# Labour Supply Issues Related to a Basic Income and Income Assistance

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**Author Note**

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**Abstract**

In this paper, I assess the various claims made about how a basic income (BI) would affect paid work. Proponents of a BI argue that a BI would reduce the welfare wall and make it easier for people with low income to choose to work. Opponents tend to be concerned that a BI could induce a large-scale withdrawal from paid work and/or a reduction in the hours that people work with potentially problematic consequences for the productivity of the economy.

In the first section, I discussion of the theoretical issues related to a BI and work, pointing out that both proponents and opponents could be right in different ways at the same time. In that discussion, it also becomes evident that the extent of expected effects hinge critically on the impacts of a switch to a BI on the effective tax rates that people face. In the second section, I review the evidence from Milligan (2020) on the size and relevance of these tax rates. This highlights the extent of the problem and where we expect to see effects. However, the ultimate impacts on labour supply depend on how people react to the changes in effective tax rates. Those reactions show up in estimates of labour supply elasticities. In the third section, I review evidence on those elasticities. The labour supply estimates obtained from a variety of sources tend to point to quite low elasticities for both men and women in recent years (i.e., both would show only modest responses to wage and income changes associated with introducing a BI).

I use the labour supply elasticity estimates in combination with data from the 2016 Census to form estimates of effects of a basic income with a $20,000 guarantee and a 50% tax back rate. I do this in two exercises: one focused on those on IA for whom the basic income would lower the welfare wall; and one focused on workers.

Overall, based on estimates in various related literatures and an exercise using those estimates in conjunction with census data for B.C., a shift to a generous basic income scheme would likely have limited impacts on total hours worked in the economy. It would also likely have small effects in drawing IA recipients into work through lowering the welfare wall. At the same time, there are some groups—notably those without children—for whom predicted hours reductions are somewhat larger. Concerns for those groups could be mitigated by implementing a wage or earnings subsidy in conjunction with the basic income. But the key conclusion is that hours impacts are likely not large enough for them to be the main factor in deciding on whether to adopt a basic income.

## Introduction

In this paper, I assess the various claims made about how a basic income (BI) would affect paid work. Proponents of a BI argue that a BI would reduce the welfare wall and make it easier for people with low income to choose to work. Opponents tend to be concerned that a BI could induce a large-scale withdrawal from paid work and/or a reduction in the hours that people work with potentially problematic consequences for the productivity of the economy.

I start with a discussion of the theoretical issues related to a BI and work, pointing out that both proponents and opponents could be right in different ways at the same time. In that discussion, it also becomes evident that the extent of expected effects hinge critically on the impacts of a switch to a BI on the effective tax rates that people face. In the second section, I review the evidence from Milligan (2020) on the size and relevance of these tax rates. This highlights the extent of the problem and where we expect to see effects. However, the ultimate impacts on labour supply depend on how people react to the changes in effective tax rates. Those reactions show up in estimates of labour supply elasticities. In the third section, I review evidence on those elasticities. I consider both evidence from BI experiments—especially the Mincome experiment in Manitoba (the only Canadian experiment)—and estimates relying on other variation in wages and income. Importantly, there is evidence that the elasticities for women have declined over time, making the results from the BI experiments in the 1970s potentially less relevant, though still informative. In the last section, I use the labour supply elasticity estimates in conjunction with 2016 Canadian census data for B.C. to generate rough estimates of the predicted impacts of introducing a BI that has a base guarantee of $20,000 and a benefit reduction rate (BRR) of 50%. The guarantee is on the upper end of what has been proposed (though it is still a somewhat commonly suggested value) so, the estimated effects could also be seen as upper bounds on what we would see from other proposals.

The examination of the effective tax rates indicates that the rates facing non-workers and low income workers are very high—over 100% in some cases. However, the results also show that a BI with a 50% BRR is only slightly better than the existing system in terms of participation tax rates (PTRs)—the effective tax rates people face when deciding whether to start working. This is true, in part, because the current system includes an earnings exemption with a 0% tax rate and the PTR averages in this zero tax rate component. The BI could be designed to also include an earnings exemption, but doing so would make it more expensive and result in more workers facing the extra BRR associated with the BI. In addition, the nature of averaging in zero values means that the difference between the PTRs for the current system and those under the BI system will still not be nearly as large as the marginal effective tax rates facing individuals in the income range where the current system taxes back all of their additional earnings. Thus, the BI is not as an effective a response to the welfare wall facing non-workers as it appears on the surface.

The labour supply estimates obtained from a variety of sources tend to point to quite low elasticities for both men and women in recent years (i.e., both would show only modest responses to wage and income changes associated with introducing a BI). This contrasts with what was estimated at the time of the negative income tax (NIT) experiments in Canada and the U.S. in the 1970s—at a time when women had much larger estimated elasticities. There are, though, some larger estimated elasticities, especially with respect to income (as opposed to wages) and especially on the extensive margin (the decision on whether to work at all). I provide guesses of the labour supply effects of introducing a BI using a range of estimates, though given the tendency in the literature to find near zero elasticities, it is likely the smaller estimated values that are the most credible.

I present estimated paid work effects in two ways. First, I examine predicted effects for those currently in receipt of income assistance (IA) in order to better understand the effect of introducing a BI on welfare wall effects. In particular, I consider a BI scheme with a guaranteed income of $20,000 for a single individual and a 50% tax back rate. A scheme like this—with the guarantee set at a level that would virtually eliminate poverty for single adults and a medium tax back rate—is a relatively common proposal among BI proponents. The key take-away from this exercise is that the impact of reducing the welfare wall on participation and hours choices among current IA recipients is very small. This is partly because disability assistance (DA) recipients make up 70% of the caseload and all but 14% of them do not work despite relatively generous earnings exemptions in the current system. For the 14% who do work, the effects on their hours choices of moving to a BI would likely be small. For other IA recipients, the predicted effects are, if anything, smaller. There are simply not enough people in a position where the welfare wall matters and for those for whom it does, the BI does not reduce it enough to have a large impact.

In a second exercise, I examine the hours and employment implications from switching to this BI scheme across the different broad demographic groups. Several conclusions stand out. First, the estimated decline in total hours worked in the economy amounts to between 0.65% and 1.7%. Given that the 1.7% number relies on large income elasticities while the consensus in the literature is closer to zero, my best guess is toward the bottom end of this range. This is a non-trivial number for the economy as a whole but is well within normal variability in hours of work over the business cycle. As a result, reductions in total hours of work are not completely trivial but they would not be a determining factor in deciding whether to implement a BI. It is worth noting that a BI with a $20,000 individual guarantee and a 50% BRR would, according simulation exercises done for the BI panel, imply an increase in the provincial government budget by roughly 20% each year. Raising this through income taxes would imply further negative labour supply responses at higher income levels, though existing estimates for Canada point to very low elasticities the higher the hours and income of the individual, so these effects may not be large. Of course, if action is to be taken on inequality and poverty, any scheme will face these taxation related effects.

Underneath these overall numbers, some groups may have substantial work reactions to a move to the BI scheme examined here. In particular, single adults and couples without children would experience substantial increases in income from the proposed BI scheme relative to the existing IA system. For single adults with income that would put them below the BI scheme break-even income level, for example, my predictions based on the range of labour supply elasticities ranges from a drop of 2.2%–10% in their hours worked. It also raises the possibility that a move to a BI scheme would imply a return to the type of more intermittent work and benefit receipt patterns seen in the mid-1990s when 12% of the B.C. population was in receipt of IA in each month and the receipt pattern included more seasonality and more short spells than in the current system. Since the increase in IA receipt in the mid-1990s seemed to be related to the federal government cutting back the Unemployment Insurance system (now called Employment Insurance) and the federal government now seems to be moving back into this area, it seems unlikely that a BI scheme would imply a complete return to those outcomes—though some move in that direction is likely.

Overall, based on estimates in various related literatures and an exercise using those estimates in conjunction with census data for B.C., a shift to a generous basic income scheme would likely have limited impacts on total hours worked in the economy. It would also likely have small effects in drawing IA recipients into work through lowering the welfare wall. At the same time, there are some groups—notably those without children—for whom predicted hours reductions are somewhat larger. Concerns for those groups could be mitigated by implementing a wage or earnings subsidy in conjunction with the basic income. But the key conclusion is that hours impacts are likely not large enough for them to be the main factor in deciding on whether to adopt a basic income.

## A Description of Labour Supply Issues

In this section, I set out a basic labour supply model to explain the possible effects of introducing a basic income (BI).

At first glance, the argument that introducing a (BI) could increase paid work may seem counter-intuitive. Wouldn't we expect people to work less when they are given money without any requirement to work to get it? The answer has to do with reducing the so-called *welfare wall* facing people who receive income assistance (IA) in the current system and reflects the fact that introducing a BI could have quite different effects for different groups of people.

Figure 1 shows the classic depiction of the effects of a negative income tax (NIT) on the budget constraint facing an individual in a period (for example, in a month). The x-axis corresponds to the number of hours the person spends in pursuits other than working for pay in the month. Point A is the maximum number of non-sleeping hours available to either work for pay or spend time in other pursuits (which, in the standard labour supply literature is called *leisure*). The y-axis corresponds to total income in the month.

The line AF shows the amount of income the person can have from work alone (i.e., in the absence of any government transfers). At point A, the person spends all of their time not in paid work and so has earned income of zero. For each hour a person works for pay, they have one hour less to spend doing other things and so moves to the left on the x-axis. That paid work results in earned income which rises linearly with time spent working, with the increase in earned income for each hour being given by the wage rate (which is the slope of the AF line). If a person spends all their time working for pay, their total income equals F.

