)[6] and Kanbur (1981). Mossin (1968) and Stiglitz (1969) confirm this result using expected utility models, which place fewer and more realistic restrictions on individual utility. These models suggest that a third effect of taxation on risky investment must also be considered. They argue that, because increases in taxes reduce wealth, the effects of these changes in wealth on ones preferences for accepting risk must also be taken into consideration. As a result, the set of conditions under which taxes increase entrepreneurship (risk-taking) are greater. Ahsan (1974) also uses an expected utility model but extends the model to examine how the impacts of progressive taxes on risk-taking differ from proportional taxation. He shows that, holding tax revenue constant, risk-taking is greater under progressive taxation than under proportional taxation. The intuition is that increased progressiveness of the tax system helps to smooth income when faced with uncertain returns. Finally, Kanbur (1981) notes that the literature on portfolio allocations made at the margin between risky and safe investments does not capture the discrete nature of the choice between entrepreneurship and wage employment. Thus, he adapts the model to a general equilibrium framework which allows for an accounting of the discrete nature of the entrepreneurial choice. Due, in part, to the interactions between occupation sectors in the general equilibrium setting, he finds the effect of progressive taxation on the equilibrium number of entrepreneurs to be ambiguous under all conditions.[7]

[6] In a more recent paper, Ahsan (1990) examined the impact of broad based taxes (income and consumption) in an intertemporal context. He found that, in such a setting, broad based taxes either decrease or leave unchanged the amount of risk taken.

[7] For a review of further refinements to these basic results see Parker (2004).

In practice, income tax systems are complex and interactions between different elements of the tax code can generate unanticipated outcomes. For example, Feldstein and Slemrod (1980), Gordon (1998) and Cullen and Gordon (2002) point to the fact that the US tax system is such that, above some threshold, taxable income is taxed at a lower rate under the corporate tax system than under the personal tax system. Given that entrepreneurs have the option to incorporate, this element of the tax code effectively allows them to reduce the progressivity of the income tax system. Thus, it is argued that this option, which is not available to wage workers, creates an incentive to become an entrepreneur. In addition, Cullen and Gordon (2002) argue that this endogeneity of choice in incorporation status can result in greater than full loss offsets when the personal tax rate is higher than the corporate rate.

In summary, the theoretical literature shows that, even for the simplest tax system, the effect of taxation on the equilibrium number of entrepreneurs is far from clear-cut. This is primarily because of the risk sharing that is introduced through the income tax system. When coupled with the fact that entrepreneurs' risk preferences are likely heterogeneous, this risk sharing role of the tax system leads to ambiguous results. The results become even less clear when consideration is given to the general equilibrium effects of taxation on occupational choice and the complex nature of interactions between various elements of the typical tax code. To add one more layer of complexity to the issue, one need also to consider the very real possibility that legislated taxes differ from those that are paid by entrepreneurs. This is the topic of the next sub-section.

10.2.2 Noncompliance and Choice of Sector

To this point I have discussed the theoretical impacts of taxation on entrepreneurship under the implicit assumption that individuals comply with the tax code. However, among business owners numerous opportunities exist to reorganize income to avoid taxation or to simply evade taxes altogether. Unlike wage workers, no third party exists to withhold taxes on behalf of entrepreneurs. Thus, the taxes paid by entrepreneurs can differ greatly from those legislated by the tax code.

A number of researchers model the endogenous choice of occupation between a sector in which tax evasion possibilities exist (entrepreneurship) and one where there are no such opportunities (wage sector) in order to identify the impact of evasion on sectoral choice and optimal tax policy (Watson 1985, Kesselman 1989, Pestieau and Possen 1991, 1992, and Jung et al. 1994). All of the models which include audits conclude, not surprisingly, that greater auditing intensity results in less evasion and, therefore, participation in the "evadable" sector. Most argue that a rise in the level of personal taxation, ceteris paribus, will result in an increase in entrepreneurial activity. This is simply because the benefit of tax avoidance increases with the level of taxation. However, there are a number of offsetting factors which may not allow such a clear cut conclusion.

For example, Jung et al. (1994) argue that tax evasion introduces uncertainty about whether or not the illegal behavior will be identified by the tax authority. Because taxes reduce wealth, this may change one's willingness to accept risk. Thus, under decreasing relative risk aversion an increase in the tax rate increases the individual's risk aversion and entrepreneurship becomes less attractive. Watson (1985) points out the possibility for general equilibrium feedback, which may offset the self-employment inducing effects of taxes in this setting. In particular, he notes that an increase in supply to the entrepreneurial sector will result in a decrease in profits in that sector, which will make entrepreneurship less attractive. Thus, he argues, the net impact of an increase in taxation is indeterminate.

10.3 Empirical Research Investigating the Effects of Taxation on Self-Employment

As the previous section suggests, the theory is ambiguous as to the relationship between tax policy and the level of entrepreneurship in a jurisdiction. Thus, it is left to empirical research to determine the nature of this association. Aided by the availability of longitudinal databases containing multiple years of information for large samples of current and potential entrepreneurs, research on this topic has flourished in recent years. Despite improvements in the quality of data and research methodologies, however, no consensus has been reached in the empirical literature.

