

1

BASIC CONCEPTS AND RELATIONSHIPS

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Macroeconomics

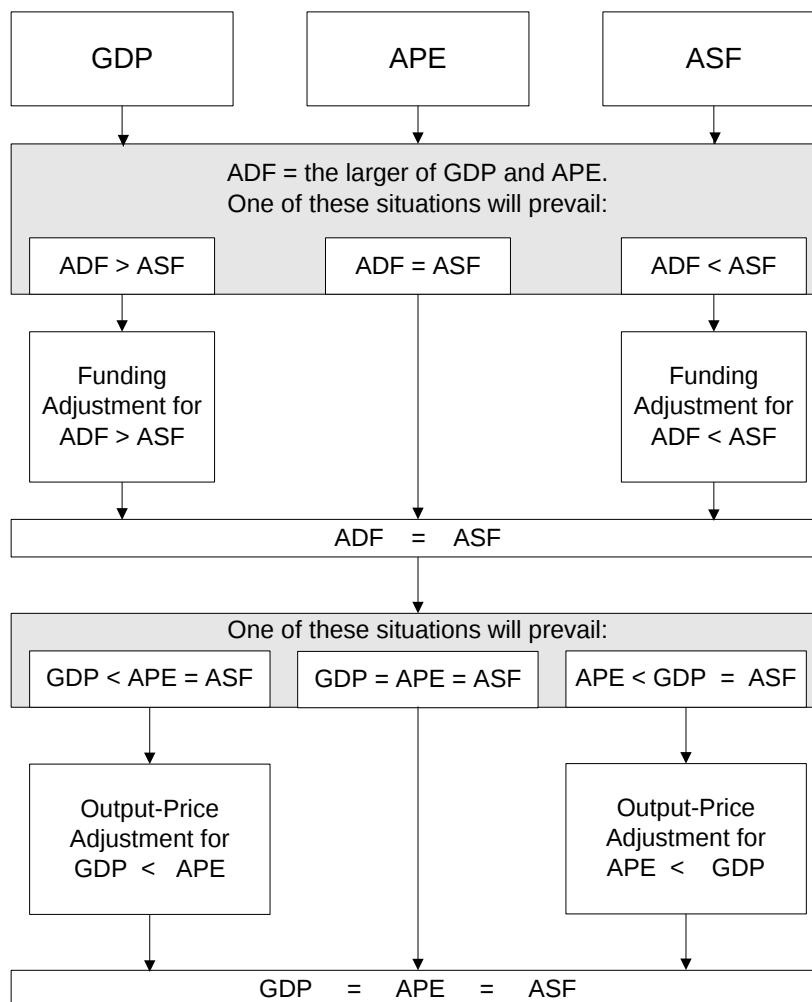
***Macroeconomics** is the study of (1) what determines the levels of employment, output, interest rates, and prices and (2) policy methods for manipulating those levels.*

This book provides a unique approach to modern macroeconomic analysis. The presentation is couched in terms of the interplay among three key aggregative magnitudes **{1} – GDP** (representing the current annual rate at which the nation is producing goods and services), **APE (aggregate planned expenditures)**, the current annual rate of demand for that output), and **ASF (aggregate supply of funding)**, the limit that is imposed upon annual purchases of current output by the existing supply of money and credit). This interplay happens automatically when GDP, APE, and ASF are not all equal and moves these three magnitudes towards equality once again even though no one is aware of the prevailing inequality and

1 Aggregative means “taken collectively as a whole” and **aggregate** means “gathered together as a whole.”

nobody seeks to restore equality. The interplay – the **macroeconomic coordination process** (the **MCP**) – involves changes in the levels of employment, output, interest rates, and prices that (1) reduce the gaps among GDP, APE, and ASF and (2) continue until $GDP = APE = ASF$. We will be using a fourth aggregative concept – the **ADF** (the **aggregate demand for funding**) – to represent the larger of APE and GDP. Schematic Diagram 1-1 summarizes the **MCP**.