Now consider the introduction of a government transfer scheme with a guaranteed income given by AC. Thus, in this scheme, when the person does not work (i.e., leisure hours equal A) the person has income given by the height of the vertical line, AC. In the form used in the B.C. IA system, the benefit amount is reduced by one dollar for each dollar the person earns.[1] Thus, as we move to the left along the x-axis, total income remains at AC until the entire benefit is paid off. This happens at point D. In essence, the person faces a 100% tax rate on earnings until they reach the number of work hours corresponding to D. This is the famous welfare wall—a high effective tax rate that strongly discourages entering the labour force.

Next, we turn to an NIT with a more moderate benefit reduction rate (BRR). For example, a common BRR in discussions of BI is 30%, which would imply that for each extra dollar earned, the amount of the benefit paid by the government is reduced by 30 cents. This scheme is represented by the vertical line AC (corresponding to the benefit amount the person gets if they do not work) combined with the dashed line CD'. Switching to this scheme from the initial IA scheme has several effects. First, it lowers the effective tax rate on earnings and thus makes it more attractive to work. This is represented by Arrow 1 in Figure 1. Second, the people working a number of hours of paid work between the number of hours corresponding to D and the number of hours corresponding to D' experience an increase in their total income because they are able to collect some of the benefit amount along with their earned income (since the benefit is not entirely taxed back one for one with each dollar earned). In part, this increased income has an income effect in the form of allowing people to be able to afford to do less work for pay. They can, for example, make their rent payments with fewer hours of work. At the same time, they now face an effective tax rate on their earnings given by the BRR that they did not face before. That will induce them to work less (since part of their earnings just goes to reducing their benefit amount and not into their pocket). Together, the income effect and this second effect (which economists call the *substitution effect*) point toward these people working less (Arrow 2). Finally, some of the people who formerly worked hours that would put them between D ' and F will choose to cut back their hours in order to qualify for some of the benefits (Arrow 3).

The result, then, is that moving from a system like the B.C. income assistance system to an NIT-type system will cause some people to increase their participation in the labour force (the Arrow 1 move in the Figure 1) while, at the same time, cause others to reduce their hours of work (the types 2 and 3 arrows in Figure 1). The net effect on the supply of paid work in the economy depends on the relative sizes of these two groups and on their labour supply elasticities. Thus, it is possible that those who are already working—especially those working a lot of hours—have a tendency to work (seeing it as the right thing to do or preferring what they can buy with their earnings relative to time spent not working). That is, they have a low labour

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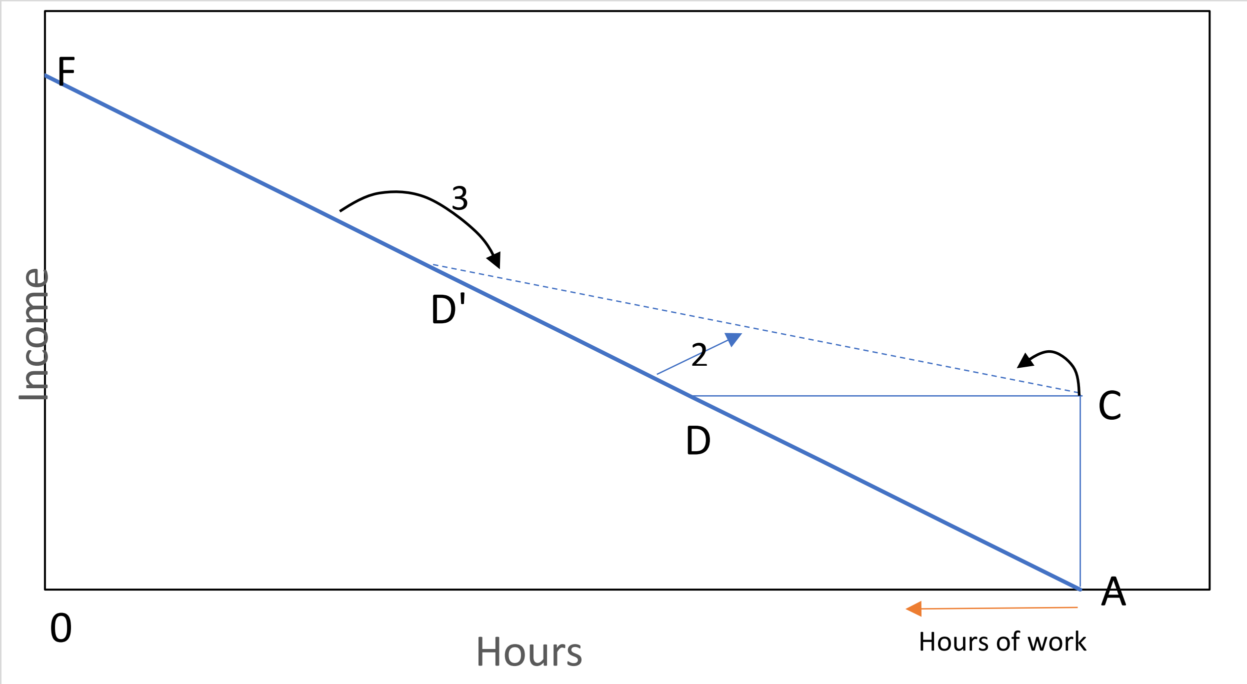
[1] The B.C. IA system allows the recipient to earn a small amount of money before the benefit starts to be taxed back. Since the amount is not large, I have leaft it out of the depiction for simplicity.[2] Although not a formal component of these simple labour supply models, there is also concern about people shifting to self-employment and cash work so as to evade reporting of income to the tax and transfer authorities. IA and BI do not thwart this evasion, while an earnings supplementation scheme can.

**Figure 1**

*Work and Income with a Negative Income Tax*




supply elasticity. Introducing the NIT system incentives shown in Figure 1 might then not induce them to reduce their hours much. If, on the contrary, the people who were initially not working were willing to work some hours but faced the welfare wall when doing so, they might respond by moving into paid work. In that scenario, the total hours of paid work in the economy could increase from moving to an NIT version of a basic income, as proponents suggest, though the relative numbers of people on IA compared to those working positive hours implies this is unlikely.

A further question is the impact on work if a basic income were introduced with a larger guaranteed income than what is present under IA. In that case, there is an added income effect for those at zero hours of work: since they can meet more of their needs and preferences with the basic guaranteed income, the impetus to work declines further. Thus, if the move from the current IA system to an NIT system involved both a reduction in the BRR and an increase in the basic guaranteed income, the effect on the willingness of a person to participate in the labour force becomes ambiguous.

The model set out to this point is static—it refers only to decisions taken in one month and does not take account of how those decisions affect future outcomes. Responses to the Poverty Reduction Committee summarized in Hertz et al. (2020) indicate that IA recipients are concerned about their ability to get back onto benefits if they leave. They have to worry about any build-up in assets and the vagaries of an assessment system they do not trust. In that case, a reasonable response is to refuse work that might end up being temporary. Since many people in this position have very irregular work histories, almost any job opportunity might be reasonably expected to last only a short period. This perception implies that income delivered as a basic guarantee, as in the NIT, would be better for encouraging work since there is no concern about moving back to the full guarantee amount if a job ends. This adds to the substitution effect, strengthening the movement reflected in Arrow 1 in Figure 1.

It is interesting to view Figure 1 in light of the theoretical literature in economics on designing an optimal tax and transfer system. As described in Boadway and Cuff (2020), the goal in this literature, starting from Mirlees (1971), is to design a tax and transfer system that meets goals such as moderating inequality or reducing poverty subject to constraints in terms of worker responses to the incentives created by the system and targets for other government spending. In these models, individuals differ in their work abilities and, therefore, in their wages. Their total income is generated from the product of their wage and the number of hours they choose to work. The government's goals are expressed through a social welfare function—a weighted evaluation of the utilities of everyone in society. Typically, we see the government as wanting to reduce inequality and poverty—that is, as having a high level of concern for the least well off. If the government could see exactly which people had the lowest earnings abilities, they would tax the others and transfer to that group. But they can only see total income and cannot tell whether low income arises because the person has a low wage (i.e., low earning ability) or because they can earn a higher wage but choose to work fewer hours. Thus, the concern—a concern that is often raised when designing transfers in the real world—is that some of the more able people who are not the true target of the transfer program will work fewer hours in order to look like the less able group and collect benefits. This is one way to describe the movements given by Arrow 2 and Arrow 3 in Figure 1.

Viewed through the lens of this literature, the welfare wall is not an attempt to retrieve the money paid as benefits to recipients. It is a wall built to keep those with higher earnings capabilities from cutting back their hours and trying to look like they are the type of person who should get benefits.[2] A higher welfare wall, by reducing this behaviour, allows better targeting of the benefits and, as a result, if we hold the total cost of the transfer system constant, a greater benefit for each actual recipient. Thus, in the classic literature, the optimal tax system combines a guaranteed income for people with zero earnings with marginal tax rates that follow a U shape: with high rates just above zero earnings in order to discourage reductions of hours of the type given by Arrow 2 and Arrow 3, lower taxes in the middle where workers are unlikely to reduce their hours so much that they would qualify for benefits, and higher taxes at the top end to match with goals to reduce inequality. In other words, the optimal tax and transfer system looks quite a bit like the B.C. income assistance and income tax system (at least, if we ignore conditionalities such as asset tests). Thus, the welfare wall looks like a flaw when viewed from the perspective of the people on income assistance but it is actually an intentional feature that minimizes inequality because it allows higher benefits to be paid to the least well off conditional

[2] Although not a formal component of these simple labour supply models, there is also concern about people shifting to self-employment and cash work so as to evade reporting of income to the tax and transfer authorities. IA and BI do not thwart this evasion, while an earnings supplementation scheme can.

on the tax costs. Indeed, the argument is that the least well off will not be very productive in work in any case so little is lost to them or society if they simply do not work.

