Chapter 4
Aggregate Demand: Setting the Stage for Demand-Side Stabilization

This chapter marks the first step toward the construction of the ISLM/ADAS model which will power macroeconomic analyses in the chapters to come. At this stage we have completed an intuitive overview of the broad links between global capital flows, fiscal, and trade imbalances, and their effects on interest rates and exchange rates.

The national savings identity (NSI), with its remarkable ability to provide an intuitive understanding of a range of diverse macroeconomic scenarios, was explored in the previous chapter. However, as highlighted in the discussion questions of Chap. 3, the NSI, in spite of its versatility and intuitiveness, suffers from a conspicuous lack of detail. The role of the central bank and monetary policy is completely missing. Similarly absent are tax rates and national tax policy, along with consumer and investor confidence. Key variables such as wages, employment, GDP growth, and inflation, are also missing from our analysis in Chap. 3.

To incorporate the above, construction begins on a fully equipped, sophisticated, and well-articulated macro model—the "engine-room"—known as the ISLM–ADAS. The first step explains, derives, and explores the economy's aggregate demand (AD) curve which is the key component in macroeconomic demand-side stabilization.

4.1 Demand-Side Stabilization

In the economy depicted in Fig. 4.1, AD at this stage is loosely defined as the total demand for all goods and services, and aggregate supply as "total output supply." Initially the economy is in equilibrium at some stagnant or recessionary GDP growth rate Y_{low} (presumably accompanied by high unemployment) and rate of price increase P_0.

From a purely diagrammatic perspective, how can this GDP growth be jump-started?

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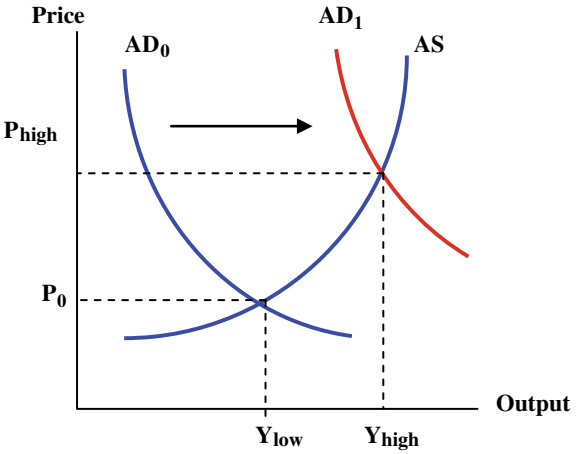

Fig. 4.1 Demand-side stabilization: jump-starting

In Fig. 4.1, if the AD curve could somehow be shifted to the right by designing and implementing the right combination of fiscal and monetary polices, we could stimulate the economy to get to Y_{high} (presumably with lower unemployment). The "cost" of this policy involving a rightward shift in AD is a higher equilibrium rate of inflation (P_{high}), with the obvious benefits being greater GDP growth and more jobs.

This is the first example of demand-side stabilization. The emphasis is on combinations of fiscal and monetary policies that shift the AD curve to the right, in this simple example.

Another scenario is depicted in Fig. 4.2 where we find an economy suffering from high inflation and GDP growth racing out of control. Here, the "problem" is one of high inflation, and to alleviate this situation we resort to another diagrammatic exercise.

In this case, appropriate fiscal and/or monetary polices would result in a leftward shift in AD, taking the economy to $P_{moderate}$ and to a lower, and perhaps more manageable, rate of GDP growth. In this example, unemployment, presumably very low or non-existent to begin with, will actually increase as the GDP growth is deliberately slowed down to $Y_{moderate}$.[1]

Both these shifts in the AD, caused by fiscal and/or monetary policies, constitute macropolicies that attempt demand-side stabilization. These polices primarily came into effect following a paradigm shift after the Great Depression and were later labeled as mainstream Keynesian stabilization policies. It was John Maynard Keynes who in the 1930s first propounded the idea to use combinations of discretionary fiscal and monetary polices to fine-tune the economy by shifting the AD curve.

An ideal situation would perhaps lie somewhere between the extremes depicted by Figs. 4.1 and 4.2 with the economy characterized by moderate inflation and sustainable GDP growth. This scenario will be discussed in Chap. 5.

[1]In the following chapter, the concepts of engineering soft-landings for overheated economies, and of jump-starting moribund output will be discussed.

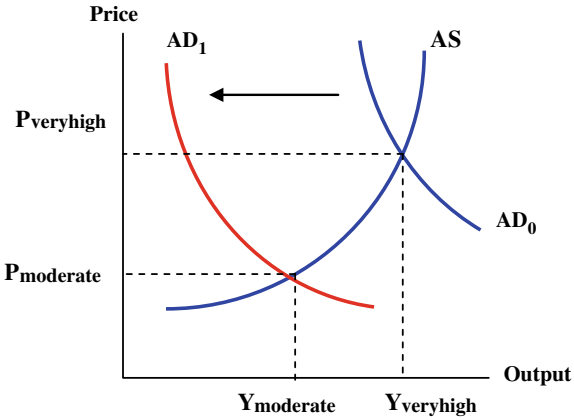

Fig. 4.2 Demand-side stabilization: soft landing

4.2 Business Cycles

A stylized business cycle is presented in Fig. 4.3. The peaks are, of course, periods of recovery and the troughs are recessions. The trend rate of growth is the inflation-adjusted real rate of growth of average GDP.

The objective of demand-side stabilization is to "flatten" business cycles by attempting to make periods of recovery less vigorous, and by making recessions less severe. A more stable planning horizon is preferable to a wildly fluctuating economy, especially when it comes to making long-term capital investments that come "on line" many years into the uncertain future.

The next step is to determine exactly how the AD can be shifted to accomplish demand-side stabilization and flatten business cycles by increasing growth in recessions or slowing down growth and, hence, bringing inflation down, as presented in Fig. 4.4.

