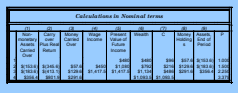
Calculating with Our Money Demand Function

Part 3



Lectures in Macroeconomics- Charles W. Upton

Nominal terms

- We can also do the calculation in terms of nominal values.
- A useful exercise.
  - At the end, a threat

Done in Nominal Terms

Done in Nominal Terms

All variables expressed in nominal dollars, not real dollars.

We use nominal interest rate

$$r_N = r_R + \eta^e + r_R\eta^e$$

Fisher's Law

The Tableau

Calculations in Nominal terms

	(1) Non-monetary Assets Carried Over	(2) Carry over Plus Real Return	(3) Money Carried Over	(4) Wage Income	(5) Present Value of Future Income	(6) Wealth	(7) C	(8) Money Holdings	(9) Assets, End of Period	P
1					$480	$480	$96	$57.6	$(153.6)	1.000
2	$(153.6)	$(345.6)	$57.6	$450	$1,080	$792	$216	$129.6	$(183.6)	1.500
3	$(183.6)	$(413.1)	$129.6	$1,417.5	$1,417.5	$1,134	$486	$291.6	$356.4	2.250
4	$356.4	$801.9	$291.6			$1,093.5	$1,093.5			3.375

Nominal Expressions

$$w_2^N = w_2^R P_2 = (\$300{,}000)(1.5) = \$450{,}000$$

$$w_3^N = w_3^R P_3 = (\$630{,}000)(1.5)^2 = \$1{,}417{,}500$$

$$r_N = r_R + \eta^e + r_R\eta^e = 0.50 + 0.50 + (0.50)(5.50) = 1.25$$

	Assets Carried Over	Plus Real Return	Over		Future Income			s	Period	P
1					$480	$480	$96	$57.6	$(153.6)	1.000
2	$(153.6)	$(345.6)	$57.6	$450	$1,080	$792	$216	$129.6	$(183.6)	1.500
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Wealth in Nominal Terms

$$w_2^N = w_2^R P_2 = (\$300{,}000)(1.5) = \$450{,}000$$

$$w_3^N = w_3^R P_3 = (\$630{,}000)(1.5)^2 = \$1{,}417{,}500$$

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$$z_1 = 0 + \frac{1}{1+1.25}\$450 + \left(\frac{1}{1+1.25}\right)^2 \$1417.5 = \$480$$

$$c_1 = \frac{1}{4+3\xi} z_1 = \frac{1}{4+3(\frac{1}{3})} 480 = 96$$

$$m_1 = \xi \frac{1+r_N}{r_N} c_1 = \left(\frac{1}{3}\right)\frac{1+1.25}{1.25} 96 = 57.6$$

									(9) Assets, End of Period	P
1					$480	$480	$96	$57.6	$(153.6)	1.000
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Period 2 Wealth

$$z_2 = (\$345.6) + \$450 + \$57.6 + \left(\frac{1}{1+1.25}\right)\$1417.5 = \$792$$

	Non-monetary Assets Carried Over	Carry over Plus Real Return	Money Carried Over	Wage Income	Present Value of Future Income	Wealth	C	Money Holding s	Assets, End of Period	P
1					$480	$480	$96	$57.6	$(153.6)	1.000
2	$(153.6)	$(345.6)	$57.6	$450	$1,080	$792	$216	$129.6	$(183.6)	1.500
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$$c_2 = \frac{1}{3+2\xi} z_2 = \frac{1}{3+2(\frac{1}{3})} 792 = \frac{3}{11} 782 = 216$$

$$m_2 = \xi \frac{1+r_N}{r_N} c_2 = \left(\frac{1}{3}\right)\frac{1+1.25}{1.25} 216 = 129.6$$

	Carried Over	Return			Income				(9) Assets, End of Period	P
1					$480	$480	$96	$57.6	$(153.6)	1.000
2	$(153.6)	$(345.6)	$57.6	$450	$1,080	$792	$216	$129.6	$(183.6)	1.500
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No Free Lunch

- In nominal terms
- In real terms

c_2=\$216,000

m_2=129,600

No Free Lunch

- In nominal terms
- In real terms

c_2=\$216,000

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$$c_2 = \frac{\$216}{P_2} = \frac{\$216}{\$1.5} = \$144$$

$$m_2 = \frac{\$129.6}{P_2} = \frac{\$129.6}{\$1.5} = \$86.4$$

Assets, End of Period 2

Assets Plus Real Return	$345.6
Plus: Wage Income	$450.0
Less: Consumption	$216.0
Less: Increase in Money Holdings	$72.0
Equals: Assets, end of Period	$183.6

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Period 3 Wealth

Calculations in Nominal terms

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Demand, Period 3

Calculations in Nominal terms

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Period 4

Calculations in Nominal terms

	(1) Non-monetary Assets Carried Over	(2) Carry over Plus Real Return	(3) Money Carried Over	(4) Wage Income	(5) Present Value of Future Income	(6) Wealth	(7) C	(8) Money Holdings	(9) Assets, End of Period	P
1					$480	$480	$96	$57.6	$(153.6)	1.000
2	$(153.6)	$(345.6)	$57.6	$450	$1,080	$792	$216	$129.6	$(183.6)	1.500
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A Threat

A Problem

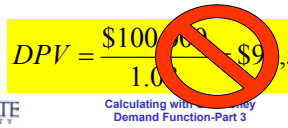
- Assuming no change in prices, Acme Widgets is certain to earn $100,000 next period.
- Newspapers report the interest rate is 8%.
- What is the DPV of next year's earnings?

$$DPV = \frac{\$100{,}000}{1.08} = \$92{,}593$$

Wrong Wrong Wrong

- Assuming no change in prices, Acme Widgets is certain to earn $100,000 next period.
- Newspapers report the interest rate is 8%.
- What is the DPV of next year's earnings?

$$DPV = \frac{\$100,000}{1.0} = \$9,593$$



Doing it Right

- This calculation mixes real and nominal.
- Suppose the expected inflation rate is 3%

$$DPV = \frac{\$100,000(1.03)}{1.08} = \$95,370$$

$$DPV = \frac{\$100,000}{1.05} = \$95,238$$

Another Problem

- Based on the consensus inflation forecast of 3%, Baker electronics expects to earn $100,000 next year.
- Experts have determined that Baker's real rate of interest, adjusted for tax and risk considerations, is 5%.
- What is the DPV of Baker's profits?

Baker

$$DPV = \frac{\$100,000}{1.05} = \$95,238$$

Wrong Again

$$DPV = \frac{\$100,000}{1.0} = \$95,238$$

Doing It Right

$$DPV = \frac{\$100,000}{1.08} = \$92,593$$

$$DPV = \frac{\frac{\$100,000}{1.03}}{1.05} = \$92,464$$

The Point

- Discount real (inflation adjusted) numbers with real discount rates.
- Discount nominal numbers with nominal interest rates.

The Threat

End