Tax Policy and Entrepreneurship

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Abstract:

Citing the potential benefits of a more entrepreneurial labour market, governments and economic actors around the world have instituted programs to help foster entrepreneurship. There is a vast array of potential policy tools available and utilized to varying degrees across countries to help stimulate small business growth. Given the importance 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. However, because this topic overlaps several areas of economic research, much of the work that has been done is fragmented. This paper pulls together the various strains of research to illustrate the current state of knowledge regarding the impacts of taxation on entrepreneurship and to identify areas in which additional research is particularly warranted.

Citing the potential benefits of a more entrepreneurial labour market, governments and economic actors around the world have instituted programs to help foster entrepreneurship. Justification for providing aid to small business varies. For instance, despite evidence to the contrary (Davis, Haltiwanger and Schuh 1996), it is often argued that small entrepreneurial ventures create a disproportionate share of jobs in the economy. Some argue that small businesses fuel economic growth through innovation that is manifest in new products, technology and forms of organization within firms. In turn, these innovations provide positive externalities or spillover benefits that accrue at no additional costs to others in the economy and lead to economic growth. In addition, it is argued that the presence of these externalities along with institutional constraints on risk trading result in a market which fails to produce the efficient amount of entrepreneurial activity. In the presence of these market failures, there is a clear role for governmental authorities to step in and provide support to entrepreneurs. Unfortunately, the economic literature to this point has made little progress in identifying the existence or magnitude of these potential benefits.

Despite this lack of evidence on the benefits of entrepreneurship most OECD countries have public policy programs designed to assist businesses. In addition, broader institutions such as the European Parliament, OECD and the European Commission have identified the significance of this issue and encourage countries to pursue policies to foster entrepreneurship.[1] There is a vast array of potential policy tools available and utilized to varying degrees across countries to help stimulate small business growth. These policies include the provision of start-up financial capital[2], aid in the development of human capital or business skills, and self-

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

employment training programs that target the unemployed in the hope of returning these workers to the ranks of the employed[3]. Administrative requirements involved in starting up a new business or complying with the tax code and labour-market-related social programs (such as social security and employment insurance), which often lack provisions for entrepreneurs, are examples of policies that indirectly affect the attractiveness of self-employment to potential entrepreneurs.

Perhaps the most complex policy tool available and most commonly utilized is the tax system. Tax polices 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 (we present a more precise discussion of how taxes might influence entrepreneurship in section 2). Thus 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 self-employment.

Given the importance 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. However, because this topic overlaps several areas of economic research, much of the work that has been done is fragmented. The purpose of this paper is to pull together the various strains of research to illustrate the current state of knowledge regarding the impacts of taxation on entrepreneurship and to identify areas in which additional research is particularly warranted. In our discussion we ignore issues of whether or not policy makers ought to encourage entrepreneurship and focus on the more positive matters.

[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).

We begin in Section 1 with a survey of the theoretical literature. In this section we examine the various facets of tax policy which have been identified by economic theory as influential in the self-employment decision as well as their likely impacts. Section 2 provides a discussion of the empirical literature related to the impacts of tax policy on self-employment. Section 3 highlights a number of issues identified in the literature relating to self-employment and tax non-compliance. A discussion of conclusions, policy implications, and areas for future research closes the paper in Section 4.

Before we begin, however, it is important to define entrepreneurship and distinguish between what is meant by "entrepreneurship" and "self-employment". Despite its importance, entrepreneurship is an elusive concept. Many definitions typically 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. It is clear from the discussion above that these are some of the attributes that policy-makers seek out when advocating entrepreneurship. However, measuring such activity can be difficult. In most of the empirical studies reviewed in this paper the measure used is the number of individuals who report working for themselves, which matches quite closely the "self-employed" classification. This measure includes individuals engaged in widely varying activities, including those who operate chain stores, as an example. Chain store operators may encounter some degree of risk but we might not think of these workers as innovative if they are following a stylized approach common across all establishments in the chain. For this and other reasons, this measure may overstate the amount of entrepreneurial activity. On the other hand, this measure leaves out individuals engaged in enterprising or innovative behavior in more established firms. Both the theoretical literature, which emphasizes risk and leaves out innovation, and the

empirical literature do not distinguish between entrepreneurship and self-employment. In keeping with the notation of the previous literature, we use the two terms interchangeably throughout the remainder of the paper. However, given the importance of this distinction, we discuss what the results in the literature tell us about "entrepreneurship" and "self-employment," separately.

1. Theoretical Impacts of Taxation on Entrepreneurship

Economic theory suggests that a country's tax system can have complex and ambiguous effects on the level of entrepreneurship. The common view presented in the literature is that entrepreneurship, unlike wage work, offers an uncertain return. 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 it is relatively straightforward to show that a system of differential taxation across sectors can make investment in the risky sector more or less attractive. In fact, 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 is the result owing to Domar and Musgrave (1944) who showed that taxation, with liberal loss offsets, of risky investments such as entrepreneurship can increase investment in these risky assets.

The intuition behind Domar and Musgrave's argument proceeded as follows. The imposition of a proportional income tax system with full loss offsets[4] has two effects on investment in risky assets. First, the tax reduces the expected yield of the investment and this will discourage investment. 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 showed 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. This important result was later confirmed in a more general setting using an expected utility model by Mossin (1968), Stiglitz (1969) and Ahsan (1974)[5].