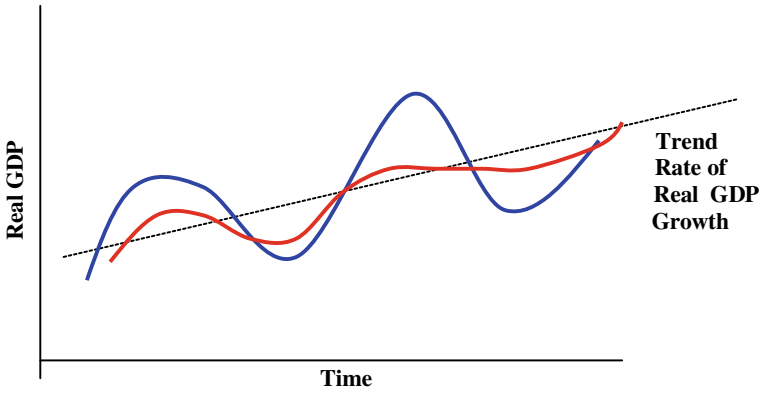

Fig. 4.3 "Flattening" business cycles

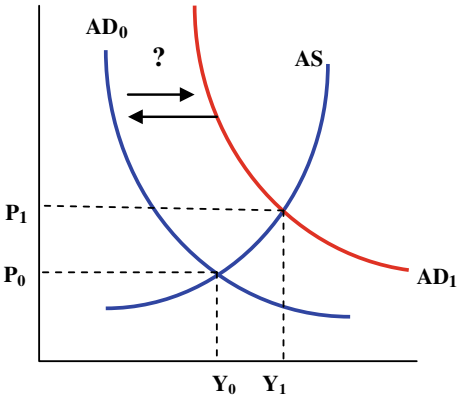

Fig. 4.4 Demand-side stabilization

In order to shift the AD to implement demand-side stabilization, we must know exactly what underlies this curve, and how it is derived. The next few pages pertain directly to attaining this objective.

4.3 Variables Underlying the Aggregate Demand: Introducing the Goods Market

This process begins with an examination of the goods market. The condition for equilibrium in this market is actually an expression that we are familiar with:

$$\mathbf{Y = C + I + G + (Exp - Imp)}$$

In Table 4.1, three scenarios in a hypothetical goods market are presented.

In row 1 (scenario 1), the value of output produced is 625, while the total planned expenditure composed of all the components, namely, domestic consumption (C), domestic capital investment expenditures (I), government consumption (G), and net foreign consumption (Exp–Imp), add up to 675.

$$\mathbf{C + I + G + (Exp - Imp) = 675}$$

Table 4.1 The goods market

Y value of output	C	I	G	(Exp–Imp)	Total planned expenditure and change in output and employment
625	475	50	125	25	675 increase
750	550	50	125	25	750 no change
875	625	50	125	25	825 decrease

In this case, since planned expenditure (675) exceeds the value of output, (625), suppliers respond to this excess demand in the goods market by increasing output and, hence, employment.

In the second row, the value of output in the goods market is 750, which equals total planned expenditure.

$$\mathbf{C + I + G + (Exp - Imp) = 750}$$

In this case, the goods market is said to be exactly in equilibrium. Y is indeed equal to C + I + G + (Exp–Imp), there is no excess supply or demand, and there will therefore be no change in output supplied or employment.

Finally, in row 3, planned expenditures (825) are less than the value of output supply (875). Here suppliers respond to this excess supply condition by reducing output and, hence, employment.

These three goods market scenarios constitute the goods market, a crucial component of the fully-articulated model. Plotting output (Y) along the horizontal axis and the components of expenditures, C + I + G + (Exp–Imp), along the vertical axis, we find that all the points where Y will equal C + I + G + (Exp–Imp) must lie on the hatched 45° line. In fact, the hatched line is simply the locus of all possible points of equilibrium in the goods market.[2]

We now plot the three scenarios, three points on the vertical axis being 675, 750, and 825, and the three corresponding points on the horizontal axis being 625, 750, and 875. Plotting these three sets of points, we obtain the expenditure line in Fig. 4.5. This line intersects the hatched 45° line at E_0 which represents the goods market equilibrium at 750.

The goods market equilibrium simply indicates that 750 units of goods produced would be exactly bought-up by 750 units of planned expenditures. At E_0 there is no shortage of goods or unsold inventory. But $E_{0,}$ by itself, tells us nothing about the overall level of unemployment in the economy.

At this point, a simple yet extremely important hypothetical exercise is in order. We are given that at E_0, in spite of the goods market being in equilibrium, the unemployment rate is a hefty 25 %. What could be done to alleviate this unemployment?

According to the classical paradigm, the model in operation at the time of the Great Depression in the US, nothing could or should be done.[3] The classical economists believed in "natural" rates of output and unemployment which were not amenable to any sort of discretionary macropolicy.

[2]We assume here that both axes have the same scale.

[3]This classical belief is not nearly as preposterous as it sounds. Their paradigm was successful, well articulated, and did in fact represent the pre-Depression era quite well. It was the paradigm shift ushered in by mistakes made in the Great Depression that rang the death knell of the classical model with its notions of natural rates of employment and output growth; more on this subject in Chap. 9.

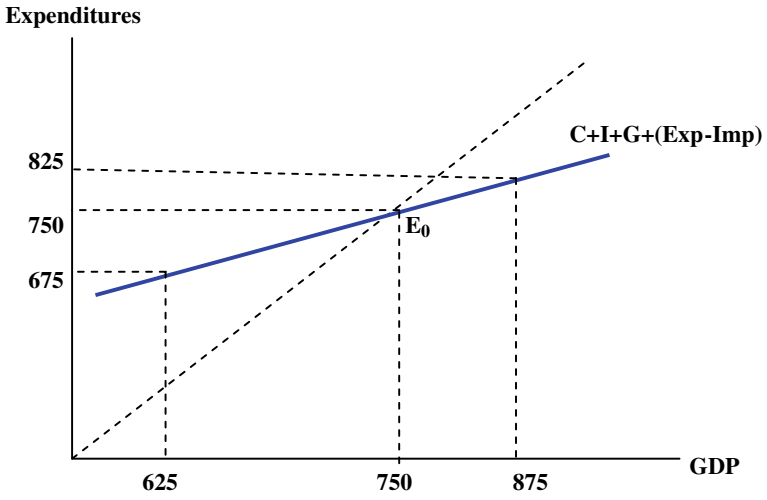

Fig. 4.5 The goods market

It was Keynes who threw a cat among the classical pigeons by propounding an actual discretionary role for fiscal and monetary policy in influencing the key macrovariables.

