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## Income taxes and the motivation to work: A review

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### Abstract

Research on the impact that income taxes have on the motivation to work has a rich history using a variety of methodologies. In this paper, we attempt to connect the various streams of research, showing how the conclusions are the same and where they differ to give researchers a starting point for future research. The literature review groups previous studies into (i) traditional theoretical and empirical archival approaches, (ii) survey and observational studies, (iii) experimental evidence, (iv) general equilibrium models and cross-country research, and possibilities for future research. The present study concludes that the effect of income taxes on the motivation to work cannot be explained by elementary economic theory, such as income and substitution effects. It is argued that an individual's preference for work and leisure can also be affected by how those effects are applied and described. It is not only income taxes but also the preference for work or the culture of leisure in the country of origin that substantially affect the motivation to work.

### Keywords

income tax, motivation to work, labour-leisure trade-off, labour-leisure preference

**JEL Classification:** H24, J22.

# Income taxes and the motivation to work: A review

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## 1. Introduction

Although personal income taxes first appeared in the United Kingdom in 1799, they did not become a permanent fixture in Europe and the United States until the end of the 19th century and the beginning of the 20th. Economists in the early 20th century started to ponder the effect of these “new” income taxes on workers' incentives to supply labour.

In this paper, we will review the research on the relationship between income taxes and the motivation to work, starting with (i) traditional theoretical and empirical archival approaches, (ii) survey and observational studies, (iii) experimental evidence, and (iv) general equilibrium models and cross-country research.

## 2. Literature Review

### 2.1 Traditional theoretical and empirical archival approaches

Traditional economic research usually explains the impact of income taxes on the motivation to work based on after-tax wages, non-labour income, and various demographic characteristics. Traditional approaches discuss what is referred to here as “the motivation to work” using terms such as “work effort”, “incentive to work”, and “labour supply”. The assumption implicit in referring to these as “the motivation to work” is that individuals have some capability to control the amount of work they supply or perform over a period of time. Although there is some debate about how much flexibility workers have in controlling the amount of labour supplied at the individual level, the ease with which this is possible is discussed in further detail in the section on traditional studies. These traditional approaches refer to the trade-off and choice between leisure and income when they measure the effect of income taxes on the motivation to work. Early theoretical studies in this area reach conflicting conclusions (Pigou, 1920; Knight, 1921; Robbins, 1930; Hicks, 1939). Their arguments suggest that income taxes can have a negative, positive, or no effect on the motivation to work.

Despite this lack of clarity, their works are accepted as the seminal works on the income and substitution effects. The income effect increases the demand for work, while the substitution effect, the price effect at the margin, decreases the demand for work. Which effect will dominate can only be determined if the demand schedule for leisure is known at every income level.

Cooper (1952) objects to the traditional economic approach, because of the possibility that subjects have limited freedom of choice concerning their willingness to work. If subjects have no control over the number of hours they work, then perhaps testing the effect of taxation on the number of hours worked is unimportant. According to Cooper (1952), if this objection is valid, then there is no need to test the influence of taxation on the “incentive” to work. He considers individuals to be free in their choices and assumes in his analysis a simple utility equation that these individuals are rational and aware of the consequences of a given tax structure for them, and they are not motivated by patriotic feelings, or by a “money illusion”. He concludes that the effect of increasing tax rates would depend on different income levels. The implication is that some individuals will choose to work more, while others will choose to work less. The analysis of Gilbert and Pfouts (1958) differs from that of Cooper (1952) as it introduces the concept of unearned income into the analysis. Unearned income raises interesting possibilities in the study of taxes and the demand for work or leisure. Gilbert and Pfouts (1958) give an example of a worker in a family where both the husband and wife work. In that case, one spouse might assume the income of the other as unearned income. Gilbert and Pfouts (1958) suggest empirical evidence is necessary to test whether there is a negative relationship between the net wage rate (after the imposition of taxes) and hours worked.