It is important to emphasize that this result hinges on the assumption that losses can be fully offset. Under conditions of partial loss deduction, Domar and Musgrave (1944) showed 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. Tax law may disallow full loss offsets. Even if they are permitted, an individual's ability to take advantage of the law may be limited by the amount of taxable income from other sources that is generated over the relevant period. 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.

[4] 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.

[5] 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.

Gentry and Hubbard (2000) argued that actual tax systems do not typically offer full loss offsets for entrepreneurs and focused on the progressivity of the tax system on entrepreneurship. They argued that greater convexity of the tax schedule reduces the returns of those who succeed disproportionately to those who do not and reduces average returns. In a model without the risk reducing benefits of full loss offsets they showed that increasing progressivity of the tax schedule discourages entrepreneurial activity even when individuals are risk neutral.

Of course, tax systems are complex and interactions between different elements of the tax code can generate interesting outcomes. Feldstein and Slemrod (1980), Gordon (1998) and Cullen and Gordon (2002) pointed 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 tax. Thus, they argued, this option, which is not available to wage and salary workers, creates an incentive to become self-employed.

In a model of risk taking by small firms Cullen and Gordon (2002) assessed the impact of the US tax system, including the important interaction between the personal and corporate tax schedules. They were able, therefore, to bring together the various facets of the tax structure to capture more of the interactions between these and their impacts on entrepreneurship. Consistent with the previous models discussed, they found that differential taxation, risk-sharing by the government and loss offsets matter. Interestingly, they argued that if the personal tax rate is higher than the corporate rate endogenous choice of corporation status can result in greater than full loss offsets. In addition, they illustrated how the interaction of the tax schedules can help to explain the growth pattern of firms in terms of incorporation status. Their results suggest that

firms are likely to start out filing under the personal tax system and are only likely to incorporate as the firm grows. It should be noted that the results here are tied specifically to the US tax system and may not apply across countries.

To this point we have discussed the impacts of taxation on entrepreneurship under the implicit assumption that individuals comply with the tax code. However, unlike wage workers, no third party exists to withhold taxes on behalf of entrepreneurs. Thus, among business owners numerous opportunities exist to reorganize income to avoid taxation or to simply evade taxes altogether. The actual tax rate and tax liabilities faced by entrepreneurs can differ greatly from those imposed by the tax code. A number of researchers have modeled the endogenous choice of occupation among workers in a setting with tax evasion in order to identify the impact of evasion on sectoral choice and optimal tax policy (Watson 1985, Kesselman 1989, Pestieau & Possen 1991 & 1992, and Jung, Snow and Trandel 1994). Most argued 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, Watson (1985) pointed out that an increase in supply to the sector in which evasion is possible may result in a decrease in wages in that sector, which will make underreporting less attractive. Thus, he argued, the net impact is indeterminate. All of the models which included audits concluded, not surprisingly, that greater auditing intensity results in less evasion and, therefore, participation in the "evadable" sector.

While these studies provide a starting point, they fail to provide a comprehensive model of the self-employment decision that accounts for evasion. Most of the studies assumed that income in the evadable or self-employment sector was known with certainty. Those that included risk in the return to self-employment did not account for the impact of taxation on the

degree of this risk. Citing the complexity in deriving analytical solutions to the model, those studies which provided more comprehensive models supplied numerical examples instead. As a final example of the inability of these models to capture fundamental characteristics of evasion among the self-employed, we point out the likely heterogeneity in entrepreneurs' opportunities to avoid taxation. For example, those involved in providing goods or services through informal arrangements that frequently involve cash transactions undoubtedly have greater opportunity to under-report income than others. Thus, factors such as the industrial composition of a country or region will determine the impact of changes in the level of taxation on entrepreneurial activity. Despite the fact that empirical studies suggest that heterogeneity across these dimensions is important, none of the models captured this element. We provide a more complete discussion of the impacts of tax non-compliance in section 4.

2. Empirical Research on the Effects of Taxation on Self-Employment

Research on the effects of tax policy on self-employment and entrepreneurial activity has flourished in recent years, due in part to the availability of vast longitudinal databases containing multiple years of information for large samples of current and potential entrepreneurs. The ability to track individuals over time, especially when the time period includes a major tax policy change, has resulted in a dramatic increase in the quality of research. Despite (or perhaps as a result of) the rapidly expanding literature, little consensus has arisen as to the effects of taxes on self-employment. Echoing the theoretical ambiguity noted above, many studies have found that higher tax rates lead to higher rates of entrepreneurial activity, while a number of more recent studies have called this general finding into question.

Most prior empirical studies have been restricted by their use of cross-section or time

series data rather than longitudinal (panel) data, and many have used aggregate tax information such as statewide or national average tax rates to avoid the issue of tax rate endogeneity which is inherent to such an analysis. The problem arises because an individual's marginal tax rate is endogenous to the entrepreneurship decision when the tax rate is a function of whether or not one is self-employed. The fact that tax rates are not necessarily determined prior to self-employment decisions presents empirical difficulties that are easily dealt with using modern statistical techniques. For example, a number of more recent studies have used panel data and have relied on exogenous changes in tax rules to deal with potential endogeneity of individual tax rates. The literature can be divided into four broad categories: time series studies, cross-section studies, individual-level panel data studies, and state-level panel data studies. Each of these categories is discussed in detail below. For the reader's convenience Table 1 provides a summary of selected studies with a focus on the impacts of the tax system on aggregate self-employment activity[6].