In our example, this would diagrammatically translate to moving the expenditure line up (using fiscal and/or monetary policies) so that it would intersect the 45° line at some higher point. As displayed in Fig. 4.6, this shift would take the goods

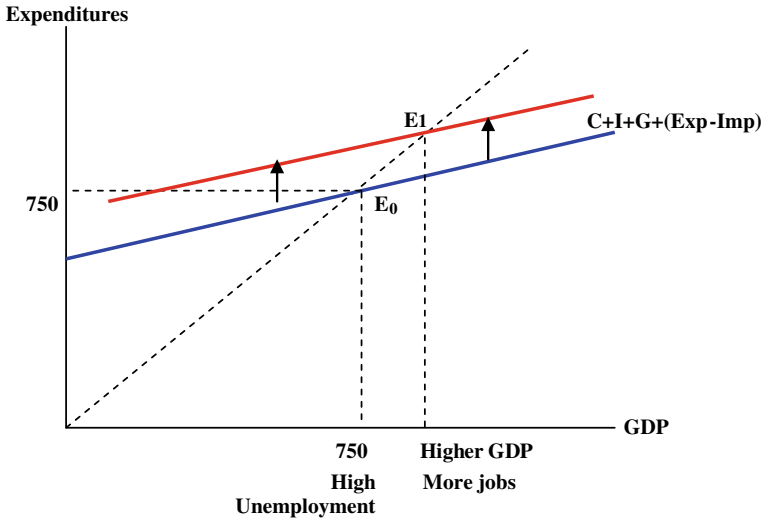

Fig. 4.6 The goods market: the brilliance of Keynes

market to a new and higher equilibrium at E_1, corresponding to a lower unemployment rate.

Keynes pointed out that E_0 was just one equilibrium point in the goods market, and not necessarily the only one, and certainly not the optimal one given the high unemployment in existence at E_0. Instead of assuming E_0 as fixed and inviolate, he proposed activist macroeconomic policies that would shift the expenditure line upward to yield a new and higher equilibrium E_1, resulting in a higher level of employment.

An increase in any of the components of the expenditure line C, I, G, Exports, or a reduction of Imports, can shift the line up. However, as discussed in Chap. 2, the only three policy instruments we have at our disposal are changes in government spending, tax rates, and changes in the money supply which in turn affect interest rates.

By increasing G, for example, the expenditure line moves up and a new equilibrium is established at E_1, as presented in Fig. 4.6. In this situation, large government outlays "jump-start" economies out of recessions.

The shift in the expenditure line presented in Fig. 4.6 will translate to a rightward shift in (P, Y) space discussed earlier in Fig. 4.1 and later in this chapter and the following one.

China from the late 1990s well into the 2000s had to aim for around 8 % GDP growth to absorb the increase in the number of new workers entering the job market.[4] This policy of ***bao ba*** (guaranteed eight percent) was de-emphasized in the early 2000s by Premier (and former central banker) Zhu Rongji, when it was found that some state and local officials may have been tempted to doctor final statistics under pressure to hit the target. Unfortunately, by 2015, after Zhu's protégés had run out, the role of targets has again been emphasized by the Chinese government.

Another example of large government spending to move the expenditure line to some higher equilibrium E_1 is the US infrastructure spending on dams, power generation, roadways, etc., in the post-Depression years and well into the 1970s and proposed again in late 2008. We will discuss these cases and others in Chaps. 5 and 7.

4.3.1 Analyzing the Components of Aggregate Demand

The next step is to formally link the goods market to demand-side stabilization policies. We begin by moving to a higher level of sophistication to determine the specific composition of the variables that constitute the individual components of aggregate demand, C, I, and G.[5]

[4]This included farm workers as well as former employees of state owned enterprises (SOEs).

[5]At this stage, we temporarily suppress the term (Exp–Imp) to focus primarily on the closed economy.

The consumption function is described by the expression:

$$\mathbf{C} = \underline{\mathbf{C}} + \mathbf{bY} + \mathbf{dW}$$

where:

C private consumption expenditure.

$\underline{\mathbf{C}}$ The autonomous component of consumption, "autonomous" in that this term is independent of income (Y). In this book, $\underline{C}$ will also be the term that includes tastes and preferences and, most important, $\underline{C}$ will be the term that captures consumer expectations. In the upcoming macroeconomic analyses, changes in consumer confidence pertaining to the economic outlook in the near-term will be proxied by this term.

For example, a collapse in consumer confidence in anticipation of an impending macroeconomic downturn is represented by a drop in $\underline{C}$. A surge in consumer confidence, on the other hand, translates to an increase in $\underline{C}$. (Later in this chapter we will discuss how confidence is measured.)

Consumer confidence, like investor confidence, is very sensitive to planned increases in future taxes or signs of unemployment. Even a whiff of impending tax increases or indications of impending or actual lay-offs causes consumer confidence to be adversely affected.

In the United States, private consumption, C, is the giant in the equation. As we have noted earlier, C was almost 72 % of Y by late 2008. In fact, in the bleak months and years following 9/11, it was C that was not just keeping the US economy afloat but (with some help from China) keeping the global economy afloat too.

b The marginal propensity to consume (MPC). This is defined as the increase in consumption, C, arising from a unit increase in national income Y. A value of b = 0.90 for the US means that if average national income were to increase by $1, consumers would spend 90 cents of this increase in income and save 10 cents. The MPC is a stable statistic and inherently captures national as well as cultural spending and saving tendencies. While long-term and gradual changes in the MPC do indeed occur, we will hold b fixed in this book for expository convenience.

Values of MPC, while held fixed for individual economies, do vary significantly across countries. Japan's MPC (around 0.3) is significantly less than that of the US which is at the high end (perhaps, around 0.92 by 2015). Even within economies, the values of MPC may vary substantially by generation, or region. For example, some studies have found the Northeastern States in the US to have a higher MPC compared to the Midwest. In Japan, post-war generations have been found to exhibit greater tendencies to consume. This behavior is in stark contrast to that of those who witnessed the trauma following World War II and the virtual eradication of household savings. In fact, single Japanese women today are at the very high end of the MPC spectrum, practically keeping the economy afloat with their formidable levels of consumption!

Y National income. This term is used synonymously with national output and GDP at this point.

d The amount of an increase in planned consumption stemming from a unit increase in wealth (W) is defined below. Here, d is a small number, unlike the MPC for the US. It may even be as low as 0.2; a $1 change in wealth does not result in a significant accompanying change in consumption, since investors (consumers) understand the enormous variability in the values of their wealth holdings.

W National wealth holdings. This term includes stock market/mutual fund portfolios and other financial assets. Real estate holdings may also be included.

