Fiscal Policy Can Raise Both Employment and Productivity

William Scarth[1]
McMaster University

RECENTLY, THERE HAS BEEN a revival of interest in what Arthur Okun (1975) called "the big trade-off". Following Okun, the conventional wisdom has been that we face a trade-off between our equity and efficiency objectives. Consider, for example, a policy whereby the government offers an employment subsidy or a payroll tax cut — initiatives that are intended to lower unemployment, and thereby help the poor. The government has to finance this initiative, and if this is accomplished by an increase in general income taxes, there will be an increase in the tax burden on the rich. The rich react to the higher taxes by investing and producing less, so that there is a reduction in the average person's material living standards. Okun introduced the metaphor of the leaky bucket to describe the loss of efficiency that is part of the redistribution process — *if there are no pre-existing market failures that redistribution can alleviate*. Okun argued that "money must be carried from the rich to the poor in a leaky bucket. Some of it will disappear in transit, so the poor will not receive all the money that is taken from the rich." This loss involved in the redistribution process is particularly high if the economy's *ongoing* productivity growth *rate* is reduced by higher taxation.

Market-oriented policy advisors often remind us of Okun's warning, and as a result, they emphasize the lower-productivity-growth costs of fighting unemployment. On the other hand, more left-leaning policy advisors argue that the productivity growth rate may not suffer too much as we address the unemployment problem. But is it possible that there is *no* trade-off, and that employment-raising fiscal policies can *simultaneously* lower unemployment and raise productivity growth? If so, there is a much stronger case for attacking structural unemployment than is commonly assumed. This article examines one of this class of fiscal policies — employment subsidies — and shows that it does lead to this "win-win" outcome — lower unemployment and higher productivity growth in an entirely standard economic model. The article argues that we can, therefore, pursue this policy with much more confidence than is usually thought appropriate.

I am not the first commentator on Canadian public policy to suggest that Okun may have overstated how much we face an equity-efficiency trade-off. Osberg (1995) surveyed some quite complicated endogenous growth models — ones that involve the property that decreasing inequality can raise overall productivity growth. This is because, with fewer poor people, a smaller proportion of the population faces a borrowing constraint that precludes the pursuit of education. But, given the limited ability to test these rather elaborate growth models, their existence has not changed the focus of policy

debate. For example, Mintz (2001) mentions the possibility that decreasing inequality can cause higher growth — rather than be a result of higher growth — but he does not dwell on it. He opts for what he regards as a safer strategy — that we rely on the rising-tides-lifts-all-boats approach (sometimes referred to as "trickle down" economics). This mainstream approach involves pursuing the efficiency objective, by stimulating higher productivity growth via tax reforms that encourage saving and investment. Those on lower incomes can benefit, even if inequality is not reduced. The contribution of the present article is that — by providing a starkly simple, mainstream example of what Alan Blinder has called "percolate up" economics, I hope to increase the willingness of policy makers to take seriously the notion that egalitarian measures can be good for productivity growth.

Before proceeding with the specifics of the analysis, it is worth noting the basic intuition behind why we should not be surprised that policies that reduce structural unemployment may not involve an equity-efficiency trade-off. As the italicized phrase in the first paragraph suggests, an initiative can be both efficiency-enhancing and equity-enhancing, if we are starting from what economists call a "second-best" situation. Involuntary unemployment involves just this kind of situation.

Perhaps it is useful to clarify what economists mean by a second-best situation, by briefly discussing an example introduced in the original paper on this topic (Lipsey and Lancaster, 1956). In a two-good economy, standard analysis leads to the proposition that a selective sales tax is "bad". With a tax on the purchase of just one good, the ratio of market prices does not reflect the ratio of marginal costs, so decentralized markets cannot replicate what a perfect planner could accomplish — achieve the most efficient use of society's scarce resources. This is because society is producing and consuming "too little" of the taxed good, and "too much" of the

untaxed good. But this conclusion assumes that there is no pre-existing market distortion, before the tax is levied. A different verdict emerges if it is assumed that there is an initial market failure. For example, if one good is produced by a monopolist who restricts output and raises price above marginal cost, a similar inefficiency is created (with society consuming "too little" of this good and "too much" of the competitively supplied good). There are two policies that can "fix" this problem. One is to try to use the Competition Act to eliminate the monopoly; the other is is to levy a selective excise tax on the sale of the *other* product. With this tax, prices of *both* goods can be above their respective marginal costs by the same proportion, and society gets the efficient allocation of resources — even with the monopoly. So the verdict concerning the desirability of a selective sales tax is completely reversed, when we switch from a no-other-distortions situation to a with-other-distortions setting.