However, incorporating a wider view on the interaction of justice and the economy may alter our conclusions. If we have considerable concern for the least well off but also consider their overall sense of self-respect and efficacy as well as their material well-being, the welfare wall looks different. Being effectively told through the mechanism of high marginal tax rates that your work contributions are not needed does not engender a feeling of self-respect. Worse yet, it appears that many people commenting on IA and work do not understand the rationale for the wall and seem to expect IA recipients to work. The combination of a system designed purposefully to have them not work and publicly shaming them as lazy seems unjust. The confusion in the goals of the system is amplified by work search requirements, presenting IA recipient with a seemingly bizarre system in which they are told that they need to find work but faced with a tax rate of 100% on earnings if they do so. The system should be made consistent either by acknowledging the logic from the optimal tax literature and not expecting IA recipients to work, or incorporating the perspective of allowing people to pursue the dignity of work and lowering the benefit reduction rate. My inclination is toward the latter approach, but what this discussion raises is the questions of the trade-offs between the movements into work for IA recipients as we shift to lower BRRs (Arrow 1) versus the movements to less work by others (Arrows 2 and 3). The extent of those movements depends on the combination of the extent of the incentives in the system (what the marginal tax rates actually look like) and labour supply elasticities (the extent to which people respond to the incentives inherent in the marginal tax rates). These are both empirical matters and we present evidence on them in the subsequent sections.

## Effective Tax Rates

Assessing the impact on paid labour supply of replacing income assistance with a NIT or adding NIT elements to the IA system requires, first, understanding the effective tax rates on earnings faced by those on IA. As we will see, those tax rates have a complex relationship to earnings and so we need to know over what ranges they are high in order to understand what kinds of paid work responses we would expect from changing them.

As Milligan (2020) sets out, we can describe the incentives facing individuals in their work decisions with two effective tax rates. The first of these is the marginal effective tax rate (METR). This shows the percentage of the next dollar a person earns that goes to taxes. The METR will vary with how much a person is currently earning. For example, the METR may suddenly jump to 100% (or higher) if the person is currently at an earnings level that is a dollar below a threshold beyond which they are no longer eligible for some type of benefit. Milligan (2020) constructs METRs for B.C., taking account of federal and provincial tax rates and including both the simple tax rates and the effects of tax credits such as the Canada Child

Benefit.[3] The interaction of all the tax credit programs makes for a complicated overall effect that needs to be carefully mapped out to be understood. As Milligan (2020) points out, that complexity surely must represent a challenge for those deciding whether to take a job or to try to increase their earnings.

M2020 also presents results for the participation tax rate (PTR) which is defined as the total net taxes paid if a person works and earns a specific amount (say, $10,000) minus the amount of net taxes they would pay/receive if they did not work divided by the earnings amount ($10,000 in our example). Importantly, the net tax can be negative. It equals the IA benefit amount for the person if they do not work, for example. The PTR shows the percentage of earnings a non-employed person would give up to taxes and/or reductions in benefits if they find a job paying a specific amount. It will differ with the level of earnings on the job, as we will see. The PTR is useful for understanding the incentives or disincentives facing an individual deciding whether to take a job with a specific level of earnings.

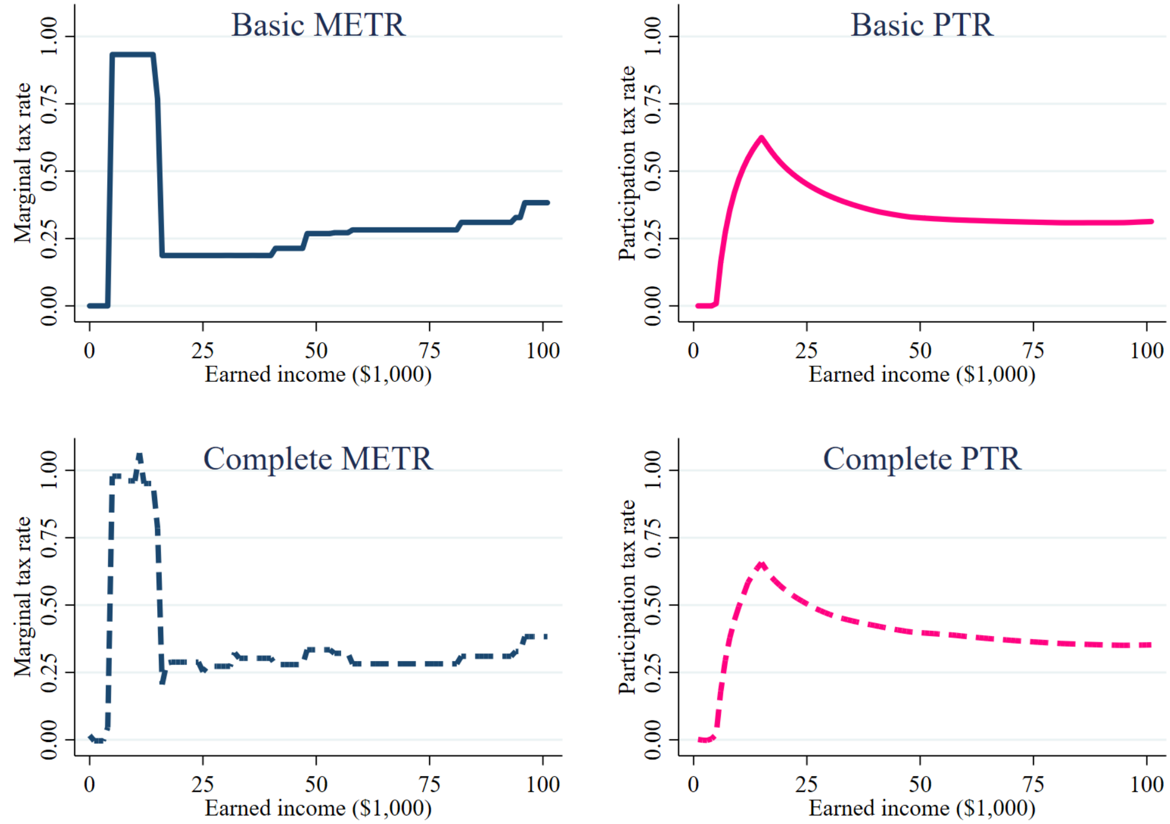
Figure 2 is taken from Milligan (2020) and shows the METR and PTR facing a single individual with no children who is in receipt of IA. The top row includes only the simple tax rates and brackets, while the second row gives results for the entire system of tax rates and credits and is where we will focus our attention. The bottom left panel shows the METRs for this person. It starts with a zero rate for the earnings below the IA system's earnings disregard but then immediately jumps to 100% because of the 100% BRR in the B.C. system beyond the disregard. Indeed, because of thresholds in other, tax credit, systems, the METR surpasses 100% in places. When earnings are equal to the IA benefit rate, there are no more benefits to be reduced and the tax rate falls to levels dictated by the combination of regular tax rates and credits in the combined federal and provincial system. If we return to Figure 1, replacing the IA system with an NIT would lower the initial wall to METRs below 100% but also imply higher tax rates over a larger range until the IA benefits are fully recovered. Thus, such a shift would alter incentives in a range above the right side of the wall in Figure 2. For example, if the guaranteed basic income amount were $10,000 (near the annualized level of IA benefits for a single individual) and the tax back rate were 30% instead of 100%, people with earnings up to $33,333 would still receive some IA benefit. Beyond that point, no benefits would be received (i.e., $33,333 corresponds to point D' in Figure 1). It is worth noting that these calculations do not include supplemental benefits such as health benefits that would raise the effective guarantee. These calculations also do not include the effective tax rates implicit in income-tested in-kind benefits such as child care subsidies.

The right bottom panel in Figure 2 shows the PTR for the same person (single, without children and on IA). The PTR is an average tax rate so it integrates over the METRs between zero and the given set of earnings. Thus, even at its peak, it does not reach the 100% level seen in the METRs because the zero tax rate for the earnings below the initial earnings

[3] The effective tax rates in Milligan (2020) do not include the effective rates embedded in income-tested in-kind benefits. In B.C.'s case this includes rent supplement programmes such as the Rental Assistance Program (RAP) and Shelter Aid for Elderly Renters (SAFER) and child care subsidies.

**Figure 1**

*Tax Rates for Single, No Children, With Income Assistance*




*Note.* Simulations using the Canadian Tax and Credit Simulator. The left-hand side shows marginal effective tax rates. The right-hand side shows participation tax rates. The basic simulations on the top show just the impact of tax rates and brackets. The complete simulations on the bottom show the impact of tax rates and brackets along with all refundable and non-refundable tax credits.

disregard are always being averaged in. Still, the PTR reaches levels of over 60% for earnings just below $20,000 and remains at high levels in a range that covers the kind of minimum wage jobs that are likely available for this population. These are strong disincentives to taking a job, especially when combined with concerns about getting back on IA when the job ends. Milligan (2020) provides figures for other family types, including with children, in couples, and for people in receipt of disability assistance. The essential shapes in all cases are the same, with a clear wall at low earnings level and a gradually declining PTR facing those who are deciding whether to work. Either adding children or shifting to DA pushes the top PTR to approximately 75%.