The celebrated and controversial "wealth effect" takes place when huge increases in the values of individuals' stock market portfolios and stock options coupled with, perhaps, significant appreciation in property prices inflate wealth holdings W. This expectation of future gains may induce individuals to increase consumption in the current period, and to lead a more extravagant lifestyle than their current disposable income would prudently allow. In a sense, the security afforded by future expected income (upon retirement, perhaps), may induce individuals to consume this "future income today". Conversely, a sharp correction in the stock market or a sudden bursting of a real estate price bubble as in the US (and around the globe) in 2007–2008 may have the opposite effect—a negative wealth effect of sorts. In fact, with a large portion of US mortgages being "underwater" since the correction of 2008—that is, value of mortgages exceeding the now lower value of houses—there has been a pronounced negative wealth effect up to the present.

At this stage, we abstract from the wealth component for notational convenience and operate with the simpler version of the consumption function[6]:

$$\mathbf{C} = \underline{\mathbf{C}} + \mathbf{bY}$$

We now examine capital investments, I, in similar detail. The investment function is:

$$\mathbf{I} = \underline{\mathbf{I}} - \mathbf{fi}$$

where:

I Private capital investment (necessitates borrowing) for items such as new plant and equipment, housing, and the growth of new capital stock.

$\underline{\mathbf{I}}$ Investment confidence. Along the lines of consumer confidence, this index captures the sentiment of business. The Dun and Bradstreet CEO Index as well as the Index of Leading Economic Activity (LEA) may be considered good proxies for investor confidence. Once again, a positive business (macroeconomic) outlook causes $\underline{I}$ to increase, thus driving up private capital investment and eventually the demand for loanable funds. Conversely, the opposite holds true—a crash in investor confidence sends private capital investment into a

[6]Changes in wealth holdings will enter our analysis via accompanying changes in confidence. The confidence term acts as a proxy for changes in wealth holdings such as stock market corrections and run-ups, large swings in real estate prices, etc.

free-fall as in the case of Japan from the late 1990s through the early 2000s (please see box).

In the US, capital investment has really not been a key player from 2000 onwards, when I collapsed following the demise of the dotcom bubble, the shock of 9/11, and then the housing and mortgage securities bubble collapses that extended well into the decade.

It should be stressed here that I is extremely sensitive to future tax increases as well as to news pertaining to unemployment, even more so than consumer confidence's aversion to future higher taxes.[7]

f The sensitivity (elasticity) of private capital investment to a unit change in interest rates, i. Again 'f' will be held fixed when we begin our ISLM analyses in Chap. 6. Here a unit increase/decrease in interest rates causes private capital investment to *fall/rise* by f, and hence the negative sign.

i Interest rate as defined above. These are assumed to be short-term interest rates, and not to be confused with long-term rates introduced in the following chapter. Here, as interest rates fall, capital investment (private demand for loanable funds) increases, and vice versa.

The main determinant of change in capital investment I is I and not interest rates per se. If the business outlook is dismal one to five years into the future, irrespective of how low interest rates may be, investors will be unlikely to pump more funds into private capital investment. In Japan in the late 1990s to the mid-2000s, when interest rates were almost zero percent, and, then later in the US by 2008 when rates were pushed down close to zero, we had perfect examples of this effect. This is similar to a well-known scenario in macro known as a **liquidity trap** where low interest rates prove futile in stimulating capital investment (I) in an economy characterized by dismal macro outlook (low I).

In fact, from 2008 to 2015, in spite of the tremendous liquidity injected into the US economy exemplified by prolonged low interest rates, there was no significant accompanying explosion of capital investment. With investor confidence staying low due to the higher taxation, excessive government regulation following the subprime crisis of 2008, and global uncertainty, capital investment became a flat-liner. Even with short-term interest rates hovering around zero percent, thanks to the **Quantitative Easing** (to be explained later in the chapter), capital investment remained dead; companies opted to simply sit on sacks of cash and ride-out the uncertainty and high taxes.

While short-term rates are exogenously determined by monetary policy, investor confidence I, like its counterpart, C, is endogenous, and determined by investors and consumers who process all current and past information. Both I and C are very difficult, if not impossible, to change by policy. A recurring theme of this book is that consumer and investor confidence, which may have taken years to build, can indeed be lost "in an afternoon" and policy makers would be unable to stop the collapse.

[7] "Taxes" here, include all taxes—federal, state, property, etc. In Chap. 10 we differentiate between business and consumption taxes.

In earlier research done jointly with Giles Mellon in *Confidence Credibility and Macroeconomic Policy* (co-authored with Richard Burdekin), we show that a potential collapse in $\underline{C}$ and $\underline{I}$ can be arrested with rapid and very significant cuts in interest rates (huge increases in M) only—only—in the very early stages of weakening confidence. Any delay only increases the imperviousness of confidence to a belated monetary/fiscal rescue plan.

Before introducing the money market and prior to the derivation of the AD, an overview of the description and measurement of consumer and investor confidence is in order.

Measuring Confidence Two major measures of consumer confidence, derived from large-scale surveys of households, are available in the United States. These are the University of Michigan's Index of Consumer Sentiment and the more familiar Conference Board's Consumer Confidence Index.

The Consumer Sentiment Index, developed by Katona and Mueller (1953), is constructed to measure "those factors which are capable of giving rise to independent variation in the rate of consumer spending and saving, namely, changes in people's perceptions, attitudes, motivations, and expectations."

This index is calculated by processing information from a survey of about 500 households. Survey respondents provide qualitative answers to questions pertaining to current family financial situations, expected financial outlook one year into the future, expected one-year-ahead business conditions, long-term (5-year) expectations of the business environment, and current buying plans for large household durable goods (defined as appliances with a service life greater than 3 years).

The Conference Board's Consumer Confidence Index is constructed in similar fashion. In this case, information is obtained from surveys mailed to about 5000 households every month, with an average response of about 3500 surveys. The questions include topics that pertain to current general business conditions, expected business conditions 6 months into the future, current employment opportunities, and expected household income 6 months into the future.

Comparing the two indexes, the Conference Board survey focuses on shorter-term expectations relative to the Michigan index; participants respond to queries about their perceptions of the economy over the next 6 months as opposed to 5 years. In addition, the Conference Board specifically includes questions pertaining to the respondent's employment and income prospects, instead of the more general "financial condition" questions in the Michigan survey. Basically, labor market news has a greater effect on the Conference Board's index, while the Michigan index is more sensitive to news from the financial markets. For these reasons, the two indexes are not always identical or perfectly correlated.

The Japanese Tankan Index Confidence is measured along similar lines in most G7 countries. The closely watched Japanese Tankan index, initiated in 1961 by the Japanese central bank, is a key quarterly measure of business sentiment and is obtained by surveying 10,000 businesses. The index subtracts the percentage reporting an unfavorable business outlook from those who say that conditions are indeed favorable. Ambivalent ("so-so") outlooks are discarded. A net positive Tankan score indicates an overall optimistic outlook while a net negative score indicates the opposite.