### 2.2 Survey and Observational Studies

Early studies in this area tried to explain the impact of taxes on the motivation to work using pure economic principles and assumptions (Knight, 1921; Pigou, 1920). Their findings were inconclusive, indicating that taxation can have a disincentivizing, incentivizing, or no effect on the motivation to work (Cooper, 1952; Robbins, 1930). Two fundamental assumptions

of this work are that individuals have unlimited willpower, and that they optimally maximize their utility (Alm, 2010). Almost all of these studies start with a simple labour supply model with standard economic theory. This theory contains two well-known principles, the income and substitution effects, which were introduced in the previous section. They indicate that the income and substitution effects work in opposite directions without being able to show which one dominates. Thus, the theoretical view struggles to explain the relationship between taxes and the motivation to work, leading to the conclusion that empirical evidence is necessary to fully understand the relationship between taxes and the motivation to work (Hausman, 1985; Pencavel, 1986).

Research using survey methods followed the groundwork laid by theoretical studies based on traditional economic principles. These studies expanded the factors that explain the relationship between taxes and the motivation to work by introducing psychological explanations (Lewis, 1982).

Survey work in this area began in the early 1950s with the second report of the Royal Commission on the Taxation of Profits and Income (1954), which surveyed 1,429 industrial workers in England and Wales. The workers were able to change the amount of work they supplied because of overtime opportunities or work paid for on a piecework basis with some minimum guarantees. The Royal Commission found a disincentivizing influence of income taxation on the amount of labour supplied. After the Royal Commission survey, economists started to collect information from taxpayers who were more knowledgeable about the tax burden. In a review article by Villard (1952), the work of Sanders (1951) is analysed. Villard reports that Sanders (1951) interviewed approximately 160 business executives in the USA. Sanders found that business executives worked as much as possible despite income taxation. This was because most of the executives surveyed were salaried employees working under direct supervision in a large corporation, and even if there was no opportunity to change the number of clock hours of work, they did not admit to decreasing their work effort during such hours. Sanders concludes that non-financial incentives outweigh the financial disincentives of income taxes. According to Rosen (1976), the most influential of the survey studies is Break's (1957) survey of 306 solicitors and accountants in England, who were either a partner or owner of their business. Break's subjects of solicitors and accountants had more flexibility in setting their hours, and therefore in responding to high tax rates. These respondents did not mention high taxes as having a disincentivizing effect on their professional efforts. The policy implication of Break's (1957) study is that income taxes can be increased for middle- and

high-income earners without affecting the number of hours that they work. Barlow et al. (1966) are similar to Break (1957) and have comparable findings. Barlow et al. (1966) surveyed 957 affluent Americans with an annual income of \$10,000 or more. Around seven-eighths of the sample said that they did not shorten the amount of work they performed because of progressive income tax rates. The main group reporting a disincentivizing effect of taxes were people aged under 65 without dependent children, who had a chance to work more but did not. Barlow et al. (1966) suggest that there are other work-related motivations besides after-tax wages, such as a sense of belonging, a sense of power, social status, and the satisfaction of meeting self-imposed standards of performance. In their study, the work motives are divided into two groups: monetary income (after-tax wages) and non-monetary income (the aforementioned motives). The authors conclude that non-monetary incentives affect the motivation to work more than taxes for high-income earners.

Fields and Stanbury (1971) employ almost the same technique as Break (1957), surveying 285 solicitors and chartered accountants in the United Kingdom. Contrary to Break (1957), Fields and Stanbury (1971) find that taxes have a disincentivizing effect, concluding that the disincentivizing effect of income taxation has increased over time. They suggest that future research with more comprehensive survey information could help economists measure precisely the effect of taxation on the incentive to work. Using an extensive survey, Brown and Levin (1974) tested the incentivizing and disincentivizing effects of income taxes on the amount of overtime worked by 2,139 respondents in the United Kingdom. In their nationwide survey, workers that were paid weekly responded to questions about taxation and work effort. They found a small effect of income taxes on the amount of overtime worked, but 75% of respondents claimed that taxation did not make them work more or less overtime. Strong conclusions cannot be drawn from their study, because they do not control for other factors that might affect work effort. Therefore, they do not know whether their findings are due to economic, demographic, sociological, or psychological factors. Holland (1977) surveyed 125 executives in the USA. His findings indicate that 15% of the sample would have liked to have worked harder if the marginal tax rate had been set to zero. Calderwood and Webley (1992) use a survey to study 153 workers in South-West England. Using a hypothetical change in the tax rate, subjective estimates, and assessment of reactions to 1988 UK tax changes, Calderwood and Webley (1992) found that respondents showed significant ignorance of how taxation affected them. They conclude that income taxes are not very salient for

people in the United Kingdom, and income taxes are a very small component of the motivation to work. Calderwood and Webley (1992) suggest that taxation can be more salient in countries where individuals are involved intensively in the tax assessment and collection process.