This article shows that this same logic applies in macroeconomics to factor markets. With incomplete information or imperfect competition in the labour market, labour's price is "too high" and firms employ "too little" labour. By stimulating employment, we can increase overall efficiency — that is, we can have a higher productivity growth rate. This is because the prospect of being unemployed reduces an individual's incentive to acquire human capital, and this is why policies that help the poor — by lowering unemployment — can be pro-growth after all. We pursue this simple idea for the remainder of the article.

A Simple Model of Productivity Growth with Unemployment

Our analysis relies on a very simple version of endogenous growth theory, which we use as a framework for examining the desirability of an

employment subsidy. Compared to the literature, the model we use involves a "middle-of-the-road" assumption concerning the factor intensities that are involved in the production process. The standard "*AK*" model of endogenous productivity growth involves a "short cut" by assuming that the accumulated stock of knowledge is simply proportional to the aggregate stock of *physical* capital. In contrast to this, the basic version of Lucas' (1988) two-sector framework makes the accumulation of knowledge completely independent of the stock of physical capital. The "education" sector is assumed to involve only the pre-existing human capital in the production of new knowledge, so it is *human* capital, not physical capital, that is the engine of productivity growth.

Not surprisingly, the fiscal policy implications of these two polar-case-opposite assumptions are very different. The standard *AK* specification leads to the policy proposition that interest-income taxes should not exist, while the assumption that only human capital is needed to acquire more knowledge leads to the proposition that wage-income taxes should not exist. The specification used in the present analysis (suggested by Barro and Sala-i-Martin (1995: 144-146)) is an appealing intermediate specification. It involves the assumption that physical capital and human capital are used in the same proportions when producing all three items: consumer goods, new physical capital goods, and new knowledge (human capital). This assumption gives physical and human capital equal weight in making the productivity growth rate amenable to policy. Despite this fact, it is interesting to note that — if unemployment is removed from the analysis — it still supports the proposition that taxes on labour should exist while those on physical capital should not. Thus, there are two reasons to regard this intermediate specification as appealing. First, since it is a more general specification (it nests within it both the *AK* and Lucas specifications) it

is more likely to apply to real economies. Second, it involves "stacking the cards" against our finding that subsidizing labour rather than taxing labour is recommended. When such a finding is supported in such a "hostile" setting, it increases our confidence in the likely applicability of that finding.

As noted, we consider a policy initiative that reduces unemployment, and this increases the likelihood that individuals will benefit from having human capital. In short, lower unemployment raises the return on human capital, so it stimulates investment in education. The government pays for this initiative by raising the general income tax. Since this includes the taxation of interest income, the financing of the employment subsidy reduces the incentive to save. A formal model is needed to determine whether the pro-growth feature of the higher employment dominates, or is dominated by, the anti-growth influence that accompanies the higher tax on interest earnings that is levied to finance the employment subsidy.

I now describe the structure of the model. In the final paragraph of this section, I summarize this discussion by listing the model as a set of equations. Readers can skip that last paragraph without any threat to their appreciating the remainder of the article. It is included only for that subset of readers who may value seeing the precise system (that they could readily solve by standard methods) to verify all statements in the article.

We start with the straightforward proposition that supply equals demand; the supply of goods produced is either consumed by each of two groups of households — the "rich" and the "poor" — or it is used to accumulate physical and human capital. It may seem odd to specify that *GDP* includes investment in human capital since such a line-item does not appear explicitly in the national accounts. Nevertheless, the expenditure by firms on retraining, and those by government on education, are included in the *GDP*.