From the bleak 1990s through the serial recessions of the early 2000s, a negative Tankan was, unfortunately, a recurring theme. The bursting of the Japanese stock market and real estate bubbles, the East Asian currency crisis, and the state of large non-performing financial institutions all contributed to the demise of confidence.

The respondents are divided into several categories such as large manufacturers, large non-manufacturers (retailers, builders, realtors, etc.), and small manufacturers. As bank credit for small manufacturers evaporated, and when a 33 % plunge in expected profits was projected, the Tankan went into a record free-fall. At one point, in October 1998, this category's sub-Tankan score fell to an amazingly low level of −57, at that point a record low.

A Singaporean Proxy for Confidence Some economies resort to commonly observed indicators that act as excellent unofficial proxies for formally measured confidence. In fact, these indicators are very readily available and are often extremely accurate. One such example is the use of the Certificate of Entitlement (COE), in the case of Singapore.

The COE is a legal document that must be obtained from the Singaporean government when a vehicle is purchased in the country. Just buying a new car by paying the car dealer the grand total inclusive of taxes, transportation charges, etc., is not enough. In Singapore, one must also obtain "permission" from the authorities to be able to drive this car on Singapore's highly "rationed" roads. The Ministry of Transportation determines the optimum number of vehicles that will operate on the nation's roads without causing the gridlock, pollution, and crippling congestion that plague so many other Asian economies. The "permission", or license, to actually entitle an individual to place another automobile into circulation is the COE.

Every month, the government makes a quota of certificates available to the public. The quota is divided into vehicles of different categories and functions. The number of certificates in each category is determined by the ministry and is based on some pre-determined accepted growth rate of new cars on Singaporean roads, and presumably matched to the rate of growth of new roads, parking spaces, and emissions levels.

Individuals participate in an "auctioning process" and bid on the monthly COE tender either through ATM machines or through car dealers. In this highly regulated environment, obtaining a COE is a significant and non-trivial cost running into thousands of dollars. Circumventing the law by purchasing a car and driving without the COE in this island economy noted for its enforcement of rules, is not an option. The final market-clearing market price of each quota (in the several different classes of automobiles) is, of course, influenced by the existing demand, given a fairly stable growth in supply. COEs become more expensive as demand for new cars increases, and vice versa.

Singaporeans, savvy to the notion of business and personal confidence, have concluded that the price of Certificates of Entitlement (released monthly) is indeed a good proxy of economic outlook and of confidence in the shape of things to come. An expected slowdown, such as the period following the East Asian currency crisis in 1997–1998, resulted in a drop in prices of COEs as demand slumped, and the monthly quota (determined by the government) sold at a significantly lower price. As the economy bounced back after weathering the Asian crisis by 1999, and as confidence in the strength of the economy rose, demand for new cars increased. Given the relatively fixed supply (quota) of available COEs, this increase in demand caused prices of COEs to rise.

Of course, if the supply of licenses (certificates) were to also change, then any change in the final price of COEs has to be interpreted with caution. An increase in the price could either be due to higher demand stemming from increased confidence or, quite simply, to a cut in the supply of new licenses.

At this stage, an examination of the money market is required so that we can proceed with the derivation of the AD curve in order to eventually shift the AD and enact stabilization policies.

4.3.2 A Preliminary Money Market and an Introduction to Quantitative Easing (QE)

Money supply in macroeconomics is defined in real terms, in units of goods. This is done to sift out inflationary effects of currencies of different countries and to reduce money supply to one common denominator, namely, the purchasing power of the money.

The real money supply is: **M/P = Nominal Money Stock/Price level**

M is in units of currency ($) in circulation and P is in units of $/good (the price of a typical market basket). For example: M/P = $100/$20 per good = 5 goods (market baskets).

The central bank (Federal Reserve), controls M, defined as the "nominal money stock". The real money supply M/P is a combination of M and P, with M being an exogenous policy instrument, and P determined endogenously by the economy. The real money supply, being independent of the interest rate, is represented by the vertical line in Fig. 4.8.

Money demand is defined as the demand for cash for transactions:

$$\textbf{MoneyDemand} = \textbf{kY} - \textbf{hi}$$

where:

k and h	are constants
Y	national income, GDP
i	interest rate.

The intuition underlying this equation is that, with higher national income Y, the average demand for cash for transactions balances increases. As interest rates rise, however, the "cost" of holding cash balances is the interest rate forgone by not placing this cash in an interest-bearing account. The demand for the amount of cash for transactions decreases, and vice versa. This accounts for the negative sign before the term with the interest rate.

Figure 4.7 displays a money market equilibrium with the equilibrium interest rate at i_0, and real money supply initially at M_0/P_0.

We now perform a simple yet very important experiment; if P_0 were to increase to P_1, with the nominal stock (M) held constant, what would be the effect in the money market presented in Fig. 4.7?

As the price level increases to P_1, the new real money supply falls.