It is worth comparing the peak levels and patterns in the PTR figure with what would arise with a basic income. Under a BI with no earnings exemption—if we ignore other taxes and transfers for the moment—the PTR equals the BRR up to the break-even level and then declines gradually thereafter. The peak of the PTR curve in the bottom right panel is about 65%. So, with a BRR above that (70% being a common suggestion), the PTR would be higher than what exists under the current system everywhere. That is, even though the 100% BRR on IA would be dropped to 70%, the earnings exemption under IA would mean that the actual average tax rates a person faces when moving from non-work to work would be higher under the BI option. With a BRR in the BI system of 50% and an income guarantee of $20,000, the PTR would be higher under BI than the current system up to about $9,000 in earnings, lower for a range up to about $22,000, and then higher again from there up to the BI break-even level of $40,000. In other words, focusing just on the marginal tax rates just above the earnings exemption in the current system misses the importance of that exemption. One could introduce an earnings exemption into the BI scheme as well, but this would move the break-even level higher and make the system even more expensive. As always, the devil is in the details. It is not a given that a BI system will reduce welfare walls.

## Labour Supply Elasticities

As we have seen, introducing a basic income can have differing effects on labour supply. If the base amount of the basic income is higher than what is currently available through income assistance, both non-workers and those with low earnings will experience an increase in their income that would be expected to reduce both their probabilities of participation in the labour market and their hours of work if they do participate. Similarly, even if the base amount does not change, we have seen that a reduction in the BRR below the 100% level currently in place in the B.C. IA system will result in increased incomes for some low earning households not on IA and, again, this would be expected to result in a reduction in hours of work. The introduction of a BI would also be expected to reduce the PTR for most people (depending on the BRR associated with the BI and whether there is an earnings exemption), which would induce increases in participation among the non-workers but would correspond to an increase in marginal tax rates facing earners that would imply reductions in their hours of work.

The net effect of a BI operating through these various channels depends on a set of key elasticities. The first is the elasticity of hours of work among workers with respect to income (the percentage change in hours worked in response to a 1% increase in income). This will allow us to estimate the extent to which workers who receive a boost in income from BI will cut back their hours of work in response (Arrow 2 in Figure 1). The second is the elasticity of hours of work with respect to the wage (the percentage change in hours worked in response to a 1% increase in the wage), which will allow us to calculate the effects of the marginal effective tax rates on work (Arrow 2 and Arrow 3 in Figure 1). The third is the elasticity of participation with respect to income (the change in the probability of participation for a 1% increase in income), which will allow us to estimate the effect of any increase in the base amount under a BI relative to what exists under IA on the probability that people become more likely not to work. And the fourth is the elasticity of participation with respect to the wage (the change in the probability of participating due to a 1% increase in the offered wage), which will allow us to capture the impact of reducing the BRR (i.e., lowering the welfare wall) on whether a person works (Arrow 1 in Figure 1).

The wage and income changes that are relevant for these elasticities are net of taxes and subsidies. Only once we account for taxes and subsidies do we see the wage and income amounts that actually affect individual choices. For example, if an individual is paid a wage of $20 per hour by their employer and faces a marginal effective tax rate of 80%, their wage (net of taxes paid) for an hours work is actually $20*(1 – 0.8) = $4. Also, the hours and participation elasticities correspond to quite different decisions. Taking a job can involve large fixed costs such as getting work clothes and setting up child care. Changing hours of work may not include fixed costs—it could correspond to taking extra shifts at work, for example. The people involved could also be quite different in the barriers they face and in their preferences related to working. For example, the set of people not working and on IA may be quite sensitive to effective tax changes that alter their take-home wages (i.e., have a high elasticity of participation with respect to the wage) while those who are already working may have established patterns of work that are not easily changed (i.e., have a low hours elasticity of labour supply with respect to the wage). Such a situation would imply an optimally beneficial response to lowering the BRR since the non-workers would be quite responsive in terms of taking work while those already working would not respond to the new incentives by lowering their hours of work. Of course, responses may be different in the short versus the long term.

**Evidence from Mincome**

What would be most useful for our purposes is evidence on labour supply and participation responses in a situation in which an NIT is introduced in an economic environment with an IA system previously in place. The Manitoba NIT experiment (Mincome) provides evidence on such a situation. Mincome provided a guaranteed income in an NIT model for three years between 1974 and 1977 in Winnipeg, a set of rural Manitoba towns, and in one saturation site (Dauphin, Manitoba). The experiment incorporated nine possible plans based on three possible guaranteed income levels ($18,900, $22,800, and $26,800 in 2016 dollars for a family with two parents and two children) and three possible BRRs (35%, 50%, and 75%). Riddell and Riddell (2020) examine the impact of the NIT systems on labour supply using the data from this experiment. The data comes both from surveys of both treatment group and control group people during the experiment and from administrative data on earnings and payments. Importantly, and in contrast to U.S. NIT experiments being conducted in the same period, Mincome drew a sample that was representative of the low income population, including a reasonably sized sample of lone parents on social assistance. Riddell and Riddell (2020) pay special attention to this latter group.

It is worth highlighting the discussions in Riddell and Riddell (2020) and Simpson (2020) about the complex survey design in the Mincome experiment. Given different family types, different geographic locations, and the different guarantee and BRRs, Mincome effectively was composed of 91 individual randomized trials. Given that there were about 1,800 families that took part in the experiment, there are resulting sample size issues that require some kind of aggregation. Moreover, in order to keep costs under control, participants were non-randomly assigned to the different guarantee level—BRR combinations (with fewer assigned to the more expensive combinations), so evaluating the data requires appropriate conditioning for the variables defining the non-random assignment.

Riddell and Riddell (2020) find results that match the arrows showing the response to a shift to an NIT in Figure 1 very well. In particular, for men in two-headed households they find small, negative, and statistically insignificant effects of the introduction of the NIT on either their probability of working or their hours of work conditional on working. For women in two-headed households, in contrast, the results show a significant decline in hours worked amounting to a 40% reduction in the mean hours worked for the group. This is clearly a very large effect in percentage terms but, since it is on a small base, is not as dramatic in absolute numbers. Indeed, their estimates of the effects for married men are half those for married women in absolute size but amount to only a 5% decrease in hours because male typical hours worked are much higher. In contrast to the hours impacts, Riddell and Riddell (2020) find only weak evidence of a reduction in the probability of working for this group for married women (or married men). These estimated effects reflect a combination of wage and income elasticities.

For lone parents (who are mostly women), Riddell and Riddell (2020) find a 14 percentage point increase in the percentage who work and a 30% increase in hours worked. Taken together, these results fit well with what is depicted in Figure 1. Approximately half of the lone parents were in receipt of social assistance at the time of the baseline interview at the start of the experiment compared to about 30% of two-headed households. Thus, the positive hours and participation results for lone mothers would fit with the movement into work corresponding to Arrow 1 in Figure 1. Women in couples, in contrast, are more likely to be in the positions corresponding to Arrow 2 and Arrow 3. This would account for their opposite responses to the NIT. Married men, on the other hand, had very low labour supply elasticities and did not respond strongly to the changed regimen.

The first study to use the Mincome data to examine labour supply was Hum and Simpson (1993). They find small and statistically insignificant effects on labour supply for both men and women. The result for men matches that in Riddell and Riddell (2020) but the results for women are quite different. Riddell and Riddell (2020) argue that the estimation in Hum and Simpson (1993) does not seem to fully account for the complexities of the sample design and that this likely accounts for the difference in results. Importantly, Forget (2018) argues that the Hum and Simpson (1993) results combined with those from U.S. experiments "suggest that people will not substantially reduce their hours worked." The Riddell and Riddell (2020) results, which appear to be more reliable, tell a more nuanced story. For men, indeed, there does not seem to be a reason for concerns related to paid labour supply. For women, moving to the NIT form of a BI actually increases work among women who were primarily on IA at the time but results in strong decreases in work for married women. The impact on overall labour supply requires an assessment of the relative magnitudes and importance of these two groups.

The only other paper examining labour supply effects of the Mincome experiment is Calnitsky and Latner (2017). In this paper, the authors again focus on the saturation site in the Mincome experiment, Dauphin, Manitoba, in order to allow for potential spillover effects related to labour force participation (i.e., the possibility that if a significant proportion of a population reduce their participation in response to a transfer benefit then it becomes more socially acceptable for others who are not in receipt of the benefit to also reduce their participation). They first show effects using the 1971, 1976, and 1981 censuses, comparing outcomes at the town level between Dauphin and a set of comparable towns for what they call the participation rate (though, since their definition seems to be based on whether a person reported receiving a wage, it seems more likely that they are reporting employment rates). The figure based on this data shows that in raw form, Dauphin starts with a lower participation rate and moves lower in 1976 and lower still in 1981. However, once they re-weight the data in order to control for the fact that Dauphin has an older population (and getting older), they find a pattern that looks more like a treatment effect: zero difference in 1971, a negative effect in 1976, and zero difference again in 1981. The difference in differences estimate from this data implies a 3% decline in the employment rate, which is in line with other estimates.

The main empirical exercise in Calnitsky and Latner (2017) uses survey data from the Mincome experiment from Dauphin, the province-wide set of controls, and the treatments other than those in Dauphin. The latter group is scattered across communities so the authors argue that differences in effects between Dauphin and the other treatments represent any social spillover effects at the community level in Dauphin. The data are in the form of a balanced panel so, in principle, the aging effects that are important in the census work should not show up here. The fact that they include people who joined the study just before the study period might weaken this argument, though. Using the survey data, they find a negative (and trending down over time) effect of the experiment on the employment rate. They take means across 2 years prior to the experiment and across the 3 experimental years to construct difference-in-difference estimates. Based on comparing Dauphin to the controls, they obtain an estimated 11% drop in the employment rate caused by the experiment. They also find that the drop is 3% larger for the Dauphin treatments than the other treatments and argue that their large (11%) estimate combined with the 3% difference between treatments points to a social effect amplifying employment responses in Dauphin.