The next methodology economists use to study the relationship between income taxes and the motivation to work is referred to as “observational studies” (Hausman, 1985; Pencavel, 1986; Killingsworth & Heckman, 1986; Blundell & MaCurdy, 1999; Meghir & Phillips, 2009; Keane, 2011; Saez et al., 2012; Manski, 2014). In this case, observational studies include cross-sectional or between-country analysis, as well as within-country analysis. While survey-based research in this area focuses primarily on the disincentivizing effects of income taxes on two economic groups, namely low-income and high-income earners (Hausman, 1985), observational studies concentrate on other groups such as single parents and married women, and particularly women married to unemployed men (Dilnot & Duncan, 1992; Ermisch & Wright, 1995; Dilnot & Kell, 1987). Most observational studies find that men are less responsive to tax rate changes, while married women and single mothers respond strongly (Meghir & Phillips, 2009).

Based on these observational studies, it can be inferred that an appropriately chosen utility-maximizing model for certain societal groups can offer reliable behavioural insights into the relationship between income taxes and the motivation to work. However, there is a criticism from Alesina et al. (2005) over the divergence between within-country and cross-country estimates of the labour supply. They add that high marginal labour tax rates are correlated with many other factors that can reduce working hours, such as generous welfare systems, workplace regulations, unemployment compensation programmes, and powerful unions. Therefore, using between-country models does a better job of capturing the true effect of labour tax rates on labour supply. In the following section, the cross-country literature on taxes and hours worked will be discussed.

### 2.3 Experimental evidence

In the economic literature on taxes, behavioural aspects seldom play a prominent role (Fochmann & Weimann, 2013). There are significant differences between the theory and the experimental evidence of the behavioural aspects of taxes. A central assumption in economics is that individuals maximize or optimize their utility and react to tax changes similarly to how they respond to price changes (Ramsey, 1927; Mirrlees, 1971; Atkinson & Stiglitz, 1976; Chetty et al., 2009). Each individual, referred to as “economic man”, is assumed to be rational and purely self-

interested, and to have unlimited willpower (Alm, 2010). The basis for elementary economic theory is the income effect and the substitution effect. Experimental evidence of tax behaviour demonstrates that this elementary economic theory, the income and substitution effects, about the behaviour of individuals may not hold in reality. Considerable evidence from behavioural economics shows that individuals do not always behave like the assumed “economic man” (*Homo economicus*).

Previous studies in experimental laboratories tried to test the standard neoclassical economic theories of human behaviour (Swenson, 1988; Sillamaa, 1999a, 1999b, 1999c). However, most of them had their own approach to studying the relationship between taxes and the motivation to work. For example, in the experiments of Swenson (1988) and Sillamaa (1999a, 1999b, 1999c), a work-leisure decision was constructed in the laboratory by offering subjects newspapers and computer games they could use instead of working. This kind of experimental design is not the same as the work-leisure decision workers face outside of the laboratory. In real work-leisure decisions there are no time restrictions, the subjects are not students (they do not have the lower financial status that students have), and they must decide about both their work effort and the total time they spend working (Fochmann et al., 2010). Alm (2010) adds that much of the early work in experimental economics suffered from a lack of realism because the experimental procedures and design of work-leisure trade-offs were not reflective of real-world values.