$$M_0/P_1 < M_0/P_0$$

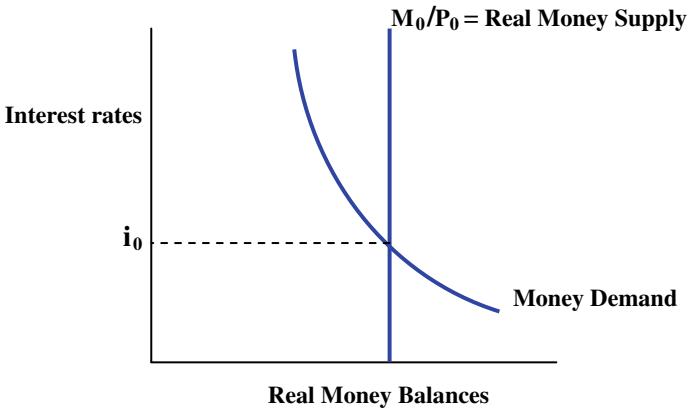

Fig. 4.7 The money market

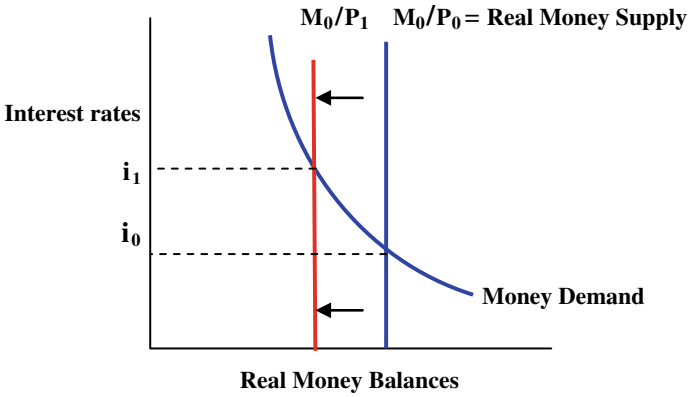

Fig. 4.8 Deriving the LM

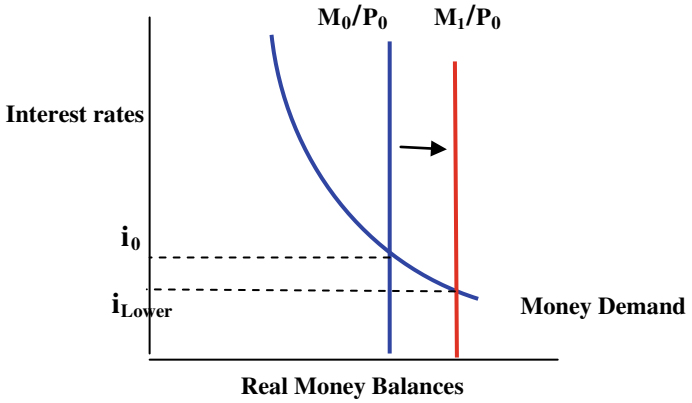

Fig. 4.9 Experiments in the money market

A drop in real money supply is tantamount to a leftward shift (decrease) in the real money supply curve.[8] As real money supply shifts to the left, equilibrium interest rates increase from i_0 to i_1 as depicted in Fig. 4.8. The result of this simple exercise will be crucial in the AD derivation that follows.

Conversely, and increase in money supply from say M_0 to M_1 (Fig. 4.9), would shift the M/P line to the right resulting in interest rates falling from i_0 to some i_{Lower}.

How is money supply increased? We examine this in detail in Chap. 11, but for now we focus on the main method known as **Open Market Operations**. This is the most common method of changing monetary growth in the United States and in other mature economies such as the Eurozone, the UK, and Japan. Very simply, the

[8]Shifts in curves were discussed in the microeconomic digression in Chap. 3.

central bank—the Fed, in our case—buys existing US Treasury debt from local banks who are required to carry these bonds in their portfolios. A purchase of a $10,000 Treasury bond from each of the local banks A, B, and C, results in the Fed crediting the local banks with $10,000 each. (Actually there is a money multiplier thanks to the "reserve ratios" involved, but, at this early stage we just treat this as if the local banks obtain $10,000 each from the Fed.) Competition between banks A, B, and C to unload this newly-available money and lend it out, results in a rapid decrease in the short-term rates from i_0 to i_{lower}. These rates that the Fed controls are exceptionally short-term, overnight rates, known as Federal Funds rates. In reality, the Fed a9and other central banks manage fluctuations of these rates within narrow ±0.25 % bands.

Important Note: To increase the nominal money stock (M) the Fed bought existing Treasury bonds from the private banks, A, B, and C. This has to be contrasted with the Treasury's auction of new government debt, in Chap. 3, which was necessary to finance new government spending (G). The distinction is important and must be noted and will be revisited in Chap. 11 when we discuss the Broken Rhombus.

The opposite process is true for hikes in short-term rates. Here the Fed requires the local banks to buy back the bonds that they had sold earlier to the Fed. Now the local banks are short of $10,000; money supply has fallen or, shifted to the left, with the result that borrowers now face an increase in interest rates. The local banks have no option; they must abide by the requests of the Fed. These purchases and sales of existing Treasury bonds—Open Market Operations—will be discussed in detail later in Chap. 11. Please note that this process of changing short-term rates via monetary policy is exceptionally fast, and changes can typically be done in under 30 min in the United States.

Following the subprime crisis of 2008, investors, brokers, banks, credit unions, hedge funds, mortgage houses, pension funds, etc., were stuck with the subprime mortgages that went bad when interest rates were nudged up. Borrowers could not make their payments on their dubious mortgages that they really should not have qualified for, in the first place. The collateralized mortgage obligations—basically investment instruments composed of chopped bits of good and rotten mortgages—went sour, leaving holders with literally trillions of dollar of rotting assets. To bail them out, the Fed began an unprecedented, highly controversial and questionable purchase of mortgage bonds worth about $85 billion per month from 2008, with this amount finally "tapering off" by October 2014. It was a mammoth and rampant money creation that beggared the imagination.

The money supply in Fig. 4.9 was shift relentlessly to the right until the interest rates were at zero percent; technically they would have been below zero percent, deep in negative territory, but zero was the floor. That amount of money creation that resulted in technically sub-zero interest rates has been euphemistically referred to as **Quantitative Easing**, **or, QE**.

And even though rates were stuck at zero (Fig. 4.10), capital investment (I) remained a no-show given the Liquidity Trap discussed earlier. The United States was essentially left with unprecedented money creation, and the investors

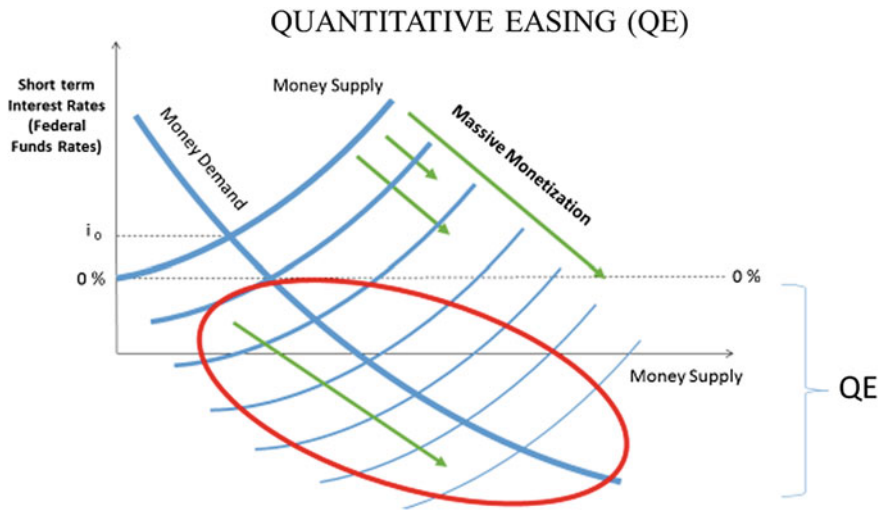

Fig. 4.10 Quantitative easing

and institutions that had made the risky and irresponsible bets on the subprime loans, and had perpetrated the crisis, were essentially bailed out.