There seem to me to be several problems with this conclusion. First, their main figure shows a declining trend in employment for the treatments in the months before the experiment that is not present for the controls. Second, there is no discussion of whether the controls (many of whom likely lived in Winnipeg) are good matches for the Dauphin treatments. Later in the article, in Table 4, the authors show characteristics for the different samples. The Dauphin sample is much older than the controls (with 39% of the Dauphin sample being over age 50 compared to 13% of the controls) and less educated (with 19% of the Dauphin sample and 45% of the control sample being high school graduates). The older age of the Dauphin sample could explain a different trend in work compared to the controls as more of the Dauphin sample will be moving toward retirement. Third, the estimated effect for the Dauphin treatments relative to the other treatments is not statistically significant at conventional significance levels. Taken together, I believe that these results should be taken with a large grain of salt. To me, the empirical work has not established that there was a large employment effect in Dauphin from the Mincome experiment caused by social spillovers. The most plausible estimate is the census-data-based-result, and it indicates an effect on employment in Dauphin that is in line with other studies showing negative but small employment effects.

**U.S. NIT Experiments**

At roughly the same time as Mincome, four income maintenance experiments were run in the U.S. Riddell and Riddell (2020) summarize the findings from these studies as "the four U.S. NIT experiments generally found that the treatment group experienced a small but non-trivial reduction in labour supply with typically small negative impacts for men in two parent families, and larger effects for women in two-headed households than their male counterparts." Thus, the declines in annual hours of work were 5% to 7% for married men, 17% to 21% for married women, and 13% to 17% for single female-headed households. Estimates of decline in the probability of employment were approximately 3 percentage points for men (a 3.5% decline in the probability), a 6 percentage point decline for married women (a 22.5% decline in the probability), and a 7 percentage point decline for single mothers (a 16% decline in the probability) (Riddell & Riddell [2020] referencing Robins, 1985). Robins (1985) uses these estimates to derive estimates of the underlying substitution and income elasticities, finding a compensated elasticity of hours with respect to the wage of about 0.1 and an elasticity with respect to income of –0.1 for men. Simpson (2020), in a comprehensive survey of BI experiments reaches a similar conclusion about these elasticities. Both of these estimates are in line with other estimates showing inelastic labour supply for men. The estimates for women indicate substitution effects that are roughly double those for men for married women but income effects that are similar in size to those for men. In all cases, the reduction in the number of hours of work (or reduction in probabilities of employment) are not large but can be large in proportion to the (low) average hours worked by women in that period of time.

**More Recent Estimates of Labour Supply Elasticities**

Are these results translatable to today? Forget (2019) points out that the 1970s in Manitoba was an environment in which married women worked few hours, and work and home roles for men and women were more strongly delineated. We can examine elasticity estimates based on other (non-BI experiment) data to try to gain some insight on this question. It is worth noting, however, that the data variation used in most other estimates does not incorporate increases in non-labour income of the size that is implied in most basic income proposals. Extrapolating these estimates to a basic income situation requires an assumption that elasticities are not bigger when income changes are much bigger.

Estimates of the elasticity of hours of work (conditional on working more than zero hours) with respect to the person's own wage for the U.S. show that this elasticity has historically been low for men while for women (and especially married women) what used to be a high elasticity has declined over time to the point that it takes similar values to those for men. Heim (2007), for example, finds that the own-wage elasticity for married women fell from 0.36 in 1978 to 0.14 in 2002, with the latter figure being similar to that for men. Similarly, he finds that the elasticity of participation with respect to the wage for married women fell from 0.66 to 0.03 over the same period. Morissette and Hou (2008) investigate the same issue for the period between 1980 and 2000 for Canada and also find a decline in the own wage elasticity for married women over time for nearly all their estimation methods. Dostie and Kromann (2013) provide the most recent and most complete labour supply elasticity estimates for Canada. They argue that the Morissette and Hou (2008) estimates are overly large because of a failure to adequately account for the impact of taxes on the net wage that workers face. Dostie and Kromann (2013) find very small elasticities for married women in their data period (1996 to 2005), using data from the Survey of Labour and Income Dynamics. Their preferred estimate for the elasticity of hours of work with respect to a married woman's own wage is 0.03—a very small estimate even compared to most estimates for men. Similarly, their estimate for the elasticity of participation with respect to own wage for married women is 0.01. They also carry out a quantile regression exercise that yields the very interesting result that the first decile of the hours distribution is much more responsive to a wage change (with an elasticity of 0.2) than higher deciles. Indeed, the upper half of the hours distribution shows virtually no response to wage changes. This fits with intuition that people who tend to work long hours are inherently hard workers (or have fiscal commitments that require them to work hard) and will tend not to react in terms of their hours of work to wage changes.[4] At the other end, Dostie and Kromann (2013) show that married women in the first quintile of the hours distribution are twice as likely to have young children as those with hours that put them in the top quintile of the distribution. Interestingly, their results imply that greater child care obligations may push women toward part time work but they remain responsive in terms of their hours of work to wage changes.

Dostie and Kromann (2013) also present estimates of the other key elasticities—the ones with respect to income. Their estimate of the elasticity of hours with respect to income is –0.01 and for participation with respect to income is effectively zero.

Lemieux and Milligan (2008) examine the impact of a change in social assistance policy on employment and hours worked in Quebec using a regression discontinuity approach. In 1989, the Quebec government removed a benefit reduction affecting those under age 30. Prior to the change, SA recipients under age 30 received $175 per month while starting on their 30th birthday benefits jumped to $507—a 175% increase. With the policy change, people under age 30 received the full benefit amount. Their estimates imply that the benefit increase led to between a 3 and 5 percentage point drop in the probability of being employed for less educated men without children. The drop in total hours worked at the same point implies that there was little change in hours worked conditional on working and that all the adjustment was at the extensive margin. They do not try to turn their estimates into an elasticity. To do that, one must

[4] This is not to say they do not react at all to tax increases. They may react by taking actions to avoid the taxes such as working under the table. These estimates just say they do not react in terms of their work hours.

take account of the fact that these men would not have been in receipt of benefits the whole year so the increase in their income is unclear. Lemieux and Milligan show that total SA annual income for the affected group went up by about one-third of what one would predict if they were on SA the whole year. Given that the employment rate for this group was approximately 66% just before age 30, the 5 percentage point estimated decline amounts to a 7.4% drop. If we divide the 175% increase in benefits by 3 (to fit with their expected usage rate of SA based on the income numbers) and use the resulting number with the employment rate change then we get that an upper bound on the implied elasticity is –0.13. The lower bound estimate (using the lower bound estimate of a 3 percentage point decline and the full 175% income increase) would be an elasticity –0.026. The upper bound fits with estimates in the broader literature while the lower bound is closer to the estimate from Dostie and Kromann (2013).

It is helpful to add the perspective of estimates of labour supply elasticities from other countries. Blundell and MaCurdy (1999) provide a summary of the relevant literature up to the late 1990s and conclude (based mainly on U.S. estimates) that the married male elasticity of hours with respect to wages is approximately .08 while the comparable elasticity for married women is .78. For income elasticities of hours of work they conclude the relevant number is –.05 for married men and –.20 for married women. However, as we have seen the elasticities for married and lone parent women have been converging to those for men over time.

One common result (evident in many of the Canadian estimates we have discussed as well) is that the elasticities of participation are higher than those for hours of work conditional on working. This consensus has been heavily influenced by work on the effects of the U.S. Earned Income Tax Credit (EITC) on work choices. Until recently, the consensus arising out of the EITC research is that the elasticity of participation with respect to the wage is about 0.3. However, Kleven (2020) questions this conclusion, pointing out that the timing of changes in employment rates for women with different numbers of children do not fit easily with the actual timing of EITC policy changes. Instead, he argues that increases in female participation rate changes in the mid-1990s (near the time of one significant expansion in EITC) can be better accounted for by changes in access to welfare combined with a booming labour market. He argues that the participation elasticity related to EITC wage subsidies is much smaller than the consensus while policy changes that reduced access to welfare had larger effects.

The sources of variation in most of the recent estimates of labour supply elasticity (mainly related to changes in tax rates) may not do a good job of identifying the effects of a basic income, which comes in the form of a permanent increase in a basic income guarantee. There are, however, some articles with variation that comes closer, in some regards, to what would happen with a BI. For example, Cesarini et al. (2017) examine labour supply responses to lottery winnings in Sweden. The lottery prizes vary in size and correspond to large, one-time increases in wealth. This is obviously not the same as a BI but does provide some insight into how people react to exogenous increases in non-work related income. They find that the lottery winnings induce reductions in earnings, with the marginal propensity to earn over the lifetime effect being in the range of –0.15 to –0.17 for younger lottery winners. These are similar to the upper values we observed in Lemieux and Milligan (2008), though they correspond to earning over the lifetime. Later, I will discuss possible changes in short term dynamics happening even within the context of a given set of longer term effects.