An inherent empirical challenge to overcome in identifying the relationship between the tax rate faced by an individual and the likelihood that she/he becomes self-employed is the issue of tax rate endogeneity. The problem is that an individual's marginal tax rate is endogenous to the entrepreneurship decision because the tax rate is a function of whether or not one is self-employed. Modern statistical techniques and the ability to track individuals over time using newly developed panel data has allowed researchers to deal with this problem. However, a number of significant obstacles remain, which may account for the ambiguity in results across studies.

Almost all of the empirical studies measure the extent of entrepreneurial activity as the fraction of the employed population reporting that they work for themselves. According to my definitions above this is the fraction that is "self-employed". Placed in the context of the current discussion, this implies that all of the income tax factors discussed above, including those related to risk sharing and noncompliance, have an influence on the variable of interest in these studies. Given the multitude of avenues by which taxes effect "self-employment" and (as we shall see) the widely varying settings in which the empirical studies have been carried out, it is perhaps not all that surprising that the literature has not reached a consensus. Refinements in the data that allow researchers to sort "entrepreneurs" from the "self-employed" would no doubt help in attempts to distinguish between the various ways in which the income tax system affects these various forms of self-employment behavior. I will revisit this issue later in the chapter.

This section provides a review of the empirical literature that investigates the link between taxes and self-employment outcomes. This literature can be divided into three broad categories: time series studies, cross-section studies, and individual-level panel data studies. Each of these categories is summarized below paying particular attention to the type of data and the measure of self-employment activity utilized. For the reader's convenience Table 10.1 provides a summary of the studies discussed by the type of data employed.

Table 10.1 Summary of Empirical Findings on the Effects of Taxation on Self-Employment

Approach	Author(s)	Tax Effect	Tax Measure(s)	Period	Country
Time Series					
	Long (1982a)	+	marginal - hypothetical couple	1963–77	US
	Blau (1987)	+/–	marginal - 2 points in distribution	1948–82	US
2nd Generation					
	Parker (1996)	+/+	marginal - 2 points in distribution	1959–91	UK
	Robson (1998)	0/+	marginal/average	1968Q3–93Q4	UK
	Robson &Wren (1998)	–/+	marginal/average	1978–92	15 OECD
	Briscoe et. al (2000)	–	marginal	1979–96	UK
	Bruce & Mohsin (2003)	+	corporate, capital gains, estate	1950–99	US
Cross-Section					
	Long (1982a)	+	average marginal	1970	US
	Long (1982b)	+	expected liability wage employment	1970	US
	Moore (1983)	+	individual and payroll	1978	US
	Parker (2003)	0	conditional SE tax liability	1994	UK
Individual Panel					
	Schuetze (2000)	+	state/provincial tax "climate"	1983–94	Canada/US
	Bruce (2000)	+/–	expected marginal/average	1970–92	US
	Gentry & Hubbard (2000)	- convexity	marginal tax "spread"	1979–92	US
	Bruce (2002)	- exits	expected marginal/average	1970–91	US
	Cullen and Gordon (2002)	+	aggregate average	1964–93	US

Adopted from Bruce and Schuetze (2004)

10.3.1 Time Series Studies

Early time-series studies on taxes and self-employment generally conclude that higher federal tax rates are associated with higher rates of self-employment (Long 1982a, Blau 1987). The explanation typically given for this result is that high tax rates drive workers out of paid employment, or wage jobs, into entrepreneurial ventures where they can more easily avoid or evade taxes. However, the results of more recent, "second generation", time-series studies, which typically use more sophisticated time series econometric tools to account for cointegration,[8] are more mixed (Parker 1996, Robson 1998, Robson and Wren 1998, Briscoe et al. 2000, Bruce and Mohsin 2003).

Long's (1982a) finding is based on a short (1963-1977) time series regression, where the number of U.S. individual income tax returns with business income as a share of all individual income tax returns is regressed on a proxy variable capturing the tax environment in any given year. The tax proxy used is a hypothetical marginal income tax rate facing the typical married working couple and is included to overcome the issue of endogeneity. Blau (1987) follows Long's (1982a) method but uses a longer time series of U.S. data (1948-1982) and a survey-based measure of the self-employment rate. His tax variables consist of two marginal tax rates at different points in the income distribution. While his findings at the higher marginal tax rate support Long's, Blau finds that increases in lower-bracket marginal tax rates actually reduce the self-employment rate. This empirical puzzle is not explained by Blau, but foreshadowed the importance of tax progressivity that is addressed by later researchers.

While early "second generation" time series studies also find a positive relationship between taxes and self-employment, more recent studies do not. Parker (1996) is the first to address cointegration using a 1959 to 1991 time series of United Kingdom data. Similar to Blau (1987) he uses two marginal tax rates associated with two different levels of income. Unlike Blau, however, Parker finds a positive relationship between both tax rates and the rate of self-employment. Studies by Robson (1998) and Robson and Wren (1998) also find support for the view that individuals turn to self-employment in order to avoid taxes.