2.1. Time Series Studies

The studies described in this section have focused on national-level tax policies, mainly in the U.S. and the U.K. Some have relied on time series econometric techniques that have since been found to be problematic. Specifically, they typically involve the use of ordinary least squares regression analysis, with simple corrections for the common problem of autocorrelation (i.e., where observations in the time series data are related in some way over time). These studies generally conclude that higher federal tax rates cause higher rates of self-employment (Long 1982a and Blau 1987). The explanation for this result usually rests on the assumption that high tax rates drive workers out of paid employment, or wage jobs, into entrepreneurial ventures

[6] Because of their different focus, discussed below, some of the individual-level and all of the state-level panel data studies are excluded from the table.

where they can more easily avoid or evade taxes.

Long's (1982a) finding was 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 was regressed on a hypothetical marginal income tax rate facing the typical married working couple. Blau (1987) followed Long's (1982a) method but used a longer time series of U.S. data for 1948 through 1982 and a survey-based measure the self-employment rate. His tax variables consisted of two marginal tax rates for incomes of $7,000 and $17,000 respectively. While his findings at the higher marginal tax rate supported Long's, Blau found that increases in lower-bracket marginal tax rates actually reduced the self-employment rate. This empirical puzzle was not explained by Blau, but foreshadowed the importance of tax progressivity as addressed by later researchers (see below).

More recent second generation time series studies use more sophisticated time series econometric tools, typically involving some consideration of cointegration (i.e., the case where two or more series exhibit a common trend but might not necessarily be closely linked). In time series data on tax rates and self-employment rates, one often observes that both series have trended generally downward, especially in the U.S., in recent decades. Both rates were quite high in the mid-1900s but have gradually fallen over time. This relationship may or may not involve some form of causation, but only more modern econometric techniques can fully address this.

Parker (1996) was the first to tackle the relationship between taxes and self-employment using modern time series techniques. He used a 1959 to 1991 time series of United Kingdom data, and again found that higher marginal tax rates increased self-employment rates. He followed Blau (1987) in using two marginal tax rates associated with two different levels of

income, but failed to support Blau's findings at the lower rate. Somewhat surprisingly, the general positive relationship between tax rates and self-employment rates continued to hold even after addressing cointegration.

Robson (1998) analyzed quarterly U.K. time series data for 1968Q3 through 1993Q4 and was the first to consider both marginal and average tax rates. While no significant results were obtained from the marginal tax rate, Robson found a positive relationship between self-employment and the average tax rate. Similarly, Robson and Wren (1998) provided a theoretical model that incorporated both average and marginal tax rates. However, their model predicted (and regressions confirmed) that higher marginal tax rates reduced self-employment rates while higher average tax rates increased self-employment.[7] This divergence was attributed to the positive (negative) relationship between average (marginal) tax rates and optimal effort and evasion. Higher marginal tax rates reduce the return to effort, thereby leading to reduced self-employment even though the rate of evasion may increase.

The time-series evidence on taxes and self-employment, which has generally found a positive relationship between tax rates and self-employment rates, generally supports the popular claim that individuals become self-employed in order to avoid paying higher wage-and-salary taxes. However, the most recent time-series evidence has not found a significant effect of taxes on self-employment rates (Fairlie and Meyer 1998, Briscoe, Dainty, and Millett 2000, and Bruce and Mohsin 2003).

Using aggregated individual data from seven decennial U.S. Censuses of Population (for 1910 and 1940-1990), Fairlie and Meyer (1998) found that the overall relationship between tax rates and self-employment is, at best, weak during this period.[8] Briscoe, Dainty, and Millett

[7] Robson and Wren (1998) examined data for 15 OECD countries for the years 1978, 1981, 1985, 1989, and 1992.
[8] However, no multivariate analysis was performed to test this conclusion.

(2000), who examined a 1979-1996 time series of self-employment in the British construction industry, found evidence to suggest that higher overall tax rates might lead to lower self-employment in this narrow focus.[9]

In addition to the usual personal income and payroll taxes, Bruce and Mohsin (2003) considered corporate income taxes, capital gains taxes, and estate taxes in a long (1950-1999) time series of U.S. data. Results generally indicated that taxes have statistically significant but very small and scattered effects on entrepreneurship rates. Further analysis confirmed the existence of stable long-run relationships between tax policy variables and self-employment rates in the presence of other statistically significant controls. However, only the top corporate income tax rate and payroll tax rates on wage and self-employment income were found to be particularly important in a series of more advanced statistical tests.

2.2. Cross-Section Studies

While time series studies have clearly dominated the empirical literature on taxes and self-employment, they are not able to address individual-level decisions to enter or remain in self-employment. The finding that higher tax rates lead to more self-employment as measured by aggregate time series is interesting, but 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 time-series results. Long (1982a) investigated 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 found that a 10 percent increase in the average marginal income tax rate in a metropolitan area increased the

[9] Briscoe, Dainty, and Millett (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.

self-employment rate in that area by 6.4 percent. Further, a $300 increase in average income tax liability increased the self-employment rate by 1 percent. In a similar study, Long (1982b) found that an increase in expected wage-and-salary tax liability of 10 percent was found to increase the probability of being self-employed by 7.4 percent.