In the studies by Swenson (1988) and Sillamaa (1999a, 1999b, 1999c), only the substitution effect between work and leisure is tested, because tax revenues are completely redistributed, removing the income effect entirely. This is related to the Lindbeck (1982) theorem that if taxes on earned income are replaced by non-income-related lump-sum taxes, then the motivation to work will increase. Swenson (1988) has mixed findings, including some general support for the theorem proved by Lindbeck (1982) that taxes on earned income to finance transfer payments lead to a decline in the motivation to work. However, at the same time, his findings were partially contradictory to Lindbeck’s theory, which might be because of some weaknesses in the experimental design (Sillamaa, 1999c). Sillamaa (1999c) replicates Swenson’s experiment but corrects the flaws in the design and finds strong evidence for Lindbeck’s (1982) theoretical prediction. Sillamaa uses this finding to assert the importance of experimental replication. In the same way, Sutter and Weck-Hanneman (2003), Ottone and Ponzano (2007), and Ottone and Ponzano (2011) confirm their experimental results.

Moreover, Sillamaa (1999b) tests another theorem presented by Phelps (1973), Sadka (1976), and Seade (1977) that marginal tax rates of 0% can increase the motivation to work of top income earners. The literature on optimal taxes emerged in the 1970s and includes Mirrlees (1971), Atkinson and Stiglitz (2015), Tuomala (1984), and Kanbur and Tuomala (1994). The logic behind the idea of 0% marginal tax rates is that if the top income earners are allowed to earn more, then they will have increased utility from working harder. This is because their work is more valuable if there are no taxes, and the gain to society will be substantial. The experimental findings of Sillamaa (1999b) support the predictions of the optimal tax literature. Sillamaa (1999a) emphasizes the distinction between linear and non-linear tax functions and finds that tax flattening increases the motivation to work.

Unlike early studies in experimental economics, more recent research on tax framing and salience have shed new light on the tax behaviour field. For example, the earlier approaches of Sillamaa (1999a, 1999b) used neutral framing (only net wage rates) and did not mention explicit tax framing. A growing body of laboratory experimentation demonstrates that after income taxes are imposed, an individual's preference between leisure and work is not only a function of these income taxes (income or substitution effect) but also how they are applied and described (McCaffery & Baron, 2004; Gamage et al., 2010; Djanali & Sheehan-Connor, 2012; Houdek & Koblovsky, 2015). Field experiments indicate that individuals react less to taxes when they are hidden (Chetty et al., 2009; Finkelstein, 2009; Cabral & Hoxby, 2012; Jones, 2012). As might be expected, recent laboratory work finds that individuals respond more to taxes when they are more salient (Sausgruber & Tyran, 2005; Blumkin et al., 2012). Fochmann et al. (2013) find a contradictory view when compared to previous studies that individuals with higher gross wages respond less to higher taxes because of a "net wage illusion". The "net wage illusion" is the belief of individuals that their net wage will be higher due to a higher gross wage. Weber and Schram (2017) report results similar to those in Fochmann et al. (2013). Contrary to the prior salience literature, Kessler and Norton (2016) hold subjects' net wages explicitly constant by using two designs, a decreasing gross wage and by introducing new taxes on labour income. They find that individuals react more to taxes on labour income than to an equivalent decrease in wages. However, as Fochmann et al. (2013) say, they cannot test the income effect in their analysis because the net wage (after-tax income) was held the same across conditions.

Other experimental studies examine the effect of taxes on the motivation to work by extending the tax salience and price partitioning literature to a work effort context (Hayashi et al., 2013). Hayashi et al. (2013) integrate price description from the robust marketing literature into labour supply models. Partitioned pricing is a largely unexplored area in the tax behaviour literature. Hayashi et al. (2013) explain that individuals do not adjust their behaviour due to wage-framing effects. Compared to the anchoring hypothesis, their hypothesis has a contradictory view. According to the anchoring hypothesis, it can be supposed that individuals work more when wages are presented as a base price and minus a tax. Many researchers have stressed that individuals mainly "anchor" on the base price, and they cannot adjust their behaviour to any surcharges. Put differently, if individuals anchor on the base wage and underestimate the surcharges like taxes, then they should work more when they have a higher base minus a tax than equivalently a lower base plus a bonus or tax credit. However, their findings with documenting partitioned pricing tell us that the motivation to work is reduced when there is a lower base plus a bonus or tax credit than when there is a higher base minus a tax. They recognize that the motivation to work is sensitive to wage framing, but on the other hand, their argument is that when they show all-inclusive wages in a salient way, the wage-framing effects disappear. This means that the wage-framing effects do not come from deep preferences but are more related to cognitive limitations, particularly with the responses to complexity.