What is unique about these two studies is that they are the first to consider the difference between the impacts of marginal and average tax rates. Robson and Wren (1998) provide a theoretical model that predicts that higher marginal tax rates reduce self-employment while higher average tax rates increase self-employment. They argue that, while higher average tax rates increase the incentives to evade taxes (and enter self-employment), marginal tax rates reduce the return to effort in entrepreneurship and, therefore, the level of entrepreneurial activity. Both Robson (1998) and Robson and Wren (1998) find a positive relationship between

[8] The case where two or more series exhibit a common trend but might not necessarily be closely linked.

self-employment and the average tax rate and Robson and Wren confirm the negative effect of marginal tax rates in their regressions.[9]

Unlike these early "second generation" time series studies, more recent studies using similar methods have failed to find a positive link between tax rates and self-employment. Briscoe, Dainty, and Millett (2000), who examine a 1979-1996 time series of self-employment in the British construction industry, find evidence to suggest that higher overall tax rates might lead to lower self-employment in this narrow focus.[10] In addition to the usual personal income and payroll taxes, Bruce and Mohsin (2003) consider corporate income taxes, capital gains taxes, and estate taxes in a long (1950–1999) time series of U.S. data. Results generally indicate that taxes have statistically significant but very small and scattered effects on entrepreneurship rates. In terms of other tax policy variables, only the top corporate income tax rate and payroll tax rates on wage and self-employment income are found to be particularly important.

10.3.2 Cross-Section Studies

The finding that higher tax rates lead to more self-employment as measured by aggregate time series is interesting, however, the time series studies described above are unable to address individual-level decisions to enter or remain in self-employment. A better understanding of this relationship is only possible through the analysis of cross-section or panel data.

The evidence from early cross-section studies generally supports the early findings in the literature of a positive relationship between tax rates and self-employment. Long (1982a) investigates the effects of income tax rates on the ratio of self-employment to total employment within a metropolitan area. Using 1970 U.S. Census data, he finds that increases in the average marginal and average income tax rates in a metropolitan area are associated with increases in the self-employment rate in that area. Long (1982b) finds similar results examining the impact of an increase in an individuals expected wage-and-salary tax liability. Expanding on Long's research, Moore (1983) focuses instead on the role of payroll taxes. Using 1978 U.S. CPS data, Moore finds the impacts of changes in the payroll tax to be larger than those of the expected wage-and-salary income tax.

The most recent cross-sectional study of taxes and self-employment casts doubt on the importance of tax policy in the self-employment decision. Parker (2003) examines two 1994 cross sections of UK data and, after multitude of specification and robustness tests, finds no evidence that the decision to be self-employed is

[9] The coefficients on the marginal tax rates in Robson (1998) are not statistically significant.

[10] Briscoe et al. (2000) focused more on changes over time in the relative enforcement of tax liabilities among self-employed construction workers. Their data reveal the possibility that self-employment rates within this single industry are highly sensitive to tax policies other than tax rates.

sensitive to taxes or opportunities for evasion. He points to earlier studies' omission of relative incomes between self-employment and wage employment as a reason for their finding of significant tax effects. However, an important shortcoming of Parker (2003), and indeed all of the cross-section studies above that use individual tax information, is that the issue of potential tax rate endogeneity is not addressed. A number of panel data studies use various means to overcome the possible endogeneity of individual-specific tax rates.

10.3.3 Individual-Level Panel Data Studies

Partly due to the availability of richly detailed pseudo-panel and longitudinal data at the individual level, empirical research on taxes and self-employment has been able to tackle the issue of tax rate endogeneity. The use of repeated cross-sections and panel data allow the researcher to identify exogenous changes in tax rules through time. Thus, instrumental variables and other such techniques can be used to overcome the endogeneity issue. As I outline below, this approach and others have been utilized in a number of recent studies that utilize the many benefits of panel data.

Schuetze (2000) is one of the first studies to address tax rate endogeneity. This is achieved by using asynchronous variation in the aggregate "tax climate" across tax jurisdictions (states and provinces) in the United States and Canada. Using repeated cross-sections for the two countries covering the period 1983 through 1994, he finds that increases in average income tax rates have large and positive effects on the rate of male self-employment.

Bruce (2000, 2002) uses U.S. data from the Panel Study of Income Dynamics and, unlike previous studies, focuses on differential tax treatment of the self-employed and its impact on both the entry and exit decisions. Both of these studies involve the use of exogenous changes in tax rules to generate instrumental variables for addressing the possible endogeneity of individual-specific tax rates. He finds somewhat counter-intuitive results which suggest that increasing an individual's expected marginal tax rate on self-employment income (holding the wage tax rate constant) increases the probability of entry, while a similar increase in the average self-employment income tax rate decreases this probability. Similarly, he finds that higher tax rates on self-employment income reduce the probability of exit from self-employment. He explains his results by arguing that changes in differential tax treatment not only alter net returns to labour, but also affect the incentives to capture relevant tax preferences (or to evade or avoid taxation altogether).