Both forms of capital, and consumer goods, are produced via a standard production (input-output) function. The inputs are the *utilized* stocks of physical and human capital. We follow the convention of standard growth theory by abstracting from short-run business cycles. Thus, physical capital is fully utilized. But, because there is structural unemployment, human capital is not. The utilized proportion of the stock of human capital is $(1 - u)$ where u is the unemployment rate. The production function can be expressed as $Y = AK$ (where Y and K denote output and the physical capital input), which is the same form as that used in the most basic form of endogenous growth theory. But the difference here is that A is *not* a technologically determined constant. Instead, it rises if structural unemployment is lower, since physical capital has more labour to work with. Thus, parameter A is affected by government policy.

It is assumed that households rent out their physical and human capital to firms (that are owned by other households). Profit maximization on the part of firms results in factors being hired to the point that marginal products just equal rental prices. The expression for the marginal product of each factor input follows from the total production function. The remaining relationships that are needed to define the model are the ones that describe how households make their consumption-vs-saving (investment in capital) decision, how the unemployment rate is determined, and how the government finances its employment-creating initiative. We discuss each of these issues in turn.

Following Mankiw (2000), we assume that there are two groups of households — each representing one half of the population. One group is patient and the other is not. The patient households save as long as the after-tax return on capital exceeds their rate of impatience, and this saving generates the income that is necessary to yield a positive percentage growth rate in con-sumption. This growth in living standards equals the economy's productivity growth rate. The simplest version of this outcome is the straightforward proposition that the productivity growth rate equals the excess of the after-tax interest rate over the household's rate of impatience. The other condition that follows from household optimization concerning capital accumulation is that both physical and human capital must generate the same rate of return per unit, so households are indifferent between holding their wealth in each of the two forms of capital.

These forward-looking households make two separate decisions. As a group, each family makes the capital-accumulation decision by following the consumption-growth relationship that was just discussed. Following Alexopoulos (2003), we can think of this decision being executed by the family patriarch, who takes the labour market outcomes of the various family members as exogenous to her planning problem. She chooses the optimal capital-accumulation plan, and allocates the corresponding amount of consumption each period to each family member. Each family member is free to augment that level of consumption by adjusting her labour market involvement. Several interpretations of the labour market are possible. For example, the individual family member can vary her work effort in what is often called a "gift exchange" with her employer. Firms offer to pay wages higher than the competitive level in exchange for increased worker effort. The result is higher productivity, but also unemployment; at the higher wage rate, firms do not find it profitable to hire all individuals who want work. In a gift-exchange equilibrium, the wage rate equilibrates the "market" in worker effort; it therefore ceases to function as a variable that can adjust to eliminate unemployment. A second interpretation is that workers at each firm rely on a group representative to negotiate wages with their employer. If the negotiator pursues a wage that exceeds the workers' outside option — but only to

a limited degree since the negotiator values a high level of employment as well — a very similar specification of the unemployment rate emerges. What is of particular interest here is that (with either interpretation) the unemployment rate varies inversely with the level of the employment subsidy. Clearly, our full model is not needed to arrive at this conclusion. What the model does is facilitate an examination of how an employment subsidy affects the growth rate of living standards (the productivity growth rate).

The second group of households is impatient. They have such a high rate of time preference that they never save — beyond the investment in human capital that is necessary to have a job. As a result, this group simply consumes all their income — which is half the after-tax labour income generated each period, plus a transfer payment that the government pays to this lower-income group, minus their spending on acquiring human capital. This group interacts with employers in the same way as was described in the previous paragraph. Thus, since this group constitutes half the population, they respresent half the unemployed. They are relatively poor since, by never acquiring any physical capital, they receive no "interest" income.

The final component of the model is the government budget constraint. This relationship stipulates that the income-tax rate must be adjusted so that just enough tax revenue is raised to pay for the costs of both the general transfer payment and the employment subsidy, when the latter is introduced.

Many prominent economists such as Phelps (1997), Solow (1998), and Freeman (1999) have advocated employment subsidies. In practical terms, they call for a major enlarging of the earned income tax credit policy in the United States. In applying this article's analysis to Canada, therefore, readers should interpret it as a call for adopting the earned income tax credit in this country. As surprising as it may seem, given the high-profile advocates of employment subsidies, the investigation of this broad strategy within an endogenous-productivity-growth setting has not been pursued before.