Schematic Diagram 1-1
The Macroeconomic Coordination Process



GDP (Gross Domestic Product)

GDP represents the volume of all goods and services produced within a country during one year.

Because there is no single unit of volume measure for the wide variety of products produced within the country, the Commerce Department (DOC) first determines the total actual (current) market value of the nation's output. The DOC then effectively deflates this total current market value to what it would have been if prices currently had been at the level that prevailed in some previous (arbitrarily chosen) base year (presently 2009). The DOC accomplishes this by dividing every year's total current market value of output by a **price index** (that measures the ratio of that year's actual prices on average to base year prices). The resulting number is what we call the GDP. That price-adjusted number will change only as the volume of output changes from year to year. It is unaffected by changes in the actual current level of prices.

In Table 1-1, the numbers in the center column give us a clear view of what it actually cost to buy the entire gross domestic product each year – its actual market value. From 2003 through 2012, those values increased by 6.64%, 6.67%, 5.82%, 4.49%, 1.66%, -2.05%, 3.75%, 3.85%, and 4.58%, respectively. Unfortunately, these numbers tell us nothing about what was happening to the quantity of output.

The numbers on the right are also values, but are somewhat lower. Those values tell us nothing useful about the true value of the nation's output. But, because the influence of inflation has been removed, they do give us a clear indication

of what was happening to the volume of output. During the years 2003 through 2012, those numbers grew by 3.80%, 3.35%, 2.67%, 1.79%, -0.29%, -2.80%, 2.51%, 1.85% and 2.78%, respectively. Because the numbers in the right-hand column were all calculated by using the same base-year (2009) prices, there is only one source for the observed changes – changes in the quantities (i.e., changes in the volume of output). These price-adjusted values for the gross domestic product are the only ones that are useful in macroeconomic analysis. So, from now on, whenever we refer to the gross domestic product, we will use the symbol **GDP**, and it will always denote the price-adjusted level for the gross domestic product.{2}

Table 1-1

YEAR	VALUE OF OUTPUT (NOT PRICE ADJUSTED) ¹	GDP (PRICE ADJUSTED) ²
2009 BASE	BILLIONS OF DOLLARS	BILLIONS OF DOLLARS
2003	\$11,512.2	\$13,270.0
2004	\$12,277.0	\$13,774.0
2005	\$13,095.4	\$14,235.6
2006	\$13,857.9	\$14,615.2
2007	\$14,480.3	\$14,876.8
2008	\$14,720.3	\$14,833.6
2009	\$14,417.9	\$14,417.9
2010	\$14,958.3	\$14,779.4
2011	\$15,533.8	\$15,052.4
2012	\$16,244.6	\$15,470.7

1 Each year's output is valued at that year's prevailing prices.

2 Each year's output is valued at the level of 2009 (base year) prices.

2 Alternative terms are used to specify the price-adjusted measure for the gross domestic product. Three are the **constant-dollar GDP**, the **real GDP**, or the **chain-weighted GDP**. We will use simply GDP.

GDP measures output; consequently, an output change will cause GDP to change immediately, in the same direction, by the same amount (as output changes).

*In contrast, price level changes have **no direct impact** upon the level of GDP.{3}*

GDP is the price adjusted value of the nation's output; that is,

$$\text{GDP} = \frac{\text{current value of output}}{\text{price index}}$$

A rise or fall in the level of prices changes both the current value of output and the price index in the same direction and by the same percentage. This leaves GDP unchanged.{4}

A change in the level of interest rates has absolutely no direct impact upon the level of the GDP.

No producer increases or decreases his output simply (and solely) because the level of interest rates has changed.

“No direct impact” does not mean that changes in the levels of prices and interest rates have no influence upon the

3 ...because the prices used to measure GDP do **not** change. They are constant, base-year-equivalent prices. These prices change only when the Commerce Department changes the base year. When the Commerce Department does this, the GDPs for all years rise by whatever percentage prices on average increased from the old base year to the new one. This leaves the indicated year-to-year percentage changes in output unaffected.