Gentry and Hubbard (2000) use the same data as Bruce (2000) but focus instead on tax progressivity. They argue that full-loss offsets are unlikely and under such conditions progressive rate schedules act as a tax on success in self-employment. In such a setting, they argue, the rewards to successful firms are reduced more than the support given to unsuccessful firms. Consistent with this hypothesis, they find that the probability of entry into self-employment increases as tax rates become less progressive.

Contrary to Gentry and Hubbard (2002), Cullen and Gordon (2002) argue that the interplay between the individual and corporate tax structures in the U.S. allows for greater than full-loss offsets. Because of this and the Domar and Musgrave (1944) risk-sharing argument, they suggest that raising personal tax rates likely increases the extent of entrepreneurial activity. Using repeated cross sections of U.S. tax return data from 1964 through 1993, their results support this hypothesis. It should be noted, however, that their focus was on a much more limited definition of self-employment than those found in most other analyses.[11] Like some of the more recent studies, they also use aggregate (averaged) tax measures to avoid concerns of tax rate endogeneity.

Summing up, while there is little consensus in the empirical literature regarding the nature of the relationship between tax policy and self-employment, the results of these studies do suggest that taxation is likely an important determinant in the self-employment decision. The ambiguity in conclusions across studies may result from the fact that the measure of self-employment activity used in most of these studies captures both "entrepreneurial" and "self-employment" activity. Indeed, there is evidence contained in the empirical results presented above that bare this out. The results in Gentry and Hubbard which suggest that (controlling for the level of taxation) progressivity of the tax system has an impact, may imply that individuals respond to changes in risk which is most likely to be associated with "entrepreneurial" activity. On the other hand, the numerous results in the literature which suggest that individuals become self-employed to avoid taxation imply a response in terms of "self-employment" activity.

The ability to identify individuals engaged in "entrepreneurial" activity, separately from those engaged in "self-employment" would no doubt help to explain the ambiguity in the empirical literature and allow for a better understanding of the tax affects. Distinguishing which activity is affected by changes in the tax code is important because the appropriate policy response depends critically on whether entrepreneurship or self-employment is influenced. While this distinction is important for the broader entrepreneurship literature it is of particular concern in the income tax setting because of the possibility for tax non-compliance. Unfortunately, data that is currently available does not allow researchers to measure the two activities separately.

While this data limitation hampers researchers' ability to draw distinctions between the impacts of taxes on entrepreneurship and self-employment, another strain of literature can help to shed some light on this issue. In the context of taxation, a key issue in making this distinction is whether or not the self-employment activity conducted is associated with a desire to avoid taxation. There is a significant and growing literature devoted to identifying the nature of tax non-compliance among the self-employed. Clearly, an understanding of noncompliance by the

[11] Cullen and Gordon (2002) focus on entrepreneurship as indicated by the presence of a non-corporate loss from a proprietorship, partnership, or subchapter S corporation that was larger than 10 percent of reported wage and salary income. They further restricted the analysis to tax returns filed by single individuals.

self-employed and the factors that influence this decision will help to identify this type of "self-employment". Thus, in the next section I provide an overview of this literature.

10.4 Entrepreneurship and Tax Non-Compliance

In this section I examine two parts of the literature that investigates tax non-compliance by the self-employed. First, in order to provide an indication of how big the issue of non-compliance is, I review the relatively few[12] papers in the literature that estimate the magnitude of non-compliance by self-employed individuals. While my primary objective is to highlight the amount of under-reporting by the self-employed, I also discuss some of the data limitations that hamper this research. Second, I examine the evidence regarding the factors that influence the degree of non-compliance among the self-employed. Identification of these factors can help to distinguish responses to tax policy for tax avoidance purposes from those with a more entrepreneurial intent.

10.4.1 The Magnitude of Tax Non-Compliance by the Self-Employed

There are two primary sources of microdata that are utilized to investigate non-compliance by the self-employed. These are tax audit data and household expenditure data. Only two countries, to my knowledge, collect and have made available data from tax audits; the United States and New Zealand. Under the Taxpayer Compliance Measurement Program (TCMP) a stratified random sample of individual and corporate income tax returns are subjected to intensive audits. The US Internal Revenue Service uses the results of these audits to publish estimates of the difference between federal tax liabilities reported and assessed liabilities owed by individuals and corporations (the so-called "tax gap"). Similar data (the "ORACLE" database) is also collected by the New Zealand Inland Revenue Department.

As an example of the estimated magnitude of noncompliance by the self-employed, the US General Accounting Office (1990) suggests that corporations and the self-employed accounted for $45 billion of the estimated $85 billion tax gap in 1987. Further, focusing on unreported income by individuals in the same year, the GAO estimates that self-employed filers account for 63% of the $48 billion in unreported income in 1987. Thus, it appears that non-compliance among the self-employed in the US is non-trivial.

[12] While there are many papers in the literature that attempt to estimate underground activity at the aggregate level, these studies do not identify the non-compliance activities of the self-employed. For a comprehensive review of these approaches in an international context see Schneider and Enste 2000.