As mentioned at the beginning of this section, this final paragraph contains a listing of equations that define the model. This paragraph can be ignored by readers who are not concerned with formal verification of the reported findings. The economy's resource constraint is $Y = C + E + \Delta K + \Delta H$, where Y, C, E, K and H denote total output, consumption spending by the forward-looking households (Group 1), consumption expenditures by the hand-to-mouth households (Group 2), physical capital and human capital. The Cobb-Douglas production function is $Y = aK^b((1-u)H)^{1-b}$ or $Y = AK$ since $B = (1-u)H/K$, $A = aB^{1-b}$, and u is the unemployment rate. Profit maximization stipulates that $bA = r$ and $(1-b)Y/(1-u)H = w$, where r and w are the rental prices of physical and human capital. Inter-temporal optimization by Group-1 households leads to $\Delta C/C = r(1-t) - i$, where t and i are the income-tax and time-preference rates. Spending by Group-2 households is given by $E = R + [w(1-u)H - \Delta H]/2$, where R is transfer-payment receipts. The unemployment-rate equation is $u = (b(1-v)/v)(1-s)$, where s is the employment subsidy and v is the exponent on employment in the labour negotiator's Cobb-Douglas objective function. $(1-v)$ is the weight on wages. The government budget constraint is $sw(1-u)H + R = trK + tw(1-u)H$, which states that the income tax revenue pays for general transfers and the employment subsidy. Balanced growth is assumed, so $\Delta C/C = \Delta K/K = \Delta H/H = n$. The equations determine the responses of $n, c, e, t, r, w, u,$ A and B, when the employment subsidy is introduced (s is increased). c and e are defined as C/K and E/K, and it is assumed that the government fixes the transfer-payments-to-GDP ratio, R/Y.

In the next section, we discuss four properties of this system — that n, c and e all rise, and that u falls — as s becomes positive.

The Policy Analysis

As noted above, it is left for the interested reader to use the equations to verify the results that we now summarize. Introducing the employment subsidy leads to lower unemployment. As a result, physical capital has more labour to work with, and this raises physical capital's marginal product, and so raises the interest rate. Thus, there is an increased incentive to save. Financing this initiative with a higher personal income tax rate shrinks, but does not eliminate, this increased incentive to save. The value of the formal model is that it allows us to see that between these competing effects on the after-tax return on saving — the rise in the pre-tax rate of return and the rise in the tax rate applied to that return — the former *must* dominate. Further, the model clarifies that there is *no* short-term pain involved (in either the richer or the poorer households having to cut current consumption) in order to secure this long-term gain (higher productivity growth). Indeed, there are "good news" outcomes on three fronts: unemployment falls, the level of consumption rises, and the ongoing productivity growth rate rises. While it is obvious that I cannot claim that all models would support these conclusions, at least we know that this quite standard one does. Further, it can be shown that the increase in the growth rate is larger when the employment subsidy is financed by an expenditure tax, not the income tax. Thus, our analysis complements the more standard fiscal policy suggestion for raising productivity (for example, Mintz (2001)): that we replace the income tax with an expenditure tax. In any event, we conclude that basic endogenous-growth analysis supports initiatives designed to reduce structural unemployment.

This conclusion may not be too surprising, if one recalls the Bhagwati/Ramaswami (1963) theorem. This proposition concerns a second-best setting, and it states that we have the best chance of improving economic welfare if the attempt to alleviate the distortion is introduced at the very source of that distortion. Since the distortion in this case is that wages are "too high" to employ everyone, one would expect that the government can improve things by pulling the wage that firms have to pay back down. Another way of saying essentially the same thing is to note that the second-best problem is the existence of some failure in the labour market, such as asymmetric information or imperfect competition, which leads to a level of employment that is "too low." By directly stimulating employment, an employment subsidy partially removes the original distortion at source, and this is why the analysis supports these initiatives.

Conclusion

Phelps (1997), Solow (1998), and Freeman (1999) have all strongly advocated employment subsidies. Despite the resulting widespread interest in this proposal, none of the existing analyses have examined its effect on productivity growth. The present analysis represents at least a partial filling of this gap in the literature. It is reassuring for the advocates of this approach that further support for this policy emerges in this variable-productivity-growth setting.