In his article in the Wall Street Journal, "Confessions of a Quantitative Easer," November, 2013, Andrew Huszar, one of the prime architects of the Quantitative Easing (QE) Program, did a very bold, and long-overdue *mea culpa*. He wrote:

> We went on a bond-buying spree that was supposed to help Main Street. Instead it was a feast for Wall Street. I'm sorry, America. As a former Federal Reserve official, I was responsible for executing the centerpiece program of the Fed's first plunge into the bond-buying experiment known as quantitative easing. The central bank continues to spin QE as a tool for helping Main Street. But I've come to recognize the (QE) program for what it really is: the greatest backdoor Wall Street bailout of all time.
>
> Andrew Huszar, Wall Street Journal, 11/11/13

He points out that the Fed had planned to buy $1.25 trillion in mortgage bonds in 12 months, and the overall Fed purchase may have topped $4 trillion. In fact, shockingly, he confirms that Wall Street experienced its most profitable year ever in 2009, thanks to money at zero percent which they could lend out at 6 %! And 2010 was almost as good.

What were the effects of this monster increase in monetary growth? More on this in the next chapter, when we analyze the effects of both fiscal and monetary policies on the economy, after developing our model further.

The residual challenges now are how to retract all this liquidity when the time for monetary contraction arises? If inflation were to reappear, or if the US economy were to get some serious traction, then the massive liquidity that is sloshing about in the economy would be inflationary. This undoubtedly was a chief concern for the Federal Reserve in Fall of 2015, when it contemplated the contraction of monetary growth and raising of short-term interest rates for the first time in eight years.

4.3.3 *Deriving the Aggregate Demand*

Figure 4.11 presents all the components pertaining to the derivation of the AD, developed up to this point.

We start by observing that the goods market is initially in equilibrium at Y_0, the initial equilibrium interest rate is i_0, and the initial price level is P_0. The AD will be derived in the space bordered by the P and Y axes, henceforth referred to as (P, Y) space. The step numbers (in bold below) are also referenced with corresponding numbers in Fig. 4.11.

(1) We begin by plotting the "given" initial point P_0 and Y_0 in (P, Y) space. (The steps numbers are matched in Fig. 4.11.)
(2) P_0 increases to P_1. We now need to determine the final equilibrium Y_1 in order to obtain the second point in (P, Y) space. The two points in (P, Y) space can then be connected to give us the AD curve.

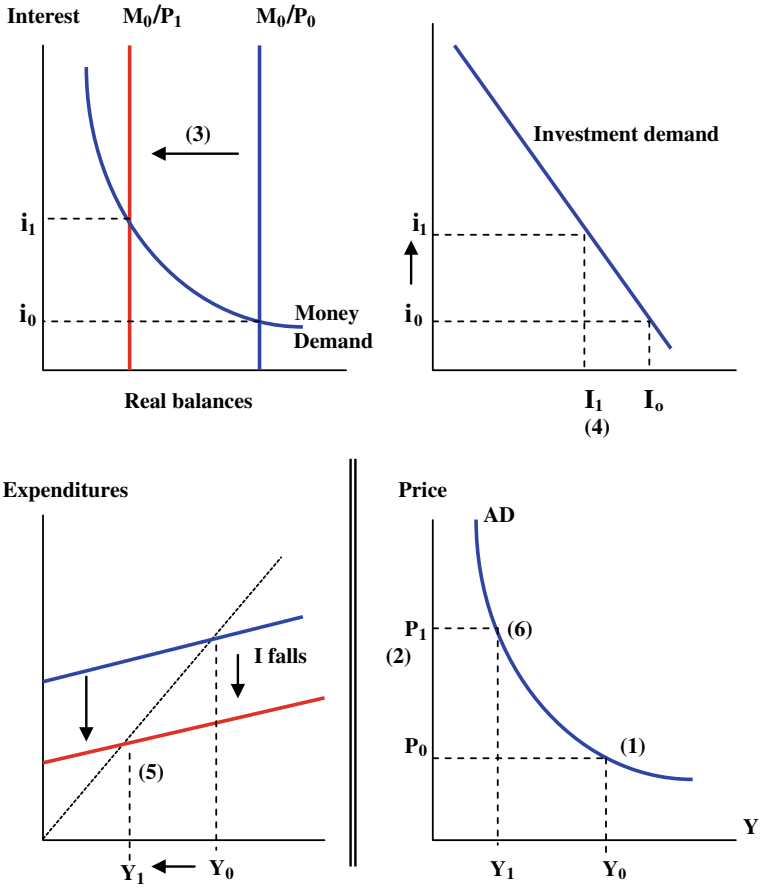

Fig. 4.11 Deriving the aggregate demand curve

(3) As prices increase to P_1, real money supply falls (see the money market diagram) and equilibrium interest rates consequently rise to i_1 as discussed in the simple exercise in Fig. 4.8.
(4) As interest rates increase, capital investment falls, as per our earlier discussion (no change in investor confidence here).
(5) This results in a drop in the expenditures line and a new equilibrium in the goods market at Y_1 that is a lower equilibrium relative to Y_0.
(6) Plotting this point (P_1, Y_1) and joining it to (P_0, Y_0), we obtain the AD curve. (In reality, the AD is a nonlinear function, a rectangular hyperbola, to be exact.)

All points along this AD curve are points obtained by synthesizing the goods and money markets; in fact, each and every point on AD is one where both goods and money markets are simultaneously in equilibrium. Specifically, in Fig. 4.11, The points (P_0, Y_0) and (P_1, Y_1) are simply simultaneous goods and money market equilibria transposed into (P, Y) space. Both these points on the AD have corresponding points of equilibrium in the goods and money markets.

Although the AD reproduced in Fig. 4.12 appears to be just another downward sloping demand curve, it is a whole lot more. There is a tremendous amount of macroeconomic structure underlying this apparently innocuous demand curve. Embedded in the AD are: consumer confidence, investor confidence, government spending, private consumption, capital investment, monetary policy, and tax rates, not to mention a host of global variables such as imports and exports, and foreign GDP, that have been suppressed here.