While quite revealing, the use of this type of audit data to identify non-compliance among the self-employed has a number of shortcomings. First, estimates of non-compliance based on audits are not very reliable. Such estimates rely heavily on the auditors' ability to identify under-reporting and interpret the tax laws as they pertain to tax deductions and tax credits. It is highly unlikely that income-tax auditors are able to identify all income that is concealed from the tax authorities. Second, such audit data are not widely available.

An alternative approach to estimate non-compliance by the self-employed, developed by Pissarides and Weber (1989), uses household expenditure micro-survey data, which is more widely available than audit data. The Pissarides and Weber (1989) approach can be summarized in terms of two stages. In the first stage, a prediction regarding the relationship between household food consumption and after-tax income, controlling for household characteristics is obtained. In order to obtain an undistorted estimate of the marginal propensity to consume food, the data is restricted to households obtaining all of their income from wage and salary employment. These households are assumed to have very few opportunities to conceal income. In the second stage, this estimated relationship between food consumption and after-tax income is used to impute estimates of "true" income for self-employed households. The difference between imputed income and reported income provides an estimate of non-compliance.

Pissarides and Weber apply this approach using expenditure data from the UK for 1982 and find that, on average, true self-employment income is one and a half times that of reported self-employment income. They conclude that their estimate implies that non-compliance among the self-employed accounted for 5.5 percent of GDP in that year. Baker (1993) replicates their analysis using the same expenditure series from the UK for the years 1978 to 1991 and finds results that are similar to Pissarides and Weber.[13] This approach is also applied using data from Canada (Mirus and Smith 1996, Schuetze 2002) and Sweden (Apel 1994). The estimates using Canadian data, while still significant in magnitude, are much lower than those using UK data. For example, Schuetze (2002) examines several years of expenditure data from Canada between 1969 and 1992 and finds that self-employed households concealed, on average, between 11 and 23 percent of total income over this period.[14] Apel (1994) applied the approach using data from the 1988 Swedish Hushallens utgifter (HUT) family expenditure survey and found results that fell

[13] More recently, Lyssiotou et al. (2002) extended the Pissarides and Weber (1989) approach by estimating a system of consumer demands and allowing for a more appropriate specification of the Engel curve. Their results suggest that the Pissarides and Weber approach likely understates the amount of under-reporting by the self-employed.

[14] Mirus and Smith's (1996) estimate of under-reporting using 1990 data from Canada was somewhat smaller than the estimate from Schuetze (2002) using the same data. Schuetze attributes this difference to the fact that Mirus and Smith included part-time workers in their sample while his sample was restricted to full-time workers.

somewhere between those for the UK and Canada. Apel estimated that Swedish self-employed concealed around 35 percent of income in 1988. However, because of the relatively low rate of self-employment in Sweden in that year, he concludes that non-compliance among the self-employed accounted for 1 percent of GDP.

Both the expenditure-based estimates of non-compliance among the self-employed and those utilizing tax audit data suggest that the amount of income tax under-reporting by the self-employed is significant. The fact that the estimates vary significantly across countries suggests that country specific factors, such as tax policy and other institutions, may be important determinants of non-compliance by the self-employed. The next section, which summarizes the research literature on the determinants of non-compliance, bares this observation out.

10.4.2 The Factors that Influence Tax Non-Compliance by the Self-Employed

While a number of studies examine the determinants of non-compliance in a broader context (see, for example, Andreoni et al. 1998, Slemrod 1992), only a few examine non-compliance by the self-employed. These studies, which are summarized in this sub-section, suggest that a number of the determinants of non-compliance are subject to manipulation through tax policy while others are an inherent part of a country's economic characteristics.

Studies using TCMP audit data suggest that higher marginal tax rates and lower audit rates (both of which are chosen by policy makers) are associated with increased under-reporting. Clotfelter (1983) utilizes a single year of TCMP audit data and examines the impact marginal tax rates have on under-reported income among individuals operating non-farm businesses in the US. In a regression setting using variation in the marginal tax rates (corrected for under-reporting) faced across individuals for identification, he finds that marginal tax rates have a positive effect on under-reporting among the self-employed. Joulfaian and Rider (1998) take a slightly different approach and use variation in the US tax code across types of business and time[15] to identify the impact of marginal tax rates on the income gap. In particular, they note that tax liabilities on sole proprietorship income were higher than other self-employment income sources in the US throughout the 1980's. Utilizing pooled TCMP data from 1985 to 1988, they find that, controlling for the audit rate, an increase in the marginal tax rate is associated with a larger income gap. In addition, using variation in audit rates over time they find (not surprisingly) that higher audit rates are associated with reductions in the amount of income under-reporting.