Of course, further research investigating the generality of this finding would be valuable. I have deliberately kept the formal analysis boldly simple, since the intention has been to emphasize that one does not need to build elaborate models to make possible the elimination of the equity-efficiency trade-off. That is, I wanted to stress that counter examples to Okun's leaky bucket should not be viewed as academic curiosities. Part of the strategy has been to adopt simplifications that make it harder to reach that very

conclusion. For example, by assuming that firms simply invest whatever households save, there can be no Keynesian insufficient demand problems. If I had allowed unemployment to exist for this reason (that is, if I had allowed for business cycles, cyclical unemployment and variable capacity utilization), it would be even easier to show that reducing unemployment and excess capacity would stimulate higher investment. Some other assumptions are made for convenience. The consumption function implies an interest elasticity of savings that is likely bigger than what obtains in the real world. Nevertheless, since both the favourable higher interest-rate effect and the unfavourable higher interest-income-tax effect operate through this same parameter, the results are likely not sensitive to this simplification.

Some readers may be uncomfortable with an applied policy analysis that appears to make no reference to empirical measurements. There is, in fact, some empirical information lying behind our conclusions. One finding — that the level of living standards for the forward-looking households rises when unemployment falls — requires that certain features of the economy be measured. A sufficient, though not required, set of assumptions for this result to hold is that both physical capital's share of national income and the initial income-tax rate be one-third, and that the initial structural unemployment rate be six percent. Since this set of assumptions is plausible (and just sufficient, not necessary, for this result to apply), we hope that more empirically oriented readers are reassured.

Another concern may be that Canada is a rather small open economy and the analysis ignores this fact. But the analysis remains fundamentally applicable to the entire North American continent. Since similar policy options are often discussed on both sides of the Canada-US border, the simplification that is achieved by modeling the entire continent is appealing.

A final concern may be that — on political feasibility grounds — there has been little appetite in Canada for initiating new government programs such as the earned-income tax credit (the applied policy analogue of the employment subsidy). At this time, however, the political tide may be turning. In the federal government's recent *Fiscal Update* (Finance Canada, 2005), the government announced a new *Working Income Tax Benefit* (to start in 2008). This initiative is intended to "help low-income Canadians break through the welfare wall." The fact that this policy is in that part of the government's document entitled "Building the Right Investment Environment," suggests that Finance Canada officials may be starting to appreciate the pro-growth benefit of addressing structural unemployment and inequality (that is the focus of this article).

Another option for actually applying the message of this article may be for policy-makers to focus on payroll tax cuts. After all, many labour-market analyses have shown that the level of structural unemployment can be reduced by this measure as well. However, it must be remembered that the payroll tax base is the wage bill (the wage rate times the level of employment) while the employment subsidy base is simply the level of employment. So a payroll tax cut is not a perfect substitute for an employment subsidy. Indeed, I have verified that more empirical information is required for a payroll-tax-cut analysis to support the conclusions of this article. Thus, the article is not intended as a "final word" on the possibility that fiscal policy can be simultaneously efficiency-enhancing and equity-enhancing. Instead, its goal has been to present the simplest defense of the proposition that such a "win-win" outcome can be expected, and to applaud the government's initiative in the recent *Fiscal Update*.

Most current macroeconomic policy debate in Canada is focused on increasing productivity growth. For example, Mintz (2001) in his influ-

ential *Most Favored Nation: Building a Framework for Smart Economic Policy*, promotes tax cuts and tax reform to increase saving and investment. Income inequality is considered, but the basic conclusion is that growth should be the primary focus, since — without growth — governments find it difficult to pursue social policies that can alleviate inequality. While the possibility of second-best considerations making the direction of causation in the relationship between inequality and growth run in the opposite direction is mentioned, this issue is not pursued. Our analysis is intended to emphasize that this possibility should be pursued. We have demonstrated that, in an entirely standard model of endogenous productivity growth, a policy that addresses ine-

quality via reducing unemployment is growth-enhancing. In short, it is not all that difficult to find counter examples to Okun's leaky bucket. Policy analysts should make exploring the robustness of our results, and the finding of more counter examples (in settings that some may regard as more realistic) a priority.

Policy makers should welcome these findings. Trade-offs are intimidating to politicians, and as a result, trade-offs make inaction a very tempting strategy. The fact that policy makers may not have to pay a cost in terms of reduced long-term productivity growth when they strive to reduce structural unemployment should make pursuing lower unemployment more feasible from a political point of view.

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