Keser et al. (2015) use three different scenarios in their experimental design: the Leviathan scenario (Brennan & Buchanan, 1980), the redistribution situation, and a global public good. In the first, the Leviathan scenario, tax revenues are not distributed to taxpayers but are eaten up by bureaucracy. At the other extreme, the redistribution scenario, tax revenues are directly distributed to taxpayers. The global public good scenario refers to the intermediate situation, where there are no direct transfers from tax revenues to taxpayers. Surprisingly, participants show a positive work effort at a 100% tax rate in the Leviathan scenario. However, their findings support those of Laffer (1974) that individuals react to tax rates greater than 50% and which reduce their motivation to work. As tax rates increase, individuals will try to withdraw work from the market or consume untaxed leisure (Levy-Garboua et al., 2009). Keser et al. (2015) relate their evidence to unfair taxation.

Levy-Garboua et al. (2009) indicate that the relationship between taxes and the motivation to work is related to both behaviour and emotion. Examining the relationship between taxes and work effort, they control for income and substitution effects by includ-

ing work productivity level. Their findings show that the substitution effect dominates the income effect at both high- and medium-productivity levels. However, they state that the findings might be an artefact of the selectivity bias of their experimental design.

Additionally, it is conceivable that cultural, political, and moral reasons can affect work/leisure preferences (Kirchler, 1998, 2007; Hardisty et al., 2010; Sussman & Olivola, 2011). Recent experimental studies on tax behaviour show that income taxes can enhance the motivation to work (Rick et al., 2017). In a real-effort laboratory experiment, Rick et al. (2017) find that individuals react to income taxation with their own attitudes towards redistribution and government intervention. Individuals who prefer both of them find taxes motivating for their work effort, while everyone else finds income taxes demotivating.

To sum up, in the experimental literature, there are different foundational disciplines that examine the effect of taxes on the motivation to work. Therefore, it is important to take into consideration the different classifications of tax behaviour in the literature when analysing the effect of taxes on human behaviour. These include the perception of marginal tax rates, tax complexity, tax aversion in labour supply, taxation and incentives to work, tax salience, tax morale and fairness, and fiscal illusion. Each of these behavioural perceptions related to taxes is unique, and the foundational disciplines must be considered before comparing the results (Fochmann et al., 2010).

#### **2.4 General equilibrium models and cross-country research**

Income taxes and the motivation to work has been the topic of many studies that use macroeconomic approaches to explain the differences in hours worked between countries (Dalamagas & Kotsios, 2012). While some of the studies have employed cross-country research, others have adopted numerical experiments (quantitative macroeconomics), which is a calibration of a general equilibrium model. A growing literature in numerical experiments (quantitative macroeconomics) started with the contribution of Prescott (2004), who constructed a representative agent neoclassical growth model with labour and consumption taxes to observe how individuals share their time between work and leisure. In the model, market work is considered to be work in the legal market for production that is taxed, whereas leisure includes ordinary leisure activities as well as home production and work activities in the shadow economy, which are not taxed. According to the neoclassical growth framework, economies are expected to work less efficiently when non-market activities dominate market activities. Such a model provides a quantitative tool for explaining the relationship between taxes and