Moore (1983) expanded on Long's research, but focused instead on the payroll tax. Indeed, Moore's was the first of a small number of studies to examine both individual income and payroll taxes using microdata. He used 1978 U.S. CPS data to estimate linear probability models and logits of self-employment status. The effect of the expected wage-and-salary income tax variable was significant, but much smaller than those estimated by Long (1982a and 1982b). Moore found much larger effects from the payroll tax; a 10 percent increase in expected wage-and-salary payroll tax liability caused a 5 to 8 percent increase in the probability of being self-employed.

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 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.

The most significant shortcoming of Long (1982b), Moore (1983), and Parker (2003)—the three cross-section studies that have used individual tax information—is that potential tax rate (and relative income) endogeneity was not addressed. Also, with the exception of Parker (2003) who eventually dismissed the issue, time series and cross-section studies had not yet considered the relative tax treatment of wage employment and self-employment. To the extent

that tax policies treat each type of employment differently, the resulting tax wedge could have important consequences for self-employment rates. Further, most studies have focused on the (cross-sectional) probability of being self-employed rather than the equally interesting start-up and shut down processes. While a number of time series and cross-section studies have considered self-employment entry and exit, none considered taxes. A few more recent studies have used panel data to investigate these broad questions.

2.3. Individual-Level Panel Data Studies

The availability of richly detailed longitudinal data at the individual level has been a boon to empirical research on taxes and self-employment. Panel data studies and those relying on repeated cross-sections have been able to focus on individual decisions about self-employment (Bruce 2000 and 2002, Carroll, Holtz-Eakin, Rider, and Rosen 2001, Cullen and Gordon 2002, Gentry and Hubbard 2000, Moore 2003, and Schuetze 2000). Results have been less conclusive than those from earlier time series and cross-section studies. Indeed, some of the more recent studies have indicated that higher tax rates on self-employment income might either increase or decrease self-employment rates. The key to understanding this is recalling that a higher tax rate reduces not only the expected return from self-employment, but will also alter the risk involved in self-employment[10]. Further, the expected impact of higher tax rates differs considerably depending on whether increases in relative taxation across sectors are being examined compared to an aggregate increase.

Schuetze (2000) was one of the first studies to avoid the pitfalls of tax rate endogeneity. This was achieved by using asynchronous variation in the aggregate "tax climate" across tax

[10] Whether risk increases or decreases depends on several factors; including the structure of the tax system (e.g. how liberal loss offsets are) and whether the increase in tax rates is accompanied by a change in the progressiveness of the tax schedule.

jurisdictions (states and provinces) in the United States and Canada – two countries which are similar in terms of overall institutional structure but which differ substantially in their income tax policies and self-employment outcomes. Using repeated cross-sections for the two countries covering the period 1983 through 1994, he found that increases in average income tax rates had large and positive effects on the rate of male self-employment. In particular, he found that a 10 percent increase in the average marginal tax rates in one year resulted in a 2.1 to 3.7 percent increase in the probability of being self-employed in the following year in the US and between 1.6 and 3.0 percent in Canada.

Bruce (2000 and 2002) used U.S. data from the Panel Study of Income Dynamics and, unlike previous studies, focused on differential tax treatment of the self-employed and its impact on both the entry and exit decisions. Both of these studies involved the use of exogenous changes in tax rules to generate instrumental variables for addressing the possible endogeneity of individual-specific tax rates. The results, which on first inspection appear somewhat counter-intuitive, showed that decreasing an individual's expected marginal tax rate on self-employment income (holding the wage tax rate constant) actually reduced the probability of entry, while a similar decrease in the average self-employment income tax rate increased this probability. Similarly, higher tax rates on self-employment income were found to reduce the probability of exit. These results are at least partially explained by the fact that changes in differential tax treatment—while having the primary effect of altering net returns to labor—also affect the incentives to capture relevant tax preferences (or to evade or avoid taxation altogether).

Gentry and Hubbard (2000) used the same data as Bruce (2000) but focused instead on tax progressivity. They argued that, under the likely condition of less than full-loss offsets, progressive rate schedules serve as something of a tax on success in self-employment. Under

such conditions, they suggested, the rewards to successful firms are reduced more than the support given to unsuccessful firms. Consistent with their hypothesis, they found that the probability of entry into self-employment increased as tax rates became less progressive.

Cullen and Gordon (2002) echoed the general finding from the earlier literature that cutting personal tax rates can reduce the extent of entrepreneurial activity. They attributed this not only to the standard Domar and Musgrave (1944) risk-sharing argument within the personal income tax system, but also to the interplay between the individual and corporate tax structures in the U.S. which, they argued, allows for greater than full-loss offsets (contrary to Gentry and Hubbard, 2002). While their study made use of repeated cross sections of U.S. tax return data from 1964 through 1993, 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 used aggregate (averaged) tax measures to avoid concerns of tax rate endogeneity.

Another recent study by Moore (2003) highlights the fact that no consensus has arisen regarding the influence of taxes on self-employment. Moore used repeated cross section data from the Surveys of Consumer Finances, which spanned key federal tax reforms in the U.S. This strategy permitted the use of a difference-in-differences technique to account for tax rate endogeneity. Moore found a negative relationship between tax rates and self-employment. Although, the coefficients were either statistically insignificant or sensitive to model specification.