More directly, Jones and Marinescu (2018) examine the labour supply effects of the Alaska Permanent Fund—an actual BI. The Permanent Fund payments are made to all residents of Alaska and vary with the price of oil but tend to be in the range of $1,000 to $2,000 per year. One might not expect a payment as small as this to have strong effects, though the authors note that it is paid per person and includes children, so a family of four could receive a payment as high as $8,000. In addition, the variability of the payments (with actual suspensions of payments in some years) may mean that these payments do not provide the type of stable stream on which one would base work decisions. In fact, Jones and Marinescu find no impact on the employment rate, though some increase in the rate of people working part time. They attribute the lack of an employment rate effect to increased demand effects since they observe increases in consumption at the same time. Their empirical approach is a synthetic controls approach, finding an optimal mix of comparison states based on years before the 1982 introduction of the fund. One flaw is that the states chosen were not oil rich states, so might not have followed the same path as Alaska during the oil price increases in the 2000s. But in any case, these results fit with the lowest end of the income elasticities discussed here. The Finish basic income experiment similarly shows small labour supply effects. This experiment is not really a basic income since payments lasted only two years and were limited to people in long term receipt of unemployment insurance. The results show small relative increases in employment among the recipients of the new benefit in the second year of the experiment (which would fit with Arrow 1 in Figure 1) but these results are confounded by other changes in the system that took place in that year. In the first year of the program there were no differences in days of work between the treatment and control.(Kela(2020))

**Single Adults Without Children**

A key feature of the existing literature is that it is heavily focused on married women and lone parent women. There are also many estimates for married men, though fewer. But there are very few estimates for single men and women without children. This could be, partly, because these people get few or no benefits under U.S. transfer programs so there is little of that type of variation to use to identify the elasticities. But whatever the reason, this lacuna in the literature is important in the current circumstance since it is exactly this group that raises the greatest policy concern. Parents with children will receive benefits from the Canada Child Benefit (CCB). If a BI were to be introduced, its primary purpose would be to cover single adults without children so it is their labour supply responses we need to understand.

Historically, one could have argued that we can narrow the question further since the labour supply elasticities of males of working age were seen as essentially zero. Men worked. But the participation rates of males whose highest level of education is a high school diploma has dropped from 95% in the early 1990s to just below 90% just before the onset of COVID-19. The declines for those who do not complete high school are much larger but this group has been declining in importance, with about 19% of 25-to-29-year-olds not having completed high school in 1997 compared to about 10% of that age group not having completed high school 20 years later. These declines are not as large as what has happened in the U.S. where deaths of despair among less educated men has become a point of real concern, but they still could indicate that one can no longer simply assume that the men, who would be most likely to use IA or be most dependent on a BI, will be inveterate workers. The only real estimate we have for this group for Canada comes from Lemieux and Milligan (2008). The Quebec policy change they study was available for and most relevant to young men and women with low educational achievement. As we have seen, they find that a large change in available benefits led to a 3 to 5 percentage point drop in the employment rate of this group. The implication is that this group will respond to benefit changes, though the elasticity is still relatively small.

**Rough Guesses of Labour Supply Effects from Introducing a BI**

Based on our preceding walk through the literature, we can form very rough guesses of what the introduction of a basic income would do in terms of hours of paid work in B.C.. To do this, I will consider an NIT plan with a $20,000 guarantee per person and a BRR of 50%. This fits with the idea of using a BI to eliminate poverty and is on the upper end of the guarantee levels that have been proposed. The tax back rate is chosen as a result of the earlier discussion pointing out that BRRs much above this would not actually reduce the welfare wall for most IA recipients. The break-even income level under this plan is $40,000, implying that the BRR would be added to tax rates associated with Employment Insurance (EI) and Canada Pension Plan (CPP) for some individuals. This would raise the total METR to approximately 75%. My goal is to focus on the incremental effects of a BI plan and so I will focus attention on the 50% BRR associated with that plan.

To form an estimate of the labour supply effects of this program, I will break the population up into groups based on their predicted effective tax rate changes in the switch from the current system to a BI. Funding the BI would involve increases in taxes for higher earners but I will ignore increases in taxes for those above the break-even income level based on findings that people whose hours of work are above the median have essentially zero elasticities of labour supply. One of the main benefits from this exercise is less the final number than as a way of organizing our thoughts about who would be most affected and what hours they work under the current system.

Working from the estimates in the labour supply literature, I will assume that the elasticities are the same for men and women and, will not use gender as a dimension for forming the affected groups.

I will examine the work implications of the BI scheme in two ways. First, in order to directly address arguments about a BI reducing the welfare wall, enabling some people to move off of benefit receipt and into work, I will create predictions for those in receipt of IA in a month under the current system. Second, because we are concerned about hours of work for a broader population (some of whom may use IA at times), I will provide estimates broken down into a set of demographic groups: single adults without children, lone parents, couples with children, and couples without children. Breaking the exercise down in this way allows for different responses for groups that are treated very differently under the current system. Throughout, I will focus on the age 19-to-64-year-old population who are not students since both students and those over age 64 have access to other support programs and the added provincial BI I am considering would not apply to them as a result.

### People Currently Receiving Income Assistance

People currently receiving income assistance should be treated separately for several reasons. The first is that they are the ones who face the welfare wall that a BI is intended to help dismantle. The second is that we have some estimated elasticities that are estimated directly for this group. The third is that the disabled make up a significant portion of the IA population and require special consideration.

#### *People Receiving Disability Assistance*

As shown in Petit and Tedds (2020), the IA caseload consists of: 71% on disability assistance (DA); 22% expected to work (ETW); 5% persons with persistent multiple barriers (PPMB); and 1.5% excused from work. Among those on DA, approximately 14% have some earnings in a month and their mean earnings are at almost exactly the annual earnings exemption. Thus, a minority of DA recipients work and those who do work appear constrained by the earnings exemption (recalling that the BRR is 100% beyond the exemption). For the remainder of DA recipients, a basic income scheme that would increase their income would likely not induce them to work and since they are already not working and not near the (relatively high) earnings exemption, the reduction in the BRR is unlikely to affect them. The PPMB and excused from work category recipients are explicitly not available for work. Putting this together, 61% of the caseload are DA recipients who are unlikely to have their non-work status changed by a BI (i.e., 71% of the caseload times the 86% who are not working) and a further 6.5% are in other non-working categories. Thus, just over two-thirds of IA recipients will not have their hours of work altered by a BI.

This is an important first point—if the reason to introduce a BI is to lower the welfare wall, this is simply not relevant for the majority of IA recipients.

For the 14% of DA recipients who do work, their mean earnings are $1,000 per month. If we assume they are working at the minimum wage (currently $14.60 per hour in B.C.), this corresponds to 68.5 hours of work per month. We can break their response to the introduction of a $20,000 BI into decisions about whether to work at all and decisions about how many hours to work if they do work. Their incentives in the decision of whether to work or not are affected by the increase in their income if they have no earnings from the current level of $14,196 on an annualized basis (for a single adult with no children—a category that makes up 88% of the DA caseload [Petit & Tedds, 2020]) to $20,000. This represents a 41% increase in non-earned income. If we use the estimated upper bound elasticity we obtained from the Lemieux and Milligan (2008) numbers of –0.12 then the probability of participation would fall by 5%. Since we are examining a group who all work, this means that 5% of these people would stop working.

Alternatively, we can express this in terms of the proportion working among all DA recipients, implying that the proportion working would decline by 5%, or from 14% to 13.3%.

At the same time, this group would move from the current situation with a 0% BRR for earnings below the earnings exemption to one with a 50% BRR starting with the first dollar earned with the BI. The relevant elasticity for this is the elasticity of participation with respect to the wage. Dostie and Kromann (2013) provide an estimate of 0.01 for this elasticity. While this is a small elasticity, it is being applied to a very large increase in the BRR. Since we cannot divide by zero, we can approximate the increase by replacing the initial 0% BRR with a 1% BRR in the calculations. Given this, the BI system represents a 5000% decrease in the net wage. Applying the elasticity implies a 50 percentage point decline in the probability of participating. Putting this together with the income effect implies that three-quarters of this group would stop working (alternatively, expressed in terms of the percentage of everyone on DA who works, that percentage would drop from 14% to 7%). Of course, it is possible that a new BI scheme would retain a substantial earnings exemption, which would greatly reduce these implied effects.

There is one substantial caveat to this conclusion. The estimated elasticities we are discussing assume that there is a continuum of people differing in their tastes for work. The increase in income at zero hours of work created by the introduction of the BI would then induce people who were working a very few hours to stop working. But we have a situation where the people who are working are not working just a few hours—they are working enough to be at the earnings exemption. This could arise if there are fixed costs to working (which is plausible for people with a disability—they face extra costs in terms of adjustments to allow them to work at all). But this means that the estimates from the literature might not apply here. One could, as the elasticities in the literature suggest, have large drops in participation but it could also be the case that those who choose to work when facing this fixed cost have a strong inclination to work and will continue to do so even when the income they would earn when not working goes up substantially. Given this, it is best to see our first estimate as an upper bound on the decline in participation, with a lower bound of zero.

We can also think about the work hours adjustments among those who work. Since virtually all workers seem to be working at the earnings exemption level, we can focus our attention on what happens at that point. Again, there is an increased income effect. In this case, these individuals would be earning $12,000 per year but that would be taxed back at 50%. Thus, their total income under BI would be $20,000 + 0.5*$12,000 = $26,000. In comparison, under the current DA system, they would get $14,196 (the basic amount) plus their earnings of $12,000 for a total of $26,196. Thus, at the number of hours they are currently working, their income would actually decline slightly under the BI scheme, which would tend to push them toward working more. At the same time, they face a complex change in their net wage. For hours below the amount that put them right at the earnings exemption, they face a higher tax rate (lower net wage) than under DA alone. That would tend to push them toward lower hours of work. On the other hand, this is a group that might have chosen to work more hours in the absence of facing the 100% tax rate beyond the exemption. Under BI, that tax rate is reduced to 50%, implying a higher net wage and a movement toward more hours. As in our discussion of the participation rate, the net outcome will depend on the distribution of preferences about working among those who choose to work under DA. For those with more inclination to work, the combination of the reduced income and the higher net wage above the earnings exemption point will push them to working more. For those with a lower inclination toward work, the income effect will work in the opposite direction to the lower net wage they face at lower hours of work. Without any way to get guidance on the relevant distribution of preferences, and guided by the small elasticities of labour supply in the literature (which, again, do not exactly apply here), a reasonable guess is that there would be a near zero change in hours worked for those who continue to work.