4 Don't be confused by the fact that GDP is a value (measured in dollars and cents). It is a very special value that changes only when the volume of output changes.

level of GDP. Changes in the levels of prices and interest rates do have an impact upon the GDP but only indirectly as they lead to subsequent employment and output changes during an ensuing macroeconomic coordination process (**MCP**).

Because the market value of a product equals its cost plus profits (where profits can be either positive or negative), the Commerce Department's market value measure of current output boils down to a measure of the total costs and profits that accrue to the producers of the nation's output. Somebody or some institution will claim each penny of these costs and profits as income. These incomes take many forms – wages, salaries, rent, interest, depreciation, distributed profits, retained earnings, taxes, etc. – and add up to the **gross domestic income**.

*The **gross domestic product** and the **gross domestic income** are distinctly different concepts. Gross domestic product measures production. Gross domestic income measures incomes. Nonetheless, their magnitudes **are necessarily equal**. The gross domestic income will change only when the gross domestic product changes and will change in the same direction by the same amount.*

There can be no change in the gross domestic income without a matching change in the gross domestic product.

We shall let **GDY** denote the “real” (price-adjusted) level for gross domestic income.^{5} The GDY is distributed among the economy's three sectors (households, businesses, and

⁵ We will consistently use the letter **Y** to denote **income**, because **I** is used for **investment**.

governments) and foreigners. We will use **HY** to represent the household sector's share. **BY** shall denote the business sector's income share. **GY** shall stand for the government sector's income share, and **TF** shall represent the total portion of the GDY that has been **transferred to foreigners**.{6}

Sector shares of the U.S. gross domestic income:{7}

6 “**Foreigners**” includes all people outside of the country's borders. For macroeconomic analysis using the GDP as its measure of output, there are no foreigners within the country. Foreigner relates strictly to location, not to nationality.

7 The entire GDY initially accrues to the household and business sectors. The government and foreign sectors start out with nothing, but taxes and income transfers among the sectors will change that. Starting out with their gross household income, households send a chunk of that income to governments as taxes, receive supplements to their incomes as transfers from businesses and governments, and give some income away as transfers to foreigners. The resulting amount of household income (HY) is income over which households have full discretionary control. HY is currently around 74% of the GDY. Starting out with their gross business income, businesses send a portion of that income to governments as taxes, receive supplements to their incomes as transfers from governments, and give some income away as transfers to households and to foreigners. The resulting amount of business income (BY) is income over which businesses have full discretionary control. BY amounts to approximately 11% of the GDY. Governments start out with no income but then receive income distributions from the household and business sectors in the form of taxes. Governments then turn around and send a significant portion of this income back to the household and business sectors as **transfers** (social security benefits, unemployment compensation, interest on government bonds, etc.). They also send transfers to foreigners (foreign aid and emergency relief). The resulting amount of income that remains within the government sector is what we call GY. It now amounts to approximately 14% of the GDY. Foreigners start out with none of the GDY. They then receive transfers from the household, business, and government sectors. We represent this as TF. It amounts to 0.5% of the GDY. Notice that **the household sector share of the gross domestic income has been increasing by 1 to 2 percentage points per decade and that the government sector's share has been decreasing by 1 to 2 percentage points per decade.**

	1970s	1980s	1990s	2000s
Households	70%	72%	73%	74%
Businesses	12%	12%	11%	11%
Governments	18%	16%	15%	14%
Foreigners	0.3%	1%	1%	1%
	100%	100%	100%	100%

It follows that

$$\text{GDP} \equiv \text{GDY} \{8\} \quad 1-1$$

and

$$\text{GDY} \equiv \underset{74\%}{\text{HY}} + \underset{11\%}{\text{BY}} + \underset{14\%}{\text{GY}} + \underset{1\%}{\text{TF}} \quad 1-2$$