Giles (2000) uses data from the 1993 to 1995 New Zealand ORACLE firm audit database to examine the impact of various firm characteristics on compliance. In a series of limited dependent choice model regressions he examines the roles of

[15] The period examined straddles major changes to the US tax code which occurred in 1986.

firm size and industrial sector, among other factors, on the probability that a firm is engaged in avoidance or evasion. He finds that smaller firms are less likely to comply with the tax rules. He argues that this result may be due to the fact that larger firms typically have more options to avoid taxation without evading, have greater resources (such as access to tax specialists and lawyers) to avoid violations of the tax code and are in complex tax situations that make detection difficult. In addition, he finds significant differences in the probability of compliance across industrial sector.

Disaggregated estimates of non-compliance, using the expenditure approach described above, suggest that industrial sector is not only an important factor in determining the probability of non-compliance, as in Giles (2000), but also influences the amount of income that goes unreported by the self-employed. Baker (1993) and Schuetze (2002) utilize family expenditure data from the UK and Canada, respectively, to provide industry level estimates of under-reporting among the self-employed. Both find significant variation in the fraction of income under-reported by the self-employed across industries. This general finding is also confirmed using the US TCMP audit data (US General Accounting Office 1990). Schuetze (2002) suggests that his results are likely explained by variation across industries in the opportunity to conceal income. He finds greater under-reporting in Canada in industries typically thought to provide services through informal arrangements and that frequently involve cash transactions.

Finally, Schuetze (2006) provides evidence that the choice of taxation unit (individual versus household) likely influences the extent of non-compliance by the self-employed. He argues that, in a progress tax system, individual taxation creates an incentive to redistribute income among household members. Because, unlike the wage sector, there is no third party reporting income in the self-employment sector, the opportunity to redistribute income in this manner is likely feasible only for the self-employed. Most forms of this "income splitting" among the self-employed are illegal in Canada. Utilizing exogenous variation in the tax codes across Canada and the US (the tax unit is primarily the individual in Canada and the household in the US), he estimates the extent of income splitting in Canada for a number of years between 1988 and 1998. He finds evidence that a significant number of Canadian self-employed households engage in illegal income-splitting.

The research summarized in this sub-section suggests that tax jurisdiction specific factors and firm characteristics are important determinants of income-tax non-compliance. Thus, whether observed responses to changes in tax policy are by business owners whose intent is "entrepreneurial" or those whose intent is to avoid taxation likely varies with the tax policies under which the sample is ruled and the firm characteristics of the sample. In particular, the research suggest that the overall level of taxation, audit probability, the unit of taxation and the industrial composition of the sample being analyzed all influence whether the researcher is likely to observe changes in the number of "entrepreneurs" versus the number "self-employed" in response to adjustments to tax policy.

10.5 Outstanding Research Questions and Data Requirements

It is clear from the discussion above that researchers have made a good deal of progress and have added to our understanding of the sometimes intricate interactions between tax policy and self-employment outcomes. However, much more research is needed to enable policy makers to design effective and efficient tax policy towards entrepreneurship that avoids the pitfalls associated with non-compliance. Many of the shortcomings in the literature are simply the result of the complexity of the issues but some of the gaps result because of a lack of quality data focused on self-employment outcomes. This section outlines the more pressing issues for research on the impacts of taxes on entrepreneurship outcomes that result because of a lack of data and identifies the characteristics of the data required for their investigation.

As is indicated by the above literature review, one of the key obstacles in attempting to measure the impacts of tax incentives on entrepreneurship is the inability of researchers to disentangle the effect of tax incentives on entrepreneurs from their effects on other self-employed individuals. The problem stems from the fact that the measure of entrepreneurship available in most data sets is far too broad to capture business owners who embody the characteristics typically associated with "entrepreneurs". This issue, which is common to all research focused on entrepreneurship, is particularly troublesome for the tax literature on entrepreneurship because of the potentially large number of individuals who enter self-employment to avoid taxation. As troubling as this problem is, it is likely that better quality data would go a long way in solving it.

One solution pertaining to survey data would be to adopt survey questions that capture the degree to which the activity carried out by the business owner is "entrepreneurial". As discussed in the introduction to this chapter most definitions of an entrepreneur include individuals who are innovative and take risks in developing a business. Questions such as "Is the business a franchise?", "How many other businesses operate in the same industry?", "Was the business purchased from a previous owner?", and "How many other businesses in the industry apply the same business plan?" would help to elicit whether the individual is innovative. To identify the degree to which the individual is adopting risk, questions such as "How much new capital is invested in the business?" and "How much of the owner's own capital is invested in the firm?" could be asked of respondents. Identification of "entrepreneurs" as distinct from other self-employed, including would be tax avoiders, would allow researchers to examine directly the impacts of tax policy on entrepreneurship.

In fact, this approach allows for an even richer examination of the relationship between tax policy and entrepreneurship. Identification of the separate elements that make up an entrepreneur (innovation and risk) allows one to identify on which dimension(s) a given tax policy change impacts entrepreneurial activity. The ability to examine how tax policy influences risk taking directly would be useful to test the conclusions of the theoretical literature, which (as outlined above) has focused on the role of risk in the entrepreneurship decision. This would also potentially allow

researchers to examine how important each of the entrepreneurial dimensions is as a determinant for success and to develop tax policies that target these characteristics.