Putting this together, one bound on the effect on hours worked for those on DA would be that 7% of those on DA would move from working 68.5 hours per month to zero hours. This is a substantial effect for the DA group but not for the total hours worked in the province. With 108,000 people on DA in 2019 this would amount to 7,560 people times 68.5 hours per month or 518,000 hours per month or approximately 6.2 million hours per year. This sounds like a large number until one realizes that workers in B.C. work about 370 million hours in a month so that this decrease amounts to 0.14%. And, of course, our lower bound estimate is a zero effect.

***Expected to Work***

For individuals expected to work (ETW), approximately 7% earn income while in receipt of benefits in a month based on numbers provided by the B.C. Ministry of Social Development and Poverty Reduction. Of those on ETW benefits, three-quarters are single adults without children and about one-quarter are lone parents (Petit & Tedds, 2020). The former face an earnings exemption of $400 per month while the latter have an exemption of $600 per month. We do not have the mean earnings for those who earn, but if the single adults without children were to work to the earnings exemption limit at the minimum wage then they could work 27 hours in a month. Given that there were approximately 30,000 single adults on ETW benefits in a pre-COVID-19 month and 7% of them (2,100) worked, this amounts to 56,700 hours of work in a month at most. Based on the fact that estimates of hours of work elasticities tend to be small, there is no point in making fine calculations about possible changes in hours worked conditional on working for this group. Instead, I will focus on the participation margin.

For the ETW recipients, monthly benefits amount for a single adult are $760. A $20,000 BI would imply an increase of $907 per month for these people—a 119% increase. Using the upper and lower bound estimates for the participation elasticity from Lemieux and Milligan (2008) of –.13 and –.03, the implied change in the employment rate for the ETW single adults would lie between an upper bound of a decline of 1.1 percentage points (from 7% to 5.9%) and a lower bound decline of 0.25 percentage points (from 7% to 6.75%). These effects would be offset by the impacts of the reduced BRR. The earlier discussion of participation tax rates suggests that the reduction in those tax rates from moving to the BI scheme would be small. The maximum PTR under the current system occurs at about $14,000 and amounts to about 65% (if one ignores taxes other than those related to IA). Thus, a shift to a BI with a 50% BRR amounts to only a 15% drop in the PTR (with the BRR constant in a BI scheme, it is equivalent to the PTR).

We can work with a lower bound elasticity of participation with respect to the wage of 0.01 from Dostie and Kromann, and an upper bound elasticity of 0.3 from the U.S. literature (at least, prior to the Kleven [2020] study). This implies a lower bound on the increase in the probability of work from lowering the welfare wall of .01 percentage points and an upper bound of 0.32 percentage points. Putting these together with the income effects, the largest predicted decrease in the percentage who work (formed by using the largest income related decline with the smallest wage related increase) is 1.1% (from 7% to 5.9%). The other extreme estimate (formed by using the smallest income related decline with the largest income related increase) is an increase in the percentage employed by .07 percentage points (from 7% to 7.07%). Thus, the estimates from the literature imply that the combination of increased income and lowering the welfare wall could have effects ranging from small decreases in the employment rate to (even smaller) increases in the employment rate. Since the increases depend on large employment responses to wage increases that are currently being questioned in the literature, it the most likely impact is a small decrease in employment.

Taken as a whole, these calculations suggest that a move to a BI will have very limited welfare wall lowering effects for the existing IA population. These mostly do not apply to the majority of IA recipients (those on DA), and for those on ETW benefits the estimated effects are very small.

## Demographic Groups

### *Single Adults Without Children*

For this group, the relevant benefit when not working will be expected to work (ETW) benefits.[5] For the ETW recipients, monthly benefits amount for a single adult are $760. A $20,000 BI would imply an increase of $907 per month for these people—a 119% increase. Based on the 2016 Canadian census, single adults (age 19 to 64) in B.C. have an employment rate of 79.7% when non-employment is defined as not working at all during the 2015 calendar year.

I will compute the expected effect on hours of work for single adults without children using the elasticity estimates discussed earlier in combination with census data. Specifically, I will use the actual hours worked and market income for this single adult group observed in the census. The alternative would be to calculate effects at each hour using differences between a budget constraint drawn under the current system and one for the BI to calculate impacts on income and BRR at each point. Moving from that to an overall number would require having a distribution of people across hours of work. Instead, I am using the observed income for each

[5] The obvious other potential source of benefits is Employment Insurance, but given its complex inter-relation with work patterns, it is difficult to incorporate and I will leave it aside for now.

person. This takes into account the actual usage of systems; for example, that people may have access to IA benefits but do not use them in most months.

I will focus on individuals with market income below the break-even level (= $20,000/0.5 = $40,000). This ignores the Arrow 3 movement in Figure 1 but calculating those movements would require estimating a full model of preferences. For each person in our single adults group with market income below the break-even level, I first calculated the difference between the income they would have with the BI and their actual income. I then used that in combination with estimates of the elasticity of hours of work with respect to income to calculate implied reductions in hours of work through this channel. I used, as a lower bound, the estimate from Dostie and Kromann of –.01 and as an upper bound the estimate by Robbins from the U.S. NIT experiments of –0.1.

In addition, I calculated the decrease in hours worked because of the increase in the tax rate by 0.5 (the BRR associated with the BI). To do this, I first computed hours of work in the year using the categorical variable in the census showing weeks of work in combination with whether the weeks were part or full time. I used the mid-point of the weeks categories and assumed that part-time workers worked 19 hours per week and full-time workers worked 40 hours per week (the means in the Labour Force Study). I then used Dostie and Kromann's result that the wage elasticity was sizable below median hours but zero above it. In particular, I assumed an elasticity of 0.1 for people with hours below the median and zero for those with hours above the median.

Finally, I added the hours loss from the two sources. If the implied reduction in hours was equal to or greater than the actual hours worked for the person, I assumed that the person withdrew from working. Thus, this approach yields the effects on total hours of work in the economy through both reductions in hours of work for those who continue to work and withdrawal from the labour force. The lower bound estimate of the percentage in our below break-even income level group who withdraw from work is 0.4% and the upper bound is 3%. The estimates imply a decline in hours of work between 2.2% and 10% for the group of single adults without children whose income was below the break-even level. These estimates are sizable but in line with estimates such as those from Lemieux and Milligan (2008). Hours worked by our group, though, make up 6.5% of all hours worked in the B.C. economy in the census year. Thus, the impact on total hours worked in the economy through this group is between 0.15% (lower bound) and 0.65% (upper bound). As a consequence, if we focus on this specific group, the hours implications for them are substantial but they amount to small (though, at the upper bound, not completely inconsequential) impacts for the economy as a whole.

***Lone Parents***

We can make the same type of calculations for lone parents as those for single adults without children. For a single parent with one child, the IA monthly benefit is $1,096, or $13,152 on an annual basis. They also get a Child Opportunity Benefit (COB) of $1,600 (if their income is below $25,000) and a CCB payment of $6,765 if they have one child under the age of six and their income is less than $31,000. This amounts to total benefits of $21,517. I have assumed throughout that the CCB and COB would remain in place under a BI scheme. Thus, the guarantee level for a single parent with one child would be $28,365 under the proposed BI plan. In addition, as with the single people without children, their BRR would be reduced from 100% to 50% and there would be no earnings exemption.

For this group, the shift of the BI represents a smaller (32%) increase in their income guarantee but because the distribution of earned income for lone parents is lower than that for single adults, the mean increase in income for people in our census sample is larger for lone parents. As a result, the implied decline in person hours of work for lone parents is between a lower bound of 10% and an upper bound of 27%. It is worth noting, again, that for this group the fact that there is no earnings exemption in our BI scheme has an impact. This is the opposite of the situation in the Mincome data where the NIT reduced the welfare wall to working. As with the single adults, the group of lone parents below the break-even point is small enough that their impact on total hours worked in the province is small. The introduction of the BI scheme would reduce total hours by between .11% and .28%

***Couples with Children***

For a couple with one child, the IA monthly amount is $1,261. The COB is, again, $1,600 and the CCB is $6,765 for families with incomes under $31,000. Thus, the total annualized amount under the current system is $23,497. If we use the square root of 2 rule for adults to compute the BI payment for the couple, that amounts to $28,000. Then, adding in the COB and CCB, their total income guarantee would be $36,385, representing a 55% increase relative to the current situation. I again use 2016 census data which refers to the 2015 calendar year for income—prior to the introduction of the CCB. To get an estimate of income changes associated with switching to the BI from the current system, I add $2300 (the amount that Najjarrezaparast and Pendakur (2020) report as the typical annual increase in benefits associated with shifting from the former system to the CCB for a family with one child) to the income for all families. Again, I assume those with predicted hours declines that are greater than their actual hours of work withdraw from the labour force. Thus, the estimates again include both extensive and intensive margin adjustments. As with the previous exercise, I assume that only those with household incomes below the break-even level adjust their hours.

The result of this exercise is a decrease in hours worked for couples with children of between 5% and 14% and a decline in the overall hours worked in the B.C. economy by between 0.15% and 0.44%.[6] Under the upper bound income elasticity, approximately 5% of this group would withdraw from work in response to the introduction of the BI. Thus, as with the single adults, the impact is significant for this group but the impact for the economy as a whole is smaller.

[6] Recall that my calculations imply a zero effect on hours for those with income above the break-even point.

***Couples Without Children***

Finally, I examine the predicted impact on hours for couples without children. Their monthly benefits under IA amount to $1,077, or $12,924 on an annualized basis. Their BI base income (using the square root rule for families) is $28,000 with a break-even level of $56,000. Thus, for this group, the BI would represent a substantial increase relative to the existing system. I will again assume that resulting hours adjustments are restricted to those with prior incomes below the break-even level.

