**Marginal Propensities to Save and Consume (MPS and MPC)[1]**
**Instructional Primer[2]**

To understand the relationship between consumption, savings, expenditures, and GDP think of consumption as a function of income less expenditures and savings, or in this case C = f(income, expenditures, savings or investment), holding government spending, taxes, borrowing, and transfer payments constant[3].

Perfectly clear, right? In truth this is no different than how you might think about your consumption at the household level. Suppose that government spending, taxes, borrowing, and transfer payments are held constant at the household level; that's the same thing as deciding not to borrow for household expenditures, recognizing that your payroll tax withholding amounts from your paycheck really doesn't change from paycheck to paycheck (or at least you don't have much control over it), that you're not going to consider in your consumption decisions any transfer payments that a government might have to offer, and that the amount the government spends each month is irrelevant to you (at that moment).

So you spend your net income less any amount you might choose to save. We're going to concede that your savings equals your investment here, and that your net income is equal to your disposable income. We recognize then that your personal marginal propensity to save (MPS) is equal to your savings divided by your disposable income ($Y_D$), and that your marginal propensity to consume (MPC) is equal to your consumption (C) divided by your disposable income, which happens to be the same things as your disposable income ($Y_D$) minus your savings (S), all divided by your disposable income and is the same as 1-MPS.

The following equations specify these relationships more specifically:

$$MPS = \frac{S}{Y_D} \quad (1)$$

$$MPC = \frac{C}{Y_D} = \frac{Y_D - S}{Y_D} = 1 - MPS \quad (2)$$

To be yet more accurate, we need to consider that we're dealing with marginal propensities here so we need to accept that these propensities are all about what happens when we get one more dollar of income. As such, these equations are most correctly specified as follows:

$$MPS = \frac{\Delta S}{\Delta Y_D} \quad (3)$$

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[1] This primer is intended to present an abbreviated discussion of the included economic concepts and is not intended to be a full or complete representation of them or the underlying economic foundations from which they are built.

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[3] This starts out very similarly to the primer on *Aggregate Consumption, Aggregate Demand, GDP and the Keynesian Cross* because the concepts discussed herein share foundational constructs with those concepts.

$$MPC = \frac{\Delta C}{\Delta Y_D} = \frac{\Delta Y_D - \Delta S}{Y\Delta_D} = 1 - MPS \quad (4)$$

This marginal propensity to save (MPS) or marginal propensity to consume (MPC) is important when thinking about changes in overall income (GDP) in our society. They form the basis for the Keynesian Multiplier as follows:

$$Multiplier = \frac{1}{1-MPC} = \frac{1}{MPS} \quad (5)$$

The Keynesian Multiplier, more fully described in a titled *The Keynesian Multiplier and the Money Multiplier*[4], suggests that our economy expands by more than increased levels of government spending, investment, or consumption such that a $1 increase in one of these forms of spending may yield an increase of $10, $15, $20 or more dollars, depending on the MPC or MPS.

Let's consider an example so we can observe some of the import of this MPC or MPS and the multiplier on our economy. Suppose the government chooses to offer stimulus package aimed at increasing GDP through increased government spending (this does not include increased transfer payments – you'll see why this is in a moment). If we accept an MPC of .85 then the multiplier = 1/(1-.85) = 6.667.

We know that changes in spending (sometimes referred to as changes in autonomous aggregate spending or AAS) are multiplied by the multiplier to see the effect these changes have on GDP. Let's assume a $787 billion stimulus package and see its expected impact on GDP as follows:

$$\Delta GDP = \Delta AAS\ x\ \frac{1}{1-MPC} \quad (6)$$

$$= \Delta AAS\ x\ multiplier \quad (7)$$

$$= \$787{,}000{,}000{,}000\ x\ \frac{1}{1-.85} \quad (8)$$

$$= \$787{,}000{,}000{,}000\ x\ 6.667 \quad (9)$$

$$= \$5{,}246{,}929{,}000{,}000 \quad (10)$$

In an Economy with a GDP of $13.9 trillion in 2009 and the $787 billion 2009 stimulus package – American Reinvestment and Recovery Act (ARRA), if the US had an MPC of .85, then we might expect a change in GDP to $19.15 trillion in 2010, which is much greater than was actually experienced, due in part to it taking more than two years for the federal government to expend the funds on the economy. So assuming the multiplier is a valid concept, what would the actual 2010 and 2011 US GDP changes of $1.8 trillion combined suggest about the nation's MPC at the time (we'll use the 2010 and 2011 GDP changes over 2009 to try to reflect the temporal deployment of the ARRA)? We can simply rearrange equation (6) to find the answer as follows:

[4] The Keynesian Multiplier is more fully described in an instructional primer titled *The Keynesian Multiplier and the Money Multiplier*

$$\Delta GDP = \Delta AAS\ x\ \frac{1}{1-MPC} \quad (11)$$

$$\$1.8\ trillion = \$.787\ trillion\ x\ \frac{1}{1-MPC} \quad (12)$$

$$\$2.287\ trillion = \frac{1}{1-MPC} \quad (13)$$

$$(1 - MPC)(\$2.287\ trillion) = 1 \quad (14)$$

$$\$2.287\ trillion - 2.287\ trillion(MPC) = 1 \quad (15)$$

$$\$1.287\ trillion = 2.287\ trillion(MPC) \quad (16)$$

$$\frac{1.287}{2.287} = MPC = .563 \quad (17)$$

So an MPC = .563 or an MPS = .437. Even though these figures include some pretty broad and likely unrealistic assumptions, this MPC makes relative sense given what the US economy experienced in the subject years. Most economist calculated that the savings rate rose substantially during 2008-2012 and as a result the economy didn't expand as much as it might have.