Leaving the question of how taxes affect the level of self-employment activity aside for the moment, a number of innovative and interesting panel data studies have examined the effects of certain tax policies on the activities of existing entrepreneurs. Carroll, Holtz-Eakin, Rider,

[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.

and Rosen (2000a, 2000b, and 2001) used panel taxpayer data to examine the effect of taxes on the growth of small firms' receipts and on decisions by existing entrepreneurs to hire additional workers or to make capital investments. Relying on exogenous variation provided by the Tax Reform Act of 1986, they suggested that the self-employed were indeed cognizant of their own personal tax situations. Specifically, marginal tax rate increases reduced overall firm growth (as measured by receipts), mean investment expenditures, and the probability of hiring employees.

Power and Rider (2002) examined a panel of sole proprietors in their investigation of the use of tax-based savings incentives among entrepreneurs. Their estimate of the tax price elasticity of contributions to these plans was about –2.0, suggesting again that entrepreneurs are highly sensitive to changes in their tax rates. Finally, Barbour, Bruce, and Holtz-Eakin (2002) used a panel of individual taxpayer data from 1979 to 1990 to investigate charitable giving among the self-employed. Results indicated that single taxpayers who filed a Schedule C and itemized their deductions were more likely to report charitable contributions than those without a Schedule C, but this result held only at lower marginal income tax rates. These filers were also less sensitive to changes in marginal tax rates than those who did not file a Schedule C. No significant differences were found for married taxpayers.

2.4. State-Level Panel Data Studies

Most of the studies discussed thus far have focused on national tax rates and policies. Sub-national (e.g., state-level) taxes have only entered as part of a composite tax rate variable, leaving independent analysis of these taxes unexplored. The analysis of self-employment trends at the sub-national level carries with it a number of important opportunities and concerns. First, sub-national tax policies often vary significantly. This geographic (and presumably exogenous)

variation can be used to identify the effects of taxes on self-employment. However, to the extent that workers or firms are mobile, a change in the self-employment rate in one area might just reflect a shift of self-employed workers from one area to another, potentially to capture tax advantages. It should also be noted that this area of research has important implications for international tax strategies across countries with integrated labour and capital markets. Regions of the world with relatively free mobility between countries compete for entrepreneurial talent.

The literature on the effects of sub-national tax policies on business location decisions is relevant to the current survey. In his oft-cited review of a vast array of empirical studies, Wasylenko (1997) concludes that taxes have statistically significant but quantitatively small effects on interregional location behavior. On the surface, this result is important because business location decisions can have important impacts on measured entrepreneurship or self-employment rates. However, tax-based incentives and their associated location effects are perhaps more important for large firms that can choose a location from a broad menu of options.

A number of authors have used U.S. time series or panel data to explicitly examine the effects of sub-national tax policies on entrepreneurial activity. Carlton (1979) found no strong evidence that local taxes influence the number of firm births. He used rather rough proxies for tax variables, however, and only considered three industries from 1967-1971 and 1972-1975. Bartik (1989) used more detailed tax information and a broader array of industries, and found that higher property taxes, corporate taxes, and sales taxes on equipment negatively impacted small business start-ups.[12] He also found that personal income taxes and general sales taxes were not statistically significant.

Chen and Williams (1999) examined business failure rates from 1984 through 1993, estimating panel regressions for each of a number of industry categories. They found that higher

[12] Bartik (1989) extends the preliminary results in Bartik (1987).

sales taxes per capita increased failure rates for low-tech industries, while higher corporate income taxes per capita led to lower failure rates for high-tech industries. Their focus was not exclusively on small businesses, however. Kreft and Sobel (2003) found that the existence of state inheritance taxes above the federal level was associated with lower rates of growth in the number of sole proprietors between 1996 and 2000.

Georgellis and Wall (2002) and Bruce, Deskins, and Mohsin (2003) used panel regressions to examine the various determinants of state-level entrepreneurship.[13] Using information from 1991-1998, Georgellis and Wall (2002) found that the maximum (state plus federal) marginal tax rate exerted a u-shaped effect on the number of non-farm sole proprietors as a share of the working-age population. An increase in the marginal tax rate reduced entrepreneurship up to a minimum effect at an MTR of about 35 percent, after which MTR increases led to more entrepreneurial activity.

Bruce, Deskins, and Mohsin (Forthcoming) expanded upon the earlier literature by considering a broader set of tax policies in addition to the usual menu of tax rates. They also went beyond explicit tax policy variables to examine the influence of state tax portfolios (i.e., the share of total state taxes generated by each tax) on entrepreneurial activity. Using more recent data covering the period from 1989 through 2000, they found that marginal and effective tax rates for corporate income, personal income and sales taxes did not have statistically significant impacts on state entrepreneurship rates. However, other key aspects of state tax policies were found to be important determinants of the observed level of entrepreneurial activity.[14] States with more balanced tax portfolios, and those which relied less heavily on sales taxes in

[13] Georgellis and Wall (2000) developed the theory and empirical methods which are the foundation for this more recent paper, but the focus in the earlier paper was on British data and no regional tax policy variables were considered.

[14] Important non-rate tax policies included such things as rules that require multi-firm companies to file a "combined" state tax return, rules allowing the formation of limited liability corporations, and a measure of progressivity within the personal income tax.

particular, tended to have higher rates of entrepreneurial activity.

