# Transfers

Graham Lewis

University of Minnesota

June 2025

# Review

- We modeled the labor supply decision by a representative household.
- The household traded leisure for consumption, which was obtainable through working.
- We then incorporated labor income taxes into the model.

# Moving Forward

- So far, all income from taxes has been thrown away by the government.
- The household has not received any benefit from paying taxes.
- In reality, the government provides services from tax dollars such as Medicaid, Medicare, Social Security, an unemployment insurance.

# Transfers

- **Social Security**: Regular payments to retirees funded by payments from younger working adults.
- **Unemployment Benefits**: Payments to workers who lose their job to partially replace lost wages. These are typically time-limited and a fraction of previous earnings.
- **Medicare**: A federal health-insurance program that provides in-kind benefits including coverage of hospital, physician, and prescription-drug costs. These are provided to virtually all U.S. residents aged 65 and older, as well as certain younger people with disabilities.
- **Medicaid**: A joint federal-state program that offers means-tested health coverage to low-income households.
- You will learn more about the structure of government spending next mini.

# Transfers

- Transfers, like taxes, are taken as given by the household.
- In our model, transfers will be guaranteed no matter the labor supply decision by the household.
- While the tax was a set % of labor income that was taxed by the government, the transfer will be a set amount $T$ that is given to the household, no matter their labor supply decision.

# Transfers

- We had

$$\max_{c,n} \; u(c) - v(n)$$
$$\text{such that } c = (1-\tau_n)wn.$$

- The household will now receive a transfer $T$ from the government, regardless of their work choice, making the problem

$$\max_{c,n} \; u(c) - v(n)$$
$$\text{such that } c = (1-\tau_n)wn + T.$$

# Government Budget Constraint

- Before the government only raised funds.
- Now, the government is spending the funds it raises.
- To ensure the government is not transferring funds it does not have, we will require the government's budget to balance.
- We will need the money raised from taxes to equal the money given from transfers

$$\tau_n w n = T.$$

- In our static model, there is no idea of the government borrowing to pay back later.

# Example from Previous Lecture

- Consider the following household problem

$$\max_{c,n} \; c^{\alpha}(24-n)^{1-\alpha}$$

$$\text{such that } c = (1-\tau_n)wn + T.$$

- Note that no matter how many hours the household chooses to work, they are able to consume more than they would have been able to in a world without transfers.

# Example Problem

- We had

$$\max_{c,n} \; c^{\alpha}(24-n)^{1-\alpha}$$
$$\text{such that } c = (1-\tau_n)wn + T.$$

- Given a tax rate $\tau_n$, we'll find a value for labor supply $(n)$ and transfer $(T)$ such that
  - given the tax rate $\tau_n$ and transfer $T$, the household will maximize its utility while adhering to its budget constraint, which will yield $n$.
  - the government operates at a balanced budget with the labor income tax rate $(\tau_n)$, transfer $(T)$, and labor supplied $(n)$.

# Without Transfers

- Let's first focus on the problem without transfers, which is

$$\max_{c,n} \; c^{\alpha}(24-n)^{1-\alpha}$$
$$\text{such that } c = (1-\tau_n)wn.$$

- Using our knowledge from the previous lectures, we first consider the MRS

$$\begin{aligned}
\text{MRS} &= (1-\tau_n)w \\
-\frac{U_n}{U_c} &= (1-\tau_n)w \\
\frac{(1-\alpha)c^{\alpha}(24-n)^{-\alpha}}{(\alpha)c^{\alpha-1}(24-n)^{1-\alpha}} &= (1-\tau_n)w \\
\left(\frac{1-\alpha}{\alpha}\right)\frac{c}{24-n} &= (1-\tau_n)w.
\end{aligned}$$

- We can rearrange to solve for consumption $(c)$ in terms of labor $(n)$.

# Without Transfers

- Rearranging our MRS condition to solve for consumption $(c)$ in terms of labor $(n)$ gives us

$$c = \left(\frac{\alpha}{1-\alpha}\right)(1-\tau_n)w(24-n).$$

- Plugging this into our budget constraint gives us

$$\begin{aligned}
c &= (1-\tau_n)wn \\
\left(\frac{\alpha}{1-\alpha}\right)(1-\tau_n)w(24-n) &= (1-\tau_n)wn \\
\alpha(24-n) &= (1-\alpha)n \\
24\alpha &= n.
\end{aligned}$$

# Without Transfers

- We had that the labor supplied $(n)$ is given by $n = 24\alpha$.
- As $\alpha \to 1$ (the household only cares about consumption), the household's labor supplied will converge to 24.
- As $\alpha \to 0$ (the household only cares about leisure), the household's labor supplied will converge to $0$.
- Notice in this example the income and substitution effects cancel out.
- No matter the real-wage $(w)$ or labor income tax rate $(\tau_n)$, the hours supplied are $n = 24\alpha$.
- If we add a transfer, the household, taking the transfer $T$ as given, is guaranteed $T$ units of consumption no matter their choice of work, which, as we will see, will change their labor supplied.