Equation 1-1 tells us that

*current production always generates current incomes that are just sufficient to purchase the entire output; so, if some products go unsold, it is **not** because there is insufficient income!*

In fact income would still remain just sufficient to buy the entire output even if prices were to double! Both GDP and GDY equal total costs plus profits of current output .
price index

A doubling of prices would double both the numerator and the denominator, leaving the GDP and GDY unchanged. Hence,

8 The three-bar equality sign ($\equiv$) denotes a relationship that is **always** true. There are no circumstances in which the two terms could become unequal.

*price level changes are **income compensated** (as far as total income is concerned); so, the volume of goods and services that income recipients together can buy with their combined current incomes is unaffected by changes in the level of prices. A change in the price level may **redistribute** shares of the GDY, but it will leave the GDY itself unchanged.*

Whereas the amount of earned income (GDY) is always sufficient to purchase all of the current output (GDP), there may not be sufficient money. Money and income are not the same things! Money is the “messenger” that delivers most income. Income is the “message.” Production of goods and services generates income and a need for money, but it does not create the money to fill that need. The amount of money that is available to distribute as incomes and to make purchases is determined by our banking institutions. They may provide us with too little, just enough, or more than enough money. It is the ASF concept (that we shall be considering shortly) that recognizes these possibilities.

APE (Aggregate Planned Expenditure)

APE (for **aggregate planned expenditures**) represents the total demand coming from all sectors for the goods and services in the nation’s output (the GDP).{9} Whereas APE is restricted to demand for domestic output only (no output from abroad) – because the GDP includes only production within the country – the Department of Commerce “throws us a curve” by including imports from abroad when it measures the purchas-

9 It is aggregate **planned** expenditures to remind us that it excludes all unplanned acquisitions such as the accumulation of excessive business inventories because of unexpectedly low sales.

es! For instance, it defines **consumption** as the household sector's demand for current output, both domestic and from abroad. Similarly, it defines **investment** as the business sector's demand for current output, both domestic and from abroad. The government sector's purchases are similarly defined. Fortunately, the Commerce Department also publishes figures on total **imports** of all current output from abroad.{10}

If we use the symbols C (for **consumption**), I (for **investment**, the business sector's purchases of current output), {11} G (for **government purchases**), X (for **exports**), and F (for **imports**) {12} – all price-adjusted volume measures – then we can represent the **aggregate planned expenditures** (APE) for current domestic output as follows:

$$APE \equiv C + I + G + X - F \quad \{13\} \quad 1-3$$

10 The Commerce Department does not keep track of imports after they have entered the country. So, although it knows the total amount of imports, it does not know which sector finally ends up with them and, hence, cannot remove sector-by-sector the imports that were included when measuring the sectors' purchases of current output.

11 Investment consists of the business sector's purchases of current output to (1) replace worn out or outmoded plant and equipment, (2) add to existing plants and equipment, (3) construct housing units, and 4) increase average inventories. In economics, a stock or a bond purchase is an act of saving, **not** an investment, and may be referred to as a "financial investment" but not as simply an "investment."

12 Think of F as representing the purchase of **foreign** goods and services.

13 You may have been taught that $GDP \equiv C + I + G + \text{Net Exports}$. This is analytically inappropriate. It implies that aggregate supply and demand are always equal when in fact they frequently are not equal. Only in the National Income and Product Accounts are they always equal – because of the way in which the Commerce Department measures demand. In economic analysis, APE represents the **intended** level of purchases; however, the Commerce Department can only measure actual acquisitions. These two amounts can be quite different. For instance, the Commerce Department treats all additions to business inventories as having been "demanded" by the businesses. Yet, it is often the case that inventory accumulations have occurred only because sales were disappointingly low. Any

Bear in mind that, by subtracting imports in a lump at the end of the equation, we are simply removing the Commerce Department's overstatement of APE (the demand for domestic output only) caused by including our purchases of foreign output (imports) in the measured magnitudes for C, I, G, and X. Imports decrease aggregate demand only if the buyers are substituting them in place of domestic purchases – which, of course, they often (but not always) do.