To summarize, while magnitudes, signs, and statistical significance levels have been anything but conclusive, the previous literature suggests that tax policies can be important determinants in the decision to work for one's self. However, whether the impacts found in these studies pertain to "entrepreneurship" as opposed to "self-employment" is less clear. This distinction is important because the normative implications differ significantly depending on which activity is being influenced by policy. Unfortunately, distinguishing between the two activities may be difficult given that both likely respond to tax policy. Indeed, there are clues provided in the research presented to this point which suggest this is the case. The fact that previous research suggests 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, results which suggest that individuals start their own businesses to avoid taxation imply a response in terms of activity that would almost certainly be classified as "self-employment". It is clear from this discussion that more research on this topic is needed to better understand the various mechanisms available to policy makers and to determine the precise nature of the responses to policy. Given the interpretation of results, one step towards achieving this goal is to develop a better understanding of the factors that influence tax non-compliance among the self-employed. We characterize the current state of knowledge with respect to this issue in the next section.

3. Entrepreneurship and Tax Non-Compliance

The self-employed have numerous opportunities to evade taxes, so tax policy makers undertake a difficult balancing act when developing tax policy towards self-employment. A

system of taxation that encourages entrepreneurial activity can be a "double edged sword." For example, a system of differential taxation may result in the desired outcome of increased entrepreneurial activity. However, such a tax system is also likely to raise the potential for tax non-compliance. A reduction in tax liabilities among those in the self-employment sector that is, for instance, financed through an increase in taxes in the wage sector raises the marginal benefit to self-employment for those wishing to engage in *entrepreneurial* activity but also increases the marginal benefit to self-employment for those whose intent is *tax avoidance or evasion*. As indicated above, the empirical evidence suggests that tax avoidance is an important consideration in the decision to become self-employed. In addition, there is fairly convincing evidence in the economics literature that suggests that the self-employed are less likely to comply with the tax code (for example, Klepper and Nagin 1989, Feinstein 1991, and Erard 1992). Therefore, an increase in the fraction of the labour market engaged in self-employment will likely result in an increase in overall non-compliance and may require a further increase in tax rates to finance the shortfall.

From an economic point of view tax non-compliance by the self-employed has two potentially distorting effects. First, because those in the self-employment sector are able to avoid tax compliance, while wage workers typically cannot, differences in the net wages paid across the sectors distort the allocation of resources within the economy. Too many resources are allocated to the self-employment sector. Second, with respect to the distribution of the tax burden, horizontal equity is reduced as the tax burden is shifted to those who are unable to avoid taxes (such as wage earners) or choose to abide by the tax laws. In turn, this may undermine individuals' perceptions of the fairness of the tax system and result in a deterioration of tax morale. In this scenario a vicious cycle is created with ever increasing non-compliance.

In this section we exam two strains of literature pertaining to tax non-compliance by the self-employed. First, we examine the few papers in the literature that estimate the magnitude of non-compliance by self-employed individuals. Estimates of non-compliance among the self-employed provide a gauge to determine the likely magnitude of the distortions caused. Second, we examine the evidence regarding the factors that influence the degree of non-compliance among the self-employed. This research may provide insights into how tax policy can be designed to avoid non-compliance. There is a relatively well established literature that examines the broader issue of general tax compliance and the impact of tax policy on compliance. Our intent here is not to review this literature, but to concentrate on research whose focus is non-compliance among the self-employed.

Indeed, there are many papers in the literature that attempt to estimate underground activity at the aggregate level[15]. However, these studies do not identify the non-compliance activities of the self-employed. There are two primary sources of microdata that have been utilized to investigate non-compliance by the self-employed. These are tax audit data and household expenditure data. We are aware of only two countries that collect and make available data from tax audits on a regular basis; the United States and New Zealand. Through the Taxpayer Compliance Measurement Program (TCMP) the US Internal Revenue Service publishes estimates of the difference between federal tax liabilities reported and assessed liabilities owed by individuals and corporations (the "tax gap"). Under the TCMP a stratified random sample of individual and corporate income tax returns are subjected to intensive audits. Estimates based on these audits are produced and published by various groups. For example, a breakdown by major component of the tax gap by the US General Accounting Office (1990) suggests that corporations and the self-employed accounted for $45 billion of the estimated $85

[15] For a comprehensive review of these approaches in an international context see Schneider and Enste, 2000.

billion tax gap in 1987. 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 is non-trivial. In addition to providing aggregate estimates of non-compliance among the self-employed, the TCMP and similar data collected by the New Zealand Inland Revenue Department (the "ORACLE" database) have been utilized to identify the various factors that influence non-compliance. We return to these studies below.

One short-coming of the audit data is that it may not be very reliable. Estimates of non-compliance based on audits 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. In addition, as noted above, such audit data are not widely available.

A unique approach to estimating non-compliance by the self-employed that uses household expenditure micro-survey data was developed by Pissarides and Weber (1989). Essentially, a prediction of the relationship between household food consumption and after-tax income, controlling for household characteristics was obtained in the first stage. In order to obtain an undistorted estimate of the marginal propensity to consume food, the data was 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 was used to impute estimates of "true" income for self-employed households, which, when compared to reported income, provided estimates of non-compliance.

Pissarides and Weber (1989) applied this approach using expenditure data from the UK for 1982 and found that, on average, true self-employment income was one and a half times that of reported self-employment income. They concluded that their estimate implied that non-compliance among the self-employed accounted for 5.5 percent of GDP in that year. Baker (1993) replicated their analysis using the same expenditure series from the UK for the years 1978 to 1991 and found results that were similar to Pissarides and Weber[16].