This is an important point in light of recent proposals to measure entrepreneurship by identifying firms that increases employment substantially over a given time period (see for example, Ahmad OECD Chapter 7, and Hessels Chapter 13 of this book). In other words, these identify entrepreneurial firms as those that succeed in terms of employment growth. While such measures would allow researchers to identify how policies affect this desirable outcome, they would not provide enough information to determine the mechanisms by which entrepreneurs become successful. In some sense these measures capture entrepreneurship through an ex-post evaluation of the entrepreneur as opposed to identifying the ex-ante dimensions of the entrepreneur's ability.

A second approach to tackling the problem is to develop data that allows the researcher to better identify individuals who enter self-employed to avoid taxation. This would allow one to pull out tax evaders from the group of self-employed but wouldn't allow for further disentanglement of the other self-employed from entrepreneurs. Thus, while not providing direct evidence on entrepreneurial outcomes, this approach would allow researchers to identify, for example, how the tax code impacts noncompliance among the self-employed; a key component of the overall impacts of taxation. There are a number of possible approaches aimed at identifying this activity (outlined above), each with its own pros and cons.

Direct measures, such as tax audit data, provide very rich information on the amount and form of tax avoidance by the self-employed. However, audit data are very expensive to collect and, therefore, are an unlikely to provide a solution to the identification problem. The data required to generate indirect measures of noncompliance, such as those proposed by Pissarides and Weber (1989), are much less expensive to collect but provide less than perfect information on the form and extent of non-compliance. Nonetheless, there is some scope to improve the data used in identifying the noncompliant through such indirect measures.

Given the links between income and tax outcomes of individuals within a family, household data is likely to be preferred to identify non-compliance. Because this approach relies on information regarding household expenditure, detailed information on individual expenditure items is required. Information on individual household members' income is also necessary and should, if possible, be directly linked to administrative data reported on income tax returns. The data currently used for this approach relies on survey responses from family members, which may differ from what is reported to tax authorities. This can lead to biased results if individuals report their income correctly in response to the survey but under-report income for tax purposes. In general, improvements in the estimates would be brought about by more detailed questioning of the financial situations of both self-employed and wage employed workers in such surveys.

These suggestions are intended as a starting point in what is hoped will be an ongoing discussion regarding current data deficiencies related to the measurement of entrepreneurship. In order to better aid policy makers around the world in their attempts to encourage "entrepreneurship" researchers require better identification

of the activities and outcomes targeted by their policies. It is only by disentangling "entrepreneurship" from other "self-employment" activities that the complex links between tax policy and self-employment can be explored.

Acknowledgments This paper was prepared for the Workshop on Entrepreneurship Statistics, February 7th—8th 2006, Huelva, Spain (organized by the Andalusian Statistics Institute and the University of Huelva). I am solely responsible for any omissions or errors. Address: Department of Economics; University of Victoria; PO Box 1700 STN CSC; Victoria, BC V8W 2Y2. (250)721-8541 (tel).(250)721-6214 (fax). E-mail: hschuetz@uvic.ca.

References

Ahsan, SM (1974) Progression and Risk-Taking. Oxford Economic Papers 26:318–328

Ahsan SM (1990) Risk-Taking, Savings, and Taxation a Re-Examination of Theory and Policy. The Canadian Journal of Economics 23(2):408–433

Andreoni J, Erard B, Feinstein J (1998) Tax Compliance. Journal of Economic Literature 36: 818–60

Apel M (1994) An Expenditure-Based Estimate of Tax Evasion in Sweden. Department of Economics Uppsala University Working paper 1994

Baker P (1993) Taxpayer Compliance of the Self-Employed: Estimates from Household Spending Data. Institute for Fiscal Studies Working paper No. W93/14

Blau DM (1987) A Time-Series Analysis of Self-Employment in the United States. Journal of Political Economy 95(3):445–467

Briscoe G, Dainty A, Millett S (2000) The Impact of the Tax System on Self-Employment in the British Construction Industry. International Journal of Manpower 21(8):596–613

Bruce D (2002) Taxes and Entrepreneurial Endurance: Evidence from the Self-Employed. National Tax Journal 55(1):5–24

Bruce D (2000) Effects of the United States Tax System on Transitions Into Self-Employment. Labour Economics 7(5):545–574

Bruce D, Mohsin M (2003) Tax Policy and Entrepreneurship: New Time Series Evidence. Working Paper University of Tennessee

Bruce D, Schuetze HJ (2004) Tax Policy and Entrepreneurship. Swedish Economic Policy Review 2(11):233–265

Clotfelter CW (1983) Tax Evasion and Tax Rates: An Analysis of Individual Returns. Review of Economics and Statistics 65(3):363–73

Congregado E, Golpe A, Millán JM (2003) Some Empirical Aspects of Self-Employment in Spain during the nineties. Seminario de Análisis Económico, Universidad de Huelva, SAE WP 20

Cullen JB, Gordon RH (2002) Taxes and Entrepreneurial Activity: Theory and Evidence for the U.S. NBER Working Paper No. 9015

