Abstract
As a rule, rational workers prefer to tax workers, not capitalists.

Taxes Rational Workers Want:
An Illustration of the Chamley-Judd Theorem

Let’s assume there’s a fixed amount of government, $g$, to pay for each period, and budgets are always balanced. There’s a bill to pay and it can’t be avoided. The question before us is simple. In the long run, in the steady state, which policy produces the highest after-tax wages for workers: an income tax on capital or a income tax on labor? Common sense says that workers would naturally prefer capitalists to pick up the tab but common sense is a bad guide to astronomy so perhaps it’s a bad guide to tax policy as well.

Output is Cobb-Douglas:

$$Y = K^{0.5}$$

and labor is supplied inelastically. Markets are competitive, and since the exponent on capital is 1/2, workers and capitalists each get half of pre-tax GDP in equilibrium. Capitalists always discount the future at rate $r$ per period. First consider what happens if capitalists pay the bill, and the tax rate on capital is $t_k$ per period. The tax rate has to adjust to pay for the fixed $g$, and since capital earns half of GDP then the following must hold:

$$g = t_k0.5K^{0.5} \quad (1)$$

In a Ramsey-style steady state without long run technological progress, the after-tax return on capital must equal the rate of time preference, which in turn equals $1-t_k$ times the marginal product of capital:

$$r=(1-t_k)0.5K^{0.5} \quad (2)$$

One could well think of $r$ as the after tax return available elsewhere in the global economy----so everything in this short note works equally well in an open- or closed-economy setting.

These two equations are all we need to solve for $K^k$, the steady state capital stock under a capital tax: After substituting out $t_k$ and a few steps of algebra (including a rare use of the quadratic formula) we find:

$$K^k = \left[ (0.25 - 2gr)+(0.25^2 - (2gr)^2)^{0.5} \right]/(2r^2)$$

Once we know $K^k$ we know total after tax wages for workers:

$$w^k = 0.5(K^k)^{0.5} \quad (3)$$
The steady-state wage under a labor tax, $w^u$, is simpler to calculate since labor is supplied inelastically and capital is now free of tax distortions. Solving (2) without a capital tax we see that the untaxed capital stock heads toward $(2r)^2$ so total after-tax wages equal

$$w^u = (4r)^1 - g.$$ (4)

One quick check that we are on the right path: You will see that total wages are the same in (3) and (4) if government spending falls to zero.

Now we would like to know: Can we be sure that $w^u$ is greater than $w^k$? You are welcome to prove that formally, but I decided to go with an Excel file. Try plugging in different values of $g$ and $r$ and you will find that after-tax wages are always higher when government puts the taxes on workers rather than the capitalists.

Rational workers would rather pay the tax themselves using a big capital stock rather than have the capitalists pay the tax but be forced to use a smaller capital stock.

**Coda**

Yes, there are plenty of ways to change this result. Examples: If capital has positive externalities or if workers are more farsighted than capitalists then rational workers might want to subsidize capital rather than leaving it untaxed. And Emmanuel Saez has summarized some critiques of the Chamley-Judd result that push in the direction of capital taxation. But we should start with the Chamley-Judd zero capital tax result because even though it’s built on standard Ramsey model foundations it provides a shocking result that reminds us of an easily neglected fact: Capital helps workers.

Paul Samuelson said that comparative advantage is one idea in economics that is true but not obvious. The Chamley-Judd zero capital taxation result is another. Both are important starting points for serious thinking about economic policy.

Another point: $g$ could just be a lump-sum grant to workers. Rational workers would turn that down rather than tax capitalists. Chamley-Judd offer a Redistribution Impossibility Theorem.

The major finding is that if the economy were to converge to a steady state where all agents have a common rate of time preference, no agent will asymptotically choose redistributive capital income taxation, independent of his initial and asymptotic level of wealth. -- *Kenneth Judd*, 1985

The capital income tax is also often regarded as a useful instrument for the redistribution of income. However, the analysis in this paper, applied to an economy of heterogeneous agents, shows that when individuals have long lives, a permanent tax on capital income is not an efficient policy for redistribution. -- *Christophe Chamley*, 1986

And don’t forget a bonus implication: *Everything* you delay gratification for is capital, so....