Interestingly, this approach has been applied using data from a number of countries. Mirus and Smith (1996) and Schuetze (2002) applied this expenditure approach using data from Canada and Apel (1994) using data from Sweden. Mirus and Smith used the 1990 Canadian Survey of Family Expenditures and estimated that Canadian self-employment incomes were under-reported by about 12.5 percent and that non-compliance accounted for around 2 percent of GDP in that year. Schuetze (2002) examined several years of expenditure data from Canada between 1969 and 1992 and disaggregated the estimates of non-compliance across several dimensions. His average estimate of non-compliance among the self-employed in 1990 was significantly higher, at 18 percent, than that of Mirus and Smith. Schuetze attributed the difference to the fact that Mirus and Smith included part-time workers in their sample while his sample was restricted to full-time workers. Nonetheless, the estimates for Canada appear to be much lower than those for the UK. Apel (1994) applied the approach using data from the 1988 Swedish Hushallens utgifter (HUT) family expenditure survey and found results that differed from those in the UK and Canada. Apel (1994) estimated the degree of under-reporting in Sweden in that year to be somewhere between that in Canada and the UK at approximately 35

[16] More recently, Lyssiotou, Pashardes, and Stengos (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.

percent. However, because of the relatively low rate of self-employment in Sweden in that year, non-compliance among the self-employed was estimated at 1 percent of GDP.

These expenditure-based estimates of non-compliance among the self-employed are consistent with those using tax audit data in that both suggest that the distortions caused by tax non-compliance by the self-employed are likely significant. In addition, the variation in estimates across countries indicates that country specific factors, including tax systems and other institutional factors, play a role in determining the extent of non-compliance by the self-employed. We turn our attention next to research that sheds some light on the factors that influence non-compliance by the self-employed. Once again, while several studies examine the determinants of non-compliance in a broader context (see, for example, Andreoni, Erard, and Feinstein 1998, and Slemrod, 1992), we focus specifically on the self-employed.

A small number of papers, using both tax audit data and expenditure data, directly examined the relationship between measures of non-compliance by self-employed individuals and various factors thought to influence non-compliance. One of the first to do so by Clotfelter (1983), utilized a single year of TCMP audit data and examined the impact marginal tax rates and after-tax income levels had 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 and incomes across individuals for identification, he found that marginal tax rates and after-tax income had a positive effect on under-reporting among the self-employed.

Joulfaian and Rider (1998) noted that there was substantial variation in the US rates of compliance across sources of self-employment income; proprietorship, royalty and rent income. They suggested that this variation may have been due to differences in detection probabilities or

to differences in the tax treatment of the source of income. In particular, they noted that tax liabilities on sole proprietorship income were higher than other sources in the US over the period examined. Utilizing pooled TCMP data from 1985 to 1988, they took advantage of variation in the tax code across types of business and across time[17] to identify the impact of marginal tax rates on the income gap. They found that, controlling for the audit rate, an increase in the marginal tax rate had a positive impact on the income gap. In particular, their estimated elasiticity implies that a 10 percent increase in the tax rate would have resulted in a 5 percent increase in the amount of income under-reported. Further, they found that audit rates had a negative impact on the amount of income under-reported.

Giles (2000) used data from the 1993 to 1995 New Zealand ORACLE firm audit database and examined the impact of various firm characteristics on avoidance, evasion and compliance. In a series of limited dependent choice model regressions he examined whether or not firm size, industrial sector or firm efficiency were related to the probability that an audit reveals a firm is engaged in avoidance or evasion. He found that smaller firms were less likely to comply with the tax rules. This may be due to the fact that larger firms likely have more options to avoid taxation without evading or that larger firms have greater resources, including access to tax specialists and lawyers, and avoid fewer violations of the tax code as a result. Even when larger firms do not comply with the tax code their violations may be much harder to detect. In addition, he found significant differences in the probability of compliance across industrial sectors and that more "efficient"[18] firms were more likely to comply with the tax code.

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

[17] The period examined straddles major changes to the US tax code which occurred in 1986.
[18] Giles' (2000) proxy for efficiency was the activity ratio (sales divided by net assets).

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) utilized data from the UK and Canada, respectively, to provide industry level estimates of under-reporting among the self-employed. Both found significant variation in the fraction of income under-reported by the self-employed across industries. Further, estimates presented in US General Accounting Office (1990) also show variation in non-compliance across industries in the US. Schuetze (2002) suggested that this result is consistent with the hypothesis that an entrepreneur's opportunity to conceal income varies across industry characteristics. Industries that provide services through informal arrangements, frequently involving cash transaction, he argued, provide greater opportunities for under-reporting.

Finally, Schuetze (2004) provided evidence that the choice of taxation unit (individual versus household) likely influences the extent of non-compliance by the self-employed. He showed that, under individual taxation with progressive marginal tax rates, households in which the distribution of income among household members is unequal benefit from the ability to "split income" by attributing income to the lower income household member. Because of a third party reporting income in the wage sector, this opportunity is typically only available to the self-employed. Utilizing exogenous variation in the codes across Canada and the US (the tax unit is primarily the individual in Canada and the household in the US), he estimated the extent of income splitting in Canada for a number of years between 1988 and 1998. He found evidence that a significant number of Canadian self-employed households engage in income-splitting. This is achieved by attributing wage earnings to the lower income spouse. He estimated that nearly half a billion Canadian dollars in taxes were avoided in 1998, a significant fraction of overall economic activity in Canada in that year.