time devoted to market work. Predictions derived from the general equilibrium models were subsequently tested with cross-country research. One should bear in mind that these studies are mixed in the literature and interconnected with each other. Prescott (2002, 2004) tested the importance of effective marginal labour tax rates on labour supply for the major advanced industrial countries, including all G7 countries for the periods 1970-1974 and 1993-1996. His macro evidence is that welfare gains such as better retirement systems can be high if countries with high tax rates decrease their effective marginal tax rate on labour income. Prescott (2004) finds that asking people to save for retirement will not decrease the labour supply in the same way that using tax revenue for retirement systems does. This concept is reinforced by many scholars (Davis & Henrekson, 2004; Ohanian et al., 2008). Nevertheless, the findings of Prescott (2004) have been criticized by other scholars because of a potential omitted variable bias (Alesina et al., 2005). Alesina et al. (2005) mention that the calibration approach used in Prescott's 2004 study can produce misleading results because this theoretical view does not include other factors that can affect working hours. First, it was acknowledged by Davis and Henrekson (2004). Then, confirmation of this criticism from Alesina et al. (2005) stimulated an emerging literature of cross-country studies on taxes and hours worked by incorporating other institutional and fiscal variables. Alesina et al. (2005) note that omitting these country-specific factors can create bias in the results and conclusions. The narrative favoured by Alesina et al. (2005) is that strong unions, generous benefit systems, and social democratic governments make taxes high, which eventually leads to fewer working hours. Even though other scholars did not widely accept the study of Prescott (2004), his calibration approach with general equilibrium models has been applied to different countries to measure the effect of taxes on labour supplies. For example, Conesa and Kehoe (2005) find that 80% of the reduction in hours worked in Spain from 1970 to 2000 can be explained by the evolution of taxation. They test their model with France over the same period, and the findings confirm their results. Contrary to Prescott (2004), Rogerson (2007) argues that taxes alone cannot explain the differences in hours worked across the US, Continental Europe, and Scandinavia. Adding Scandinavia to the G7G7 countries examined previously, he finds that differences in the types of government expenditures can account for the elasticity of hours worked between countries. Silva (2008) proposes a model that predicts the relationship between taxes and hours worked for Portugal, the United Kingdom, France, Spain, and the United States for the periods 1970-1974, 1983-1986, 1993-1996, and 2000-2002. He concludes that taxes

explain large differences in the number of hours worked. Applying Prescott's approach to Australia, Hallam and Weber (2008) show that increases in labour taxes temporarily decreased hours worked in the 1980s, but there is little change in the long run. Using both a numerical experiment and a cross-country study, Ohanian et al. (2008) find that a tax wedge explains much of the variation in hours worked across OECD countries for the period 1956-2004. Koyuncu (2011) uses the progressivity of taxes to explain the relationship between taxes and labour supply. The progressivity of taxes is measured by dividing the marginal tax rate by the average tax rate. Koyuncu (2011) finds that a decline in the progressivity of taxes can lead to increased working hours. His finding suggests that in the US, people work more because the progressivity of taxes is less for the periods 1971-1974 and 1986-1989. On the other hand, German people work less because of the high progressivity of taxes for the same periods. The main criticism of his study for the findings of Prescott (2004) and Ohanian et al. (2008) is that their models do not view individuals as heterogeneous. Koyuncu (2011) believes that individuals have heterogeneous time preference characteristics, which makes them have different labour-leisure choices. Using a similar methodology to Conesa and Kehoe (2005), Dalton (2014) finds that the evolution of taxes can account for 76% of the decrease in the number of hours worked over the period 1970-2005 in Austria. Chen et al. (2015) state that labour taxes and unemployment benefits together account for around 75% of the reduction in the labour supply in Europe relative to the USA for the periods 1970-1973 and 2000-2003.

It can be seen from the latest general equilibrium models that they started to emphasize the importance of not only taxes but also other omitted variables, such as the progressivity of taxes (Koyuncu, 2011) and unemployment benefit systems (Chen et al., 2015). Therefore, after Alesina et al. (2005), Faggio and Nickell (2007), Causa (2009), and Berger and Heylen (2011) started to measure the effect of taxes on hours worked in cross-country research to find more reliable answers. Faggio and Nickell (2007) find a contradictory view, especially when they apply the story of Alesina et al. (2005) to Sweden. Despite Sweden having strong unions, generous benefit systems, more social democratic governments, and high taxes, the employment rate, measured as hours worked, is very high. For this reason, Faggio and Nickell (2007, p. F416) say, "Taxes are part of the story, but much remains to be explained." Causa (2009) approaches the story differently, looking more closely at labour force heterogeneity, and finds that high marginal taxes can have a disincentivizing effect on female working hours, but there is no significant effect on male work-

ing hours. The study of Causa (2009) is along the same lines as the labour supply elasticity literature, which is mentioned in the previous section. Using both a fiscal and labour and product market institution view, Berger and Heylen (2011) find support for the fiscal view that hours worked decrease when the labour tax rate increases. The labour and product market institutions have less of a role to play.