A \$1 billion rise in GDP (and, hence, in GDY) will have the following approximate impacts upon APE:**{14}**

Households would receive approximately 74% (\$740 million) of the GDY increase as additional disposable income and would spend about 65% of it for current output – raising C by as much as \$481 million.**{15}**

such unwanted inventory accumulations would motivate the businesses to take action to unload their excess inventories – actions that would have implications for the levels of prices, employment, and output. Such reactions to the inventory changes that occur when buyers want more or less output than is being produced lie at the heart of the macroeconomic coordination process that you are studying. Clearly, to expose the mechanics of that process, the economist must define "demand" in the sense of "intends to acquire it," not "has it." It is the difference between what people and institutions have and what they want that motivates them to take the actions that we want to study.

14 In the real world, many unrelated things that influence expenditure happen simultaneously. Our interest in this section is to indicate the results of sophisticated statistical analyses that show how much expenditures for current output would likely change following an increase in income that is unaccompanied by any of those other influences. That is why the indicated expenditure responses are so small relative to the income change. These sectors normally will eventually spend additional portions of their new income, but it will be for reasons other than simply the presence of more income.

15 $\$481 = 0.65 \times \740

Businesses, governments, and foreigners would (as a group) receive the remaining approximately 26% (\$260 million) of the GDY increase. Statistical analysis suggests that they will spend around 40% of it on current output – raising $I + G + X$ by as much as \$104 million.**{16}**

Typically, about 15% of these new purchases will be for imports – raising imports (F) by as much as \$88 million.**{17}**

If we now deduct the \$88 million rise in F from the sum of the \$481 million increase in C and the \$104 million of additional $I + G + X$, we find that APE will have risen by as much as \$497 million.

All of this suggests that a \$1 billion increase in GDP (and, hence, in GDY) will result in about a \$500 million rise in APE.

Similar but opposite changes would occur in APE if GDP were to fall by \$1 billion. Hence,

a \$1 billion fall in GDP (and, thus, in GDY) will result in approximately a \$500 million reduction in APE.

The impact of a change in the level of GDP upon the level of APE is as permanent as is the change in the level of GDP itself. That is,

16 $\$104 = 0.4 \times \260

17 $\$88 = 0.15 \times (\$481 + \$104)$

APE will remain at the new level as long as GDP remains at its new level (unless some APE determinant other than GDP changes).

The APE response is quick – that is, within the year (following the change in GDP) – except for most of the rise in plant and equipment investment following a GDP rise (because the complexity of plant and equipment investment activities leads to an average response delay of about fifteen months). Whereas the delay in a portion of the APE response will prolong the operation of the macroeconomic coordination process, it will not otherwise affect its operation. Consequently, we shall – throughout the remainder of the book – simply ignore the fact that a small portion of the APE response to a change in GDP occurs with a delay of more than a year.

*Conclusions: The impact upon APE of a change in GDP (and hence in GDY) is **quick, positive** (APE moves in the same direction as GDP), and **strong** (50 cents on the dollar).*

Surprisingly, there is little empirical support for a significant link between the level of interest rates and the level of consumption.

The household sector as a whole does not respond significantly to interest rate changes.

To some extent this reflects the rather slow and modest fluctuations that occur in the level of interest rates. More abrupt and substantial swings in interest rates might generate a measurable response. Another factor in the lack of a significant interest rate response is the presence of offsetting household

behavior.{18} In contrast, investment and net exports ($X - F$) do respond to changes in the level of interest rates – with interest rate changes having a modest (because the investment and trade sectors are so small) {19} negative impact upon net exports, plant and equipment investment, and upon investment in new housing units. So,

APE rises as the level of interest rates falls and falls as the level of interest rates rises, although these impacts are typically rather small.