In summary, it appears that income tax non-compliance by self-employed individuals, while varying significantly by country, is a significant concern and may result in considerable economic distortions. The issue of tax non-compliance is one that should be given serious consideration by tax policy makers, particularly as attempts are made to encourage entrepreneurship. Research suggests that country specific characteristics as well as tax policies influence the magnitude of the non-compliance problem. Country specific factors such as firm size and industrial composition make it more or less likely that a given tax system will result in significant non-compliance. The choice of the individual as the unit of tax, reducing overall marginal tax rates and increased audits are all options available to reduce non-compliance.

4. Conclusions

We have summarized several of the key findings in the literature regarding the relationship between tax policy and self-employment. Researchers have made some progress and have added to our understanding of the sometimes intricate interactions between policy and labour market outcomes. However, much more research is needed to enable policy makers to design effective and efficient tax policy towards business that avoids the pitfalls associated with non-compliance. In this final section we aim to guide policy makers and researchers by discussing possible policy conclusions and by identifying areas of research in which the most important "gaps" in the literature still exist.

Given the inconclusive nature of the research to this point, it would be an understatement to suggest that any policy conclusions that may be drawn from the results are tentative. Nonetheless, a number of trends have appeared that suggest a certain course of action and that question conventional wisdom. The fact that self-employment appears to increase with income

tax rates calls into question the common view that high taxes hamper self-employment. Whether it is desirable or not to increase self-employment in this manner is a separate question, which depends on whether individuals in these studies are responding to increases in risk-sharing or the marginal benefit of evasion. Unfortunately, the literature to this point provides little guidance in answering this question. To be certain, the prevalence of tax evasion among the self-employed, while varying with country-specific factors, should be taken into account in the design of tax and auditing systems. As long as tax evasion among the self-employed is not eliminated, second best considerations may result in tax rates for the self-employed which are higher than those among wage earners. Nonetheless, from this perspective, the literature appears to provide little support for the common view that taxes should be lower for the self-employed. That said, identifying the appropriate tax rate differential will require policy makers to weigh these results against the equally important efficiency and horizontal equity considerations.

While there are very few papers examining the impacts of the progressiveness of the tax system on self-employment, the results of these studies may offer some guidance to policy makers. If the finding that more progressive taxes reduce risky activities such as self-employment is correct, it suggests that reducing progressivity and extending loss offsets to small businesses may be beneficial. On the surface, this strategy appears to better target those individuals for whom risk, as opposed to tax avoidance, is the important determinant in the decision to become self-employed. However, these strategies will also likely alter the marginal benefit of evasion or avoidance. Like the proposal on differential taxation, the argument for less progressive taxes must be weighed against distributional and efficiency considerations.

With the difficulties of designing an effective self-employment tax policy in mind, we now identify what we believe are the key gaps in this literature. Regarding the empirical literature on

the impacts of taxation on self-employment we suggest a number of key areas for future research. First, given the mixed results on this topic, it is likely that identifying and determining the relative importance of changes in "average return" and "risk" that arise from changes in tax rates is key to determining the underlying impact of tax rates on self-employment. The studies conducted to this point have examined very diverse tax events that entail substantially different changes in the combination of expected return to self-employment and extent of government risk-sharing which may explain the varied results. On the same topic, more work needs to be done at the national and sub-national levels to look more comprehensively at the impacts of tax systems. Lastly, more research needs to be conducted to identify the impacts of taxation on the duration or survival of self-employed ventures. Most of the work to this point has focused on the relationship between taxation and the existence of or entry into self-employment activity.

Perhaps most important for policy makers, greater knowledge is required about the relationship between self-employment and tax avoidance or evasion. Development of a theoretical model that captures the elements of risk and non-compliance, together, would likely be useful in this regard. The goal would be to identify factors that influence an individual's decision to be more "entrepreneurial" while not encouraging entry into the self-employment sector among individuals attracted by the ability to avoid taxes. Short of this, it is nonetheless clear that more information on the factors that influence self-employed individuals to evade taxes is needed. A great deal of research has examined the relationship between taxation and economy-wide noncompliance, however, the decision to evade taxes in self-employment is likely very different from, for example, the decision to become employed "under the table". An example is the lack of knowledge pertaining to the impact of audit rates or penalties on the self-employment decision.

Finally, much of the research to this point has focused on the relationship between income and/or payroll taxes and entrepreneurship. Very little is known about the impacts of other methods of taxation, such as consumption taxation, on self-employment and non-compliance[19]. While there has been much discussion in the public economics literature regarding the broader issue of optimal tax systems, fundamental uncertainty remains regarding the relative impacts of various tax options on self-employment and compliance[20]. A better understanding of this issue would help to ensure that policy makers are able to make informed tax policy decisions and that the intended outcomes are achieved.

[19] A recent paper by Hubbard (2002) is an exception. This paper examined differences between income and consumption taxes and the relative impacts on capital investment.
[20] For a discussion of compliance and administrative issues surrounding tax reform see Gale and Holtzblatt (2002)

Table 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
	Fairlie & Meyer (1998)	0	no regressions	1910-90	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
	Moore (2003)	-	marginal and average	1983-2001	US

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