Domar ED, Musgrave RA (1944) Proportional Income Taxation and Risk-Taking. Quarterly Journal of Economics 58:388–422

Erard B (1992) The Influence of Tax Auditing on Reporting Behavior. In: Slemrod J, Arbor A (eds) Why People Pay Taxes. University of Michigan Press, Michigan

European Commission (1998) Fostering Entrepreneurship in Europe: Priorities for the Future. Communication for the Commission to the Council, COM (98) 222 final

Fairlie RW, Meyer BD (2000) Trends in Self-Employment Among White and Black Men: 1910–1990. Journal of Human Resources 35(4):643–669

Feldstein M, Slemrod J (1980) Personal Taxation, Portfolio Choice, and the Effect of the Corporate Income Tax. Journal of Political Economy 88:854–66

Gentry WM, Hubbard RG (2000) Tax Policy and Entrepreneurial Entry. American Economic Review 90:283–287
Giles D (2000) Modelling the Tax Compliance Profiles of New Zealand Firms. In: Scully G, Caragata P (eds) Taxation and the Limits of Government. Boston: Kluwer Academic Publishers, Boston
Gordon R (1998) Can High Personal Tax Rates Encourage Entrepreneurial Activity? IMF Staff Papers 45(1):49–60
Joulfaian D, Rider M (1998) Differential Taxation and Tax Evasion by Small Business. National Tax Journal 51(4):675–687
Jung YH, Snow A, Trandel GA (1993) Tax Evasion and the Size of the Underground Economy. Journal of Public Economics 54:391–402
Kanbur SM (1989) Risk Taking and Taxation: An Alternative Perspective. Journal of Public Economics 15:163–184
Kesselman JR (1989) Income Tax Evasion: An Intersectoral Analysis. Journal of Public Economics 38:137–182
Long JE (1982a) Income Taxation and the Allocation of Market Labor. Journal of Labor Research 3(3):259–76
Long JE (1982b) The Income Tax and Self-Employment. National Tax Journal 35:31–42
Lyssiotou P, Pashardes P, Stengos T (2002) Estimates of the Black Economy based on Consumer Demand Approaches. University of Guelph Working Paper
Mirus R, Smith RS (1996) Self-Employment, Tax Evasion and the Underground Economy: Micro-Based Estimates for Canada. Working Paper No 1002 Cambridge MA: International Tax Program, Harvard Law School
Moore RL (1983) Self-Employment and the Incidence of the Payroll Tax. National Tax Journal 36:491–501
Mossin J (1968) Taxation and Risk-Taking: An Expected Utility Approach. Economica 35:74–82
OECD (1998) Fostering Entrepreneurship: The OECD Jobs Strategy. OECD, Paris
Parker SC (1996) A Time Series Model of Self-employment under Uncertainty. Economica 63:459–75
Parker SC (2003) Does Tax Evasion Affect Occupational Choice? Oxford Bulletin of Economics and Statistics 65(3):379–394
Parker SC (2004) The Economics of Self-Employment and Entrepreneurship. Cambridge University Press, Cambridge
Pestieau P, Possen UM (1991) Tax Evasion and Occupational Choice. Journal of Public Economics 45:107–125
Pestieau P, Possen UM (1992) How Do Taxes Affect Occupational Choice. Public Finance 47(1):108–119
Pissarides CA, Weber G (1989) An Expenditure Based Estimate of Britain's Black Economy. Journal of Public Economics 39(1):17–32
Robson MT (1998) The Rise in Self-Employment Amongst UK Males. Small Business Economics 10:199–212
Robson MT, Wren C (1999) Marginal and Average Tax Rates and the Incentive for Self-Employment. Southern Economic Journal 65(4):757–773
Schneider F, Enste D (2000) Shadow Economies: Size, Causes, and Consequences. Journal of Economic Literature 38(March):77–114
Schuetze HJ (2000) Taxes, Economic Conditions and Recent Trends in Male Self-Employment: A Canada-U.S. Comparison. Labour Economics 7(5):507–544
Schuetze HJ (2002) Profiles of Tax Non-Compliance Among the Self-Employed in Canada: 1969–1992. Canadian Public Policy 28(2):219–238
Schuetze HJ (2006) Income Splitting Among the Self-Employed in Canada and the Optimal Unit of Taxation. Canadian Journal of Economics (Forthcoming)
Slemrod J, Arbor A (1992). Why People Pay Taxes: Tax Compliance and Enforcement. University of Michigan Press, Michigan

Stiglitz JE (1969) The Effects of Income, Wealth, and Capital Gains Taxation on Risk-Taking. The Quarterly Journal of Economics 83(2):263–283
US General Accounting Office (1990) Tax Administration: Profiles of Major Elements of the Tax Gap. Document GGD-90-53BR. Washington, DC: GAO.
Vroman W (1997) Self-Employment Assistance: Revised Report. The Urban Institute, Washington
Wasylenko M (1997) Taxation and Economic Development: The State of the Economic Literature. New England Economic Review March/April: 37–52
Watson H (1985) Tax Evasion and Labor Markets. Journal of Public Economics 27:231–46