Also, much of the response will be delayed. There is considerable time involved in planning projects, arranging financing, and obtaining needed materials and services; so, the investment response to a drop in the level of interest rates will inevitably be delayed. So too will be a response to a rise in the level of interest rates, as existing investment projects are eventually completed in an environment in which fewer new projects are being undertaken.

*Conclusions: The impact upon APE of a change in the level of interest rates is **slow** (delayed), **negative** (APE moves in the opposite direction to that of the interest rate level), and **weak** (only the relatively small business and trade sectors react).*

It is important to recognize that what we are considering here is

18 Generally, higher (lower) interest rates depress (boost) household consumption and boost (depress) household saving. However, households do a lot of fixed-target saving (for retirement, life insurance, college funding for children, etc.). With respect to this kind of saving, higher (lower) interest rates permit (require) reduced (increased) saving and more (less) consumption.

19 Remember, the business sector receives only about 11% of the GDY; so, compared to the household sector, it is small. Even a relatively strong response to a change in interest rates by such a small sector will not amount to much.

the impact of a change in interest rates upon the level of APE, not the impact of a change in APE upon the level of interest rates.{20}

In the United States the annual rate of rise in the price level (usually well down in the single digits, often around 3%) is simply too low to generate a significant direct APE reaction. Because of this reality and the fact that price level changes are income compensated – as explained on page 7, any rise (fall) in the price level will cause a matching rise (fall) in total incomes, leaving goods and services no less (more) affordable – we will make the simplifying assumption that

price level changes have no direct impact upon the level of APE.

Because income recipients can borrow against expected future incomes and can save a portion of current incomes, APE at any time may exceed, equal, or be less than GDP (and GDY).

ASF (Aggregate Supply of Funding)

Currently, there are no kinds of money in the United States other than coins, paper currency, and checking account balances – because nothing else is commonly used to pay for products and services.

20 If interest rates move first, APE will move in the opposite direction – a negative relationship. If, however, it is APE that moves first, we will discover later on that the macroeconomic coordination process will cause interest rates to rise if APE has risen and fall if APE has fallen – a positive relationship. Hence, APE and interest rates move in the same direction or in opposite directions depending upon which one moves first! They move in opposite directions when interest rates move first but in the same directions when APE moves first.

Checks, debit cards, credit cards, electronic fund transfers, stored-value gift and smart cards, and smart phone apps are simply alternative means for transferring money among checking accounts. They do not add to the money supply. By official definition, the U. S. money supply includes only

*all U. S. issued cash (coins, paper currency, and non-bank traveler's checks) **except** cash in the vaults of banks, Federal Reserve Banks, and the U. S. Treasury*

*plus all U. S. dollar checking account balances in banks **except** those owned by other domestic banks and by the U. S. Treasury.*

We can represent this as follows: $M = CC + CA$, where CC represents the coins and currency component of the money supply (M) and CA represents the checking account component. The current totals are approximately

$$\begin{array}{rcl} M & = & CC + CA \\ \$2500 \text{ billion} & = & \$1100 \text{ billion} + \$1400 \text{ billion} \end{array}$$

*The **velocity of money** is the average number of times that a dollar of money is used in a year's time to fund purchases of current domestic output. We shall represent this magnitude with the symbol V.*

Currently, the magnitude of V is approximately equal to 6.5.

When banks increase their lending, M increases. This is because the borrowers' checking account balances increase, while no other checking account balances decrease; so, CA rises while CC is unaffected. When non-bank lenders (such as

auto finance companies) increase their lending, V increases.

It follows (logically) from the definitions of M and V that actual purchases of current domestic output in a year's time cannot exceed the magnitude of the product of M times V (i.e., $M \times V$).

With approximately \$2.5 trillion of money and $V = 6.5$, actual purchases from the GDP in a year's time cannot exceed \$16.25 trillion.

