

APPENDIX TO CHAPTER 23

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Deriving the Formulas for the Keynesian Multiplier and the Forward-Looking Consumption Model

TOPIC OVERVIEW

The first section of the appendix explains the Keynesian multiplier and provides a discussion of why its value is so uncertain. The second section introduces the forward-looking theory of consumption and explains how it reduces uncertainty about the size of the Keynesian multiplier.

The multiplier is derived in simple graphical and algebraic fashion and traced through the successive spending rounds to illustrate the intuition behind the concept. Then the multiplier concept is extended to include net exports and is again appraised in terms of uncertainty about its size. The uncertainty is to some extent resolved by the introduction of forward-looking consumption behavior as a way to identify and quantify the sources of uncertainty.

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TEACHING OBJECTIVES

1. Derive the multiplier and trace its effect through the economy.
2. Derive the open economy multiplier.
3. Introduce the forward-looking theory of consumption and explain how it reduces uncertainty about the size of the multiplier.

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KEY TERMS

Keynesian multiplier	marginal propensity to import(MPI)
<u>Forward-looking consumption</u>	<u>Consumption smoothing</u>
<u>Permanent income model</u>	<u>Liquidity constraint</u>
<u>Life-cycle model</u>	

TEACHING TAYLOR'S ECONOMICS

The concept of the multiplier is developed in this topic in a simple fashion so as not to cloud the central issue of uncertainty about its size which is discussed separately. Emphasize that the multiplier can be explained with either graphs, algebra, numerical examples, or words; tell students that this is true of economic models in general and refer them back to the appendix to Chapter 1 on this point

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LECTURE OUTLINE AND TEACHING TIPS

Emphasis on the uncertainty about the size of the Keynesian multiplier reflects the practical problem of forecasting the impact of a policy-induced change in spending on real GDP. Despite this uncertainty, the multiplier is useful for understanding the range of potential short-run effects of policy-induced changes in spending.

1. A graphical review of the multiplier.

a. The first step in measuring the multiplier is to understand how it fits into the depiction of the spending balance between spending and real GDP. To do this we measure the effect of a shift in spending from old to a new level in Figure 23A.1. Here a \$100 billion increase in spending increases GDP by \$250 billion, using the same assumptions as in the previous chapter.

(1) The size of the multiplier is equal to the change in real GDP divided by the shift in spending.

b. The algebraic derivation of the multiplier is given and the same example used. The general form of the derivation is given in Table 23A.1.

c. The use of spending rounds is a third approach to understanding how the multiplier works its way through the economy. This is summarized in Table 23A.2.

2. What if Net Exports Depends On Income?

a. Net exports respond to income through the sensitivity of imports to income, not exports.

(1) Since exports are not sensitive to income but imports are, net exports are negatively related to income.

b. We are now able to incorporate the effect of income on net exports into the multiplier. The multiplier depends on both the MPI and MPC. Table 23A.3 summarizes the derivation of the open economy multiplier.

3. Part of the uncertainty about the multiplier can be resolved by the use of forward-looking models of consumption behavior, that is, permanent income, life-cycle and rational expectations models.

a. People are believed to look ahead in making consumption decisions, basing them on permanent or life-cycle income. In effect, they choose a smooth consumption path over the life cycle. Figure 23A.2 illustrates the extremes in consumption behavior.

b. Forward-looking consumption behavior implies that the MPC is very different depending on whether a change in income is permanent or temporary. If the change is permanent, the MPC is close to 1: if temporary, the MPC is close to zero. Households that are liquidity constrained are in effect prevented from consumption smoothing, but this group is not believed to be large.

c. The forward-looking model has been applied to a number of families; and it has been found that the permanent income MPC is large and the temporary MPC is small, the latter about one-third the size of the former.

(1) The idea of consumption smoothing also affects current consumption when a tax change is anticipated in some future period. The rational expectations approach would suggest that the effect is large.

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SOLUTIONS TO ADVANCED TOPIC PROBLEMS

1. a. True, since $0 < MPC < 1$ so that $1/(1 - MPC) > 1$. For if $MPC > 1$, $1/(1 - MPC) < 1$. The multiplier would not multiply.

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b. True since $1/(1 - MPC) > 1/(1 - MPC + MPI)$.

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2.

MPC	.48	.54	.60	.66	.72
Multiplier	1.923	2.174	2.5	2.941	3.571
Effect of <i>G</i>	192.3	217.4	250	294.1	357.1

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3. a. Figure 23A-1(a) shows how imports depend on income.

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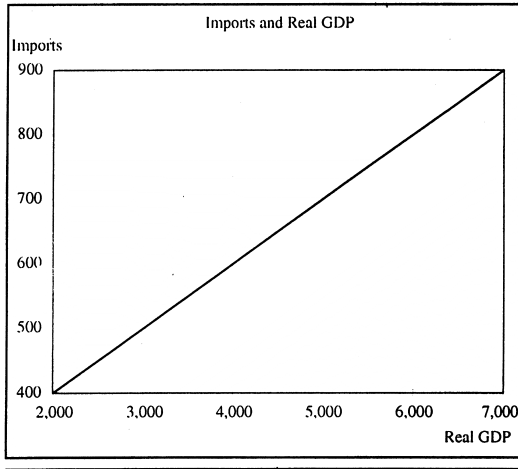


Figure 23A-1(a)

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b. Figure 23A-1(b) shows how net exports depend on income.

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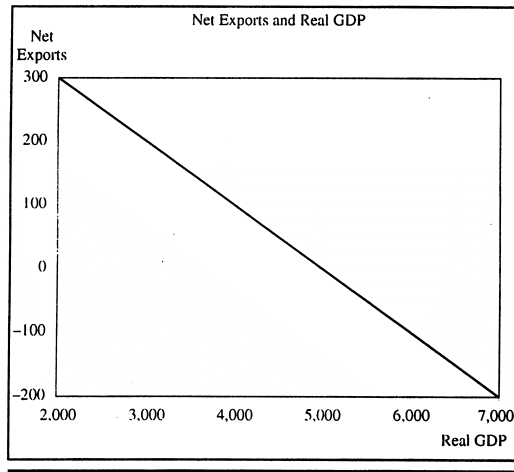


Figure 23A-1(b)

b. Trade deficit = - 100 billion. Slowing economy by raising taxes or lowering G will bring economy closer to zero surplus.

c. The multiplier is $1/(1 - .6 + .1) = 2$.

4. a. $MPC = 80/100 = .8$ and $MPI = 10/100 = .1$, so the multiplier is 3.33. The $MPS = 2$.

b.

Real GDP	AE	C	I	G	NX
100	220	80	60	50	30
200	290	160	60	50	20
300	360	240	60	50	10
400	430	320	60	50	0
500	500	400	60	50	-10
600	570	480	60	50	-20
700	640	560	60	50	-30

A trade deficit occurs for real GDP of 500 and larger.

c. Real GDP will rise by 33.3 (10×3.33) when G rises by 10. The new equilibrium will be $Y = 533.33$.

5. a. Joe's $MPC = 1$. The consumption function is a 45-degree line.

b. Jane's $MPC = .5$. The slope is .5 and the consumption function is a 30-degree line.

c. Joe's job is probably more permanent than Jane's. Or perhaps Joe's income fluctuates less than Jane's.

6. Under the rational expectations assumption, even though disposable income rises, people are certain that a decrease in disposable income will occur in the next period. The hoped-for increase in consumption would be weakened by this knowledge that the shift is purely temporary and so the MPC is much smaller.

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