# Transfers

- We had

$$\max_{c,n} \; c^{\alpha}(24-n)^{1-\alpha}$$
$$\text{such that } c = (1-\tau_n)wn + T.$$

- Recall in our framework the household, taking transfers $(T)$ as given, receives the same transfer $(T)$ no matter how much they work or consume.
- Our MRS condition will remain the same, with

$$\begin{aligned} \text{MRS} &= (1-\tau_n)w \\ -\frac{U_n}{U_c} &= (1-\tau_n)w \\ \left(\frac{1-\alpha}{\alpha}\right)\frac{c}{24-n} &= (1-\tau_n)w. \end{aligned}$$

# Transfers

- We'll have the same equation for consumption $(c)$ that we did last time, with

$$c = \left(\frac{\alpha}{1-\alpha}\right)(1-\tau_n)w(24-n).$$

- Now, when we plug our equation into the budget constraint we'll have

$$\begin{aligned} c &= (1-\tau_n)wn + T \\ \left(\frac{\alpha}{1-\alpha}\right)(1-\tau_n)w(24-n) &= (1-\tau_n)wn + T \\ T &= \left(\frac{1}{1-\alpha}\right)(1-\tau_n)w(24\alpha - n). \end{aligned}$$

- We have one equation with two unknowns ($T$ and $n$). Remember we are finding the labor supplied as a function of the labor income tax rate $(\tau_n)$

## Government Budget Constraint

- Recall we discussed earlier that the government must balance its budget each period.
- This equation is given by $T = \tau_n wn$.
- Using this and our previous work, we'll have

$$\begin{aligned} T &= \tau_n wn \\ \left(\frac{1}{1-\alpha}\right)(1-\tau_n)w(24\alpha - n) &= \tau_n wn \\ (1-\tau_n)24\alpha &= (1-\alpha\tau_n)n \\ \frac{(1-\tau_n)24\alpha}{1-\alpha\tau_n} &= n. \end{aligned}$$

- Notice that in this formulation, the tax rate does indeed affect labor supply.

# Labor Supply & Transfers

- In our model without transfers, we had

$$n = 24\alpha$$

- In our model with transfers, we had

$$n = \left(\frac{(1-\tau_n)}{1-\alpha\tau_n}\right) 24\alpha.$$

- Notice that since

$$\frac{1-\tau_n}{1-\alpha\tau_n} < 1,$$

  the household works less than they did without transfers.

- With transfers, the household has a base level of income no matter what they choose to work.

# Increasing Transfers

- We had

$$n = \left( \frac{(1-\tau_n)}{1-\alpha\tau_n} \right) 24\alpha.$$

- Note that we can increase transfers to the household by increasing taxes on labor income.

- According to our solution, we have

$$\frac{\partial n}{\partial \tau_n} = (\alpha - 1)\frac{24\alpha}{(1-\alpha\tau_n)^2} < 0.$$

- With the above preference specifications, increasing the labor income tax rate $(\tau_n)$, which increases transfers $T$, reduces the labor supplied.

# Labor Supply & Transfers

- It is worth reemphasizing that the household **does not** take into account the impact that its labor supply decision has on the transfer.
- The idea is that individuals don't think about their contribution to government revenues when making labor supply decisions.
- Mechanically, this means we cannot make the substitution $T = \tau_n wn$ when optimizing the household decision, note that

$$\begin{aligned}(1-\tau_n)wn + T &= (1-\tau_n)wn + \tau_n wn \\ &= wn.\end{aligned}$$

- The fact the household takes the transfer as given drives the change between our model with and without transfers.

# Moving Forward

- We incorporated transfers into our model.
- We saw that with transfers, the household had a base level of income no matter the hours worked and in our example showed that the household worked less.
- So far we have a model of labor supply and a model of labor demanded. Next time we will combine the two, defining a general equilibrium.