So that we will be able to compare this upper limit that $M \times V$ imposes upon annual current domestic output sales to both the annual rate at which buyers are seeking to purchase current domestic output (APE) and the annual rate at which U.S. producers are currently generating output (GDP), we must convert it from a current value measure to a volume measure that is comparable to those for both APE and GDP. That is, we must “deflate” $M \times V$ by dividing it by the **price index** (p , which measures the accumulated changes in the level of prices from what it was in the base year, 2009). We shall refer to this deflated measure of $M \times V$ as the **aggregate supply of funding** and shall represent it by the symbol **ASF**.

The aggregate supply of funding (ASF) is the upper limit upon the volume of annual purchases of current domestic output that is imposed by the existing money supply (M), the prevailing velocity of money (V), and the level of prices (p).

$$ASF \equiv (M \times V) / p \quad (1-4)$$

GDP determines how much income (GDY) is earned during the year, but ASF limits how much income can actually

be distributed as money and spent during the year. In the U.S. each year, people and institutions earn over \$16 trillion of income by producing a matching value of goods that need to be sold. However, there are just over \$2.5 trillion of money that must be used repeatedly (about 6.5 times each year) for paying incomes and for making purchases from the GDP!

Increases in M and V will increase ASF, whereas rises in the price level (and thus in p) will decrease it. Any rise in $M \times V$ relative to the price index will increase buyers' capacity to fund purchases. Similarly, any fall in $M \times V$ relative to the price index will decrease buyers' purchasing capacity.

When a bank customer makes a deposit (withdrawal), the bank receives (loses) a matching amount of **reserves**. Net deposits over time yield a growing amount of reserves for the bank. Bank reserves are a primary source of funds that a bank uses to earn revenues by making loans to customers. This use of reserves is possible only because banking regulations permit banks to operate with **fractional reserves** (reserves of less than one dollar per dollar of customer deposits). Current regulations set **required reserves** at approximately 7% (i.e., required reserves of only 7 cents per dollar of customer deposits).

To protect themselves from being forced by net withdrawals into insufficient (i.e., below the required) reserve positions,

*banks voluntarily choose to hold a small amount of extra reserves. These are called **working reserves**.*

By maintaining working reserves, banks are sacrificing interest earnings on the additional loans that they could otherwise have

made with those funds.{21} As an offset, the working reserves “buy insurance” against developing an inadequate reserve position that would lead the bank to borrow reserves and to pay a modest “penalty” interest rate (the **discount rate** or the **federal funds rate** {22}) on those borrowed reserves.{23}

We can expect banks to operate with relatively large working reserves when interest rates (including bank lending rates) are low relative to the discount rate and the federal funds rate (because the relative cost of holding working reserves is minimal {24}). If interest rates (i) rise relative to the discount rate, the rising relative cost of working reserves will motivate banks to expand their lending by reducing their working reserves. All of this means that

the magnitude of M will rise as the level of interest rates (represented by i) rises and will fall as the level of interest rates (i) falls.{25}

21 Excess reserves equal total reserves minus required reserves and working reserves. It is excess reserves that banks use to fund customer loans.

22 The **discount rate** is the rate of interest that the Federal Reserve System charges banks when they borrow reserves. As an alternative to borrowing reserves from the Federal Reserve, a bank that lacks adequate reserves will often borrow reserves directly from a bank that currently has excess reserves and pay the lending bank what is called the **federal funds rate** of interest.

23 There are alternative ways to fill a reserve deficiency, but all of these alternatives involve comparable costs to the bank.

24 Remember, the cost of holding working reserves is the loan interest income that those funds are not earning.

25 ...relative to the cost of borrowed reserves – the discount rate and the federal funds rate. As i rises and banks respond by reducing their working reserves, these reserves will approach the minimum level that is acceptable to banks. It is likely that as working reserve levels approach this minimum, further reductions would come with increasing resistance. Once i has risen sufficiently to entice working reserves down to the minimum level, then any further rises in i would bring no further M rises.