The results for this group indicate that a move to a BI would imply a decline in their hours of work by between 6% and 12% with the impact on total hours worked in the economy being a decline between 0.18% and 0.35%.

If we add the estimates for the four groups, we arrive at a lower bound impact of the introduction of the BI on overall hours of paid work in B.C. of a decline of 0.6% and an upper bound impact of a decline of 1.7%. These numbers are small relative to regular variability in the economy but the upper bound number, in particular, is not completely trivial. Thus, impacts on total working hours in the economy might be a consideration in whether to implement a BI but it would certainly not be the determining factor. But it is worth keeping in mind that one might expect much more substantial impacts on hours worked for low income populations relative to the current system, especially for single adults and couples without children. Because this is unlikely to be an issue for the economy as a whole, this points to questions about what is best for people in these disadvantaged populations and what they want.

**Dynamics**

All of the estimation and discussion to this point has taken place within a static framework. In that framework, individuals or households make decisions at one point in time for that point in time. But we know from the work with the B.C. administrative data that there are important dynamics, with most IA recipients being in receipt of benefits for short individual spells (approximately 60% of spells for IA recipients without a PWD designation are 6 months or less in length [Green et al., 2020]) but some having repeated spells. This complicates the discussion of welfare walls to some extent. If we pay attention only to those currently on IA, as we have seen, reducing the welfare wall imposed by a 100% BRR would likely have only minimal effects on paid work. But if the non-work benefit is more generous and easier to access then a lower welfare wall (i.e., a lower BRR) could have the effect of moving the system toward even more short spells.

As a first step in examining this possibility, I obtain the employment rates at the weekly level from the 2016 census for the demographic groups examined earlier.[7] In order to focus attention on the set of people most likely to receive transfer benefits, I restrict the samples to those whose highest educational level is high school graduation or less. This has the added

[7] The census questionnaire specified that respondents report their labour force status in the week of May 1 to May 7, 2016.

advantage that it is the same population for which Lemieux and Milligan (2008) obtained estimates of the impact of access to higher SA benefits in Quebec.

For single, childless adults with high school or less education, the employment rate in the reference week was 64.6%. Notice that this is much lower than the 80% employment rate we obtained for this group when we define non-employment as not working during an entire year. This shows that some of those not employed in a given week will still work at some time during the year.

As we saw earlier, a shift to a $20,000 BI would represent a 119% increase in benefits when people in the group are not working. If we use the extreme elasticities of employment with respect to income from Lemieux and Milligan (2008) of –.03 and –.13, the employment rate is predicted to fall by between 2.3% and 10% due to the income increase. Offsetting this is the effects of the reduction in the BRR, which we estimate using the same extreme values for the elasticity of participation with respect to the wage as we used in our discussion of the ETWs (i.e., 0.01 and 0.3). As before, I apply these to the percentage increase in the net wage due to the drop of the PTR from its highest current value (0.65) to the BRR under the BI (0.5). This implies an increase in the employment rate of 0.1 percentage points at the smallest and 2.9 at the largest. Pairing the largest income induced decline with the smallest BRR induced increase yields a lower bound estimate of a decline in the employment rate by 9.9 percentage points (i.e., from 64.6 to 54.7). Pairing the smallest income induced decline, with the largest BRR effect implies an upper bound estimate of 0.6 percentage points (i.e., from 64.6 to 65.2). This is obviously quite a large range, reflecting the level of uncertainty in the estimates in the literature. What seems most plausible (given what previous authors see as their preferred estimates) is a small decline in the employment rate. The results for childless couples are very similar to those for single adults because they experience similar increases in their base guarantee income.

For couples with children, the BI scheme implies a much smaller increase in guaranteed income (19% instead of 119%). Because of this, for this group, the BRR reduction effect dominates, and the bounds on the impact on the participation rate are -1.7 percentage points (reducing the employment rate from 73.9% to 72.2%) and 1.5% (an increase from 73.9% to 75.4%). For this group, with small changes in benefits, it is the reduction in the welfare wall that matters.

The estimated effects for the employment rate at the weekly level are relevant because they capture potential sub-annual effects that are not part of my earlier calculations about annual hours of work. Green, et al. (2020) show that one of the key changes in IA use at the time of the program cuts in the mid-1990s and in 2002 was a sharp shift away from short and more seasonal spells. The system in place before those policy changes allowed easier access, so was closer to a BI than the system that existed once the reforms were implemented.

The important question is whether introducing a BI would result in a shift back to the patterns that existed in the early 1990s when, at the peak, 12% of the B.C. population was in receipt of IA benefits in any month. The largest of the estimated employment rate effects point to some substantial shifts in this direction for some groups. The estimates in Green et al. (2020) show that approximately half the decrease in IA receipt at the time of the 2002 policy changes can be attributed to limiting entry into IA receipt, with the other half being due to an increase in the exit rate from IA. A BI would be similar to a return to easier entry rates (since there are no other requirements than income loss to qualify for the full benefit) and explicitly does not have a mechanism for affecting the move from non-work to work. Thus, on both margins, we could expect a move back toward the conditions under IA in the early 1990s. However, Green et al. (2020) argue that the sharp increase in the level and seasonality of IA receipt in the early 1990s was likely a result of the cut-backs in the Unemployment Insurance system at the time. At the moment, the federal government is moving to expand Employment Insurance to cover more of the people who lost access to benefits in the early and mid-1990s. For that reason, it seems likely that a BI would not induce a complete return to the IA patterns of the early 1990s but, at the same time, it seems reasonable to predict that introducing a BI could induce a move toward more seasonal, shorter spell work patterns.

## Conclusion

One of the main questions raised in considerations of whether to introduce a basic income is its potential effects on paid work—both at the extensive margin (whether people work) and the intensive margin (how many hours they work when they do work). In this article, I examine these effects using a combination of basic theory, previous computations related to impacts on the effective tax rates faced by households, estimates of labour supply elasticities from both the 1970s NIT experiments and the broader labour supply literature, and calculations using census data, the elasticity estimates, and the effective tax rate computations.

The examination of the effective tax rates indicates that the rates facing non-workers and low income workers are very high—over 100% in some cases. However, the results also show that a BI with a 50% benefit reduction rate is only slightly better than the existing system in terms of participation tax rates—the effective tax rates people face when deciding whether to start working. This is true, in part, because the current system includes an earnings exemption with a 0% tax rate and the PTR averages in this zero tax rate component. The BI could be designed to also include an earnings exemption, but doing so would make it more expensive and result in more workers facing the extra BRR associated with the BI. In addition, the nature of averaging in zero values means that the difference between the PTRs for the current system and those under the BI system will still not be nearly as large as the marginal effective tax rates facing individuals in the income range where the current system taxes back all of their additional earnings. Thus, the BI is not as an effective a response to the welfare wall facing non-workers as it appears on the surface.

The labour supply literature provides a range of estimates of both the wage elasticity (i.e., how hours of work or the decision of whether to work would respond to changing the effective hourly wage facing worker through changes in tax rates) and the income elasticity (i.e., how hours and participation decisions would respond to increases in income due to the introduction of a basic income), although the majority of credible estimates of both tend to be small. Using these estimates in conjunction with 2016 census data on actual incomes and family types, I generate plausible impact ranges. I examine a basic income with a $20,000 guaranteed income and a 50% BRR, which is on the upper end of generosity among basic income proposals. For that reason, my exercise generates work effects that are larger than would occur under most proposed basic income schemes.

The impact of moving to this basic income scheme is relatively small, with estimated effects amounting to reduction in total hours worked in the B.C. economy varying between 0.6% and 1.7% (depending on the elasticity estimates being used). Since most elasticity estimates are at the small end of the range of estimates, it is the lowest value that is likely the most credible. This is a non-trivial number for the economy as a whole but is well within normal variability in hours of work over the business cycle. As a result, reductions in total hours of work are not completely trivial but they would not be a determining factor in deciding whether to implement a BI.

While the impact on overall hours is small, there is variation in expected impacts for different groups. For those already on income assistance (for whom the basic income scheme would represent a lowering of the welfare wall), expected effects are small. This is partly because disability assistance recipients make up 70% of the IA caseload and all but 14% of them do not work despite relatively generous earnings exemptions in the current system. For the set of people on disability assistance who are working and for recipients in the rest of the IA system, the work effects of shifting to a basic income are generally small. There are simply not enough people in a position where the welfare wall matters and for those for whom it does, the BI does not reduce it enough to have a large impact.

Single adults and couples without children would experience substantial increases in income from the proposed BI scheme relative to the existing IA system. For single adults with income that would put them below the BI scheme break-even income level, for example, my predictions based on the range of labour supply elasticities ranges from a drop of 2.2% in their hours worked to a drop of 10%. It also raises the possibility that a move to a BI scheme would imply a return to the type of more intermittent work and benefit receipt patterns seen in the mid-1990s when 12% of the B.C. population was in receipt of IA in each month and the receipt pattern included more seasonality and more short spells than in the current system. Since the increase in IA receipt in the mid-1990s seemed to be related to the federal government cutting back the Unemployment Insurance system and the federal government now seems to be moving back into this area, it seems unlikely that a BI scheme would imply a complete return to those outcomes—though some move in that direction is likely.

Overall, based on estimates in various related literatures and an exercise using those estimates in conjunction with census data for B.C., a shift to a generous basic income scheme would likely have limited impacts on total hours worked in the economy. It would also likely have small effects in drawing IA recipients into work through lowering the welfare wall. At the same time, there are some groups—notably those without children—for whom predicted hours reductions are somewhat larger. Concerns for those groups could be mitigated by implementing a wage or earnings subsidy in conjunction with the basic income. But the key conclusion is that hours impacts are likely not large enough for them to be the main factor in deciding on whether to adopt a basic income.

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