Approaching the work of Alesina et al. (2005) and follow-up studies from a different perspective explains why prior studies could not explain why high taxes increase working hours in some countries and decrease them in others. For example, previous studies used many different country groups, such as the Euro area, Nordic, southern European, and Anglo-Saxon countries, to find the answers regarding the relationship between taxes and hours worked, but most of them failed to give a clear picture. In addition, some researchers include home production in the number of hours worked in their models (Olovsson, 2009; Duernecker & Herrendorf, 2018). Following Reid (1934, p. 11), home production can be defined as "those unpaid activities which are carried on, by and for the members, which activities might be replaced by market goods, or paid services, if circumstances such as income, market conditions, and personal inclinations permit the service being delegated to someone outside the household group". These studies are not directly comparable to this research because unpaid home production and the untaxed or "underground" sector of the economy, including tax avoidance and tax evasion activities, are not included in the measures of hours worked used in the empirical analysis. The primary objective of this analysis is to explain the "work versus leisure" choice that workers make and the role that taxes play in their motivation to work).

### 3. Conclusion

Research in the area of income taxes and the motivation to work has primarily relied upon economic explanations for the theory and explanation of results (e.g. the income effect and substitution effect). However, when there have been competing predictions for predicted or observed phenomena, it has been challenging to determine when one might apply instead of the other. Therefore, this paper aims to provide a review of methodological issues related to the stream of research examining the relationship between income taxes and the motivation to work. The review classifies methodologies into four categories, namely (i) traditional theoretical and empirical archival approaches, (ii) survey and observational studies, (iii) experimental evidence, (iv) general equilibrium models and cross-country research. The methodolo-

gies are found to be complementary even though they compete with each other for interest. Testing the relationship between income taxes and the motivation to work requires a few conditions. The review shows these conditions and the following crucial lessons: (a) First, there must be changes in tax rates. A change in tax rates is required for the taxpayers to react to and change their hours worked. The change in tax rates can be thought of as a sort of “natural experiment” to which workers’ reactions can be gauged. However, tax rates within a country change infrequently, making it difficult to collect more than a few data points on how workers react, even with a long time series. In addition, tax reform is often accompanied by other structural or macroeconomic changes. These confounding events make it difficult to determine whether the change in hours worked is due to tax rate changes or other factors. (b) The second condition that is required to test the association between income taxes and the motivation to work is the ability of workers to adjust the number of hours that they work. If this is limited due to the influence of unions, for example, then even if the tax rates change, workers might not alter the number of hours they work. (c) Third, possible psychological factors need to be considered in explaining the relationship between income taxes and the motivation to work. The reason is that even if individuals are free in their choices with respect to the willingness to work, an individual’s choice between leisure and work is not only the function of elementary economic theory (income and substitution effects) but also of how they are applied and described.

(d) In summary, using a between-country instead of a within-country design has the advantages of more tax rate changes and the ability to rule out most confounding events and other factors and to test which control variables mitigate or intensify workers’ reactions to tax rate changes. When testing between countries, there are cultural differences and structural factors such as legal systems, social programmes, and other control variables that add complexity to the natural experiment that exists when countries change their tax rates.

In addition to the above reasons, when the disparity in income worldwide is observed, it is difficult to test the effect of tax rate changes on workers with different income levels within one country. Although there is some within-country variance in wages, it is small compared to the between-country variance. One criticism of previous research, particularly survey studies, is that they focus almost exclusively on the short term. There has been significant criticism of experimental approaches to testing the relationship between taxes and the motivation to work. For example, in experiments, the designs used do not allow researchers to observe the impact of potential taxes on

the motivation to work. Experimental research often suffers from a lack of external validity.

Despite these difficulties, future research in this area will likely focus on behavioural explanations, even if it is only to determine which economic theory applies under particular circumstances. Future research on taxes and the motivation to work will also likely examine the concept of leisure. Leisure is more than just rest: it contains purposeful elements and goals, apart from work. Currently, leisure is generally interpreted as hours not working. However, some of this “leisure” time is spent doing unpaid work such as household chores, cooking, shopping, and home repairs, and less enjoyable leisure activities such as eating, bathing, and sleeping. Disentangling the utility from the different types of leisure can help determine the cost of leisure and how the substitution effect applies across different individuals and cultures.

In summary, although we know more about income taxes and the motivation to work, future research is required.

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