Non-bank lenders (including all holders of currently idle money balances) will also be motivated by rising lending rates of interest to draw down those money balances and expand their lending. Idle money balances do, after all, cost their possessors the interest that they could have been earning on those funds. As interest rates rise, this cost of holding money idle increases and induces idle money holders to exchange some portion for interest-earning assets – thereby raising the velocity of those dollars and, hence, also raising the level of V .^{26}

*Hence, ASF rises as interest rates rise or prices fall.
ASF falls as interest rates fall or prices rise.*

So far in this section, we have specified the key concepts of GDP, APE, and ASF and have indicated how each responds to changes in the levels of output, interest rates, and prices. We may summarize these responses in Table 1-2 (on page 22). We have one more key concept to consider, ADF.

ADF (Aggregate Demand for Funding)

Private enterprises cannot afford to incur the costs to produce goods and services that don't sell; so, we are very concerned about the level of demand for any output. APE represents this demand. Suppose that APE is at least as great as GDP. Surprisingly, this does not assure that all of the GDP

²⁶ As a rising i level induces non-bank lenders to trim their money balances toward the minimum level that they will tolerate, further i increases are likely to yield diminishing additional reductions in those balances. Consequently, the tendency of V to increase as i rises will likely diminish until, eventually, further interest rate increases will yield no further rise in V .

will sell. This is where the concept of ASF comes in.

Demanders must have access to \$1 before they can make a \$1 purchase, but each dollar of money in circulation will support the sale of V/p dollars' worth of GDP. ASF recognizes this and measures how much GDP can actually be purchased with the existing circulating supply of money. In order to carry out their purchasing plans, buyers need to access \$1 of ASF per dollar of APE. This demand for ASF is included in the ADF. Is anything else included? Whenever APE is at least as large as the GDP, the answer is no. This is because, when there is adequate funding to support APE and APE is at least as large as GDP, there is sufficient funding to support sale of the entire GDP and thus fully support the revenue needs of the nation's producers.

The situation changes whenever APE is less than GDP. Would-be buyers still need an amount of ASF that is equal to APE, but — with $APE < GDP$ — there will be an additional need for funding coming from producers. Producers are used to fluctuations in sales. There are good days and weeks. There are bad ones. Consequently, when sales drop below production, businesses do not want to slash employment and production immediately. Because of the normal fluctuations in sales, it is wise to be patient and see if this is just another one of those normal slow sales periods. Just wait awhile and see if sales bounce back. While they are waiting for sales to rebound, the businesses will still need to meet payroll and pay their other bills. But, with low sales, the businesses will lack sufficient sales revenues to cover all of these expenses. The producers will need an additional \$1 of ASF for every dollar that APE is less than GDP. Consequently, whenever $APE < GDP$, the $ADF = APE + (GDP - APE)$.^{27} But, $APE + (GDP - APE) = GDP$.

²⁷ The APE portion of the ADF satisfies the funding needs of buyers. The $(GDP -$

This all means that, whenever APE is at least as large as GDP, $ADF = APE$. However, whenever APE is less than GDP, $ADF = GDP$. It follows then that

ADF always equals the larger of APE and GDP.

Relationship Summary

In Table 1-2, causation flows from the levels of employment, output, interest rates, and prices to the levels for GDP, APE, and ASF. It is changes in the levels of employment, output, interest rates and prices that are causing changes in the levels of GDP, APE, and ASF.

Table 1-2

Impact of a change in the level of:	upon the level of GDP	upon the level of APE	upon the level of ASF
employment and output	positive (equal to output change)	positive (equals half of output change)	no direct effect
interest rates	no direct effect	negative	positive
prices	no direct effect	no direct effect	negative

APE) portion satisfies the temporary funding needs of producers while they await a hoped for rebound in sales.