With the derivation of the AD, a very significant milestone in the analysis and design of macroeconomic policy has been reached. The stage is now set to explore how we can shift this AD to implement demand-side stabilization in the following chapter.

The following section will highlight as well as supplement the information presented in this chapter.

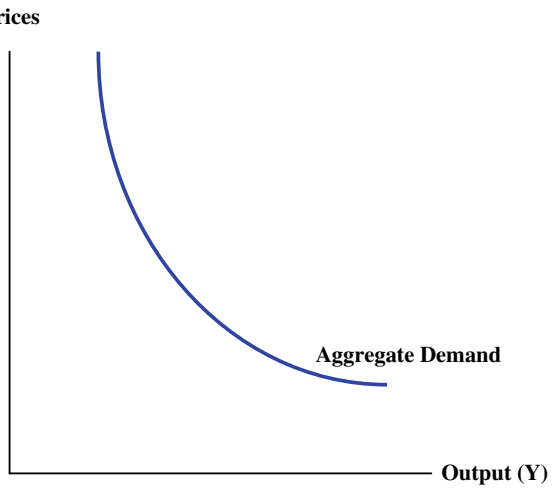

Fig. 4.12 The aggregate demand curve

4.4 Discussion Questions

1. *We have suddenly gone from a very intuitive plane to a more theoretical model. Is this the shape of things to come*?

We have indeed moved to a more theoretical model. In doing so, however, we have increased our level of sophistication. For instance, consumer and investor confidence, the wealth effect, the MPC, monetary policy and the money market, and tax rates (to be discussed soon) were all conspicuously absent in the NSI framework.

As discussed earlier, the NSI was a "broad-brush" accounting framework with tremendous relevance in analyzing international flows of funds, etc., but lacking the domestic details, and particularly missing the existence and role of monetary policy.

In this chapter, we are essentially converging to our final ISLM analysis. With the construction of that model, the "real world" implications and the practicality of our final model will be evident.

2. *Are most measures of confidence adopted in different economies based on survey-generated results? Are the indexes constructed in similar fashion*?

Yes, the method is similar but not identical. We have discussed the Japanese Tankan index in this chapter. Germany's eagerly awaited index for consumer confidence is published monthly by the Munich-based research institute Ifo, referred to simply as the Ifo index. France has a similar index that is released once every other month that includes intangibles such as "quality of life".

In emerging economies, the confidence index may be skewed toward cities and may not be representative of the entire economy. In China, for example, a confidence survey conducted in Beijing or Shanghai, both on the fast-growing Eastern seaboard, may be at odds with the state of the economy in the more agricultural and rural central and western parts of the country. A single confidence survey may not be appropriate for these two structurally different sectors that exhibit vastly different hopes and aspirations, and, most importantly, consumption patterns.

3. *What is the "triple whammy" effect on private consumption*?

Private consumption (C) comprises three elements: consumer confidence, income (actually after-tax income), and wealth holdings (assuming MPC and "d" to be constant).

If the stock market were to undergo a very significant correction, then, according to the much-feared "triple whammy" effect, confidence would fall as wealth holdings collapse with the stock market. Further, if the factor(s) causing the stock market crash were to result in a slowdown in real GDP growth, Y would also fall.

Thus, there is concern that the "triple whammy" of decreases in national income (Y), consumer confidence C, and wealth (W) would all rapidly conspire to severely curb private consumption.

4. *Are economists in agreement regarding the importance of the role of confidence in designing and analyzing macroeconomic policy*?

Unfortunately, they are not. Those who believe in the importance of the confidence statistic attribute its importance to[9]:

(a) Confidence being a causal factor capable of influencing macroeconomic activity in the near future.
(b) The ability of the confidence term to forecast macroeconomic fluctuations.
(c) The ability of confidence to act as a catalyst, magnifying the effects of macroeconomic shocks.
(d) The confidence index exclusively captures information pertaining to individual's expectations.

Those that do not subscribe to the above sentiment (Fuhrer 1993, for example), find that aside from some idiosyncratic information, the variation in the Michigan Consumer Sentiment Index can be explained by readily available macroeconomic data. That is, any information content provided by the confidence index is already subsumed in the readily available macroeconomic data.

The fact is that while macroeconomic academics remain divided, the confidence indexes, both here and abroad, remain eagerly anticipated by individuals, central bankers and, most importantly, policy makers.

5. *Can confidence be influenced by appropriate macroeconomic policies*?

Both consumer and investor confidence are endogenous, and technically cannot be manipulated by macroeconomic policy. In rare and isolated cases, however, it may be possible to influence confidence with appropriate monetary policy only in the very early stages of a crisis in confidence. (Please see Chaps. 8 and 9 of Burdekin and Langdana 1995, for theoretical details.)

A good example may be Alan Greenspan's prompt action in decreasing interest rates twice in a 2-week period following the collapse of Long Term Capital in Fall 1998 and in the wake of the Asian currency crisis. There is a sense that this preemptive action prevented confidence in the US from collapsing along the lines of the indexes in the stricken East Asian economies. More recently, in a controversial series of policy moves, Fed Chairman Ben Bernanke desperately attempted to save C and I by lowering interest rates to prevent contagion of C, C, I, and I from falling wealth holdings (W), as US housing prices began deflating in 2007. This led to the rampant bond-buy-back program, euphemistically known as Quantitative Easing, which we briefly discussed earlier in this chapter. More details on this subject are forthcoming in future chapters.

[9]Please see Confidence, Credibility and Macroeconomic Policy: Past Present and Future, by Richard C.K. Burdekin, and Farrokh K. Langdana, for an in-depth discussion of this subject (Chap. 7).

Article 4.1 SCIENTISTS RATE MACRO CAMP A SUCCESS

By Mike Perron, World Business Review, New York.

Nestled on a hillside with a panoramic view of the Atlantic Ocean, the Macro Retreat conducted by New Jersey based Rutgers Macroscape is getting rave reviews. Designed exclusively to give professionals with non-business backgrounds a hands-on, working knowledge of macro-economic policy analysis, the program has been swamped by an unexpected number of applicants.

Prof. Steve Fountelroy, director of the program, said, "Professionals who have no business background are desperately in need of information pertaining to how the economy works. Should they pull out of the market? Should they invest some more? This course will give them a very focused yet fundamental working knowledge". He adds, "individuals with non-business backgrounds are having to make very major business decisions today, both at work and in their personal finances. They need to know how the macroeconomy works, and this is where they get the necessary practical information."

Participants attend a 1-week course every 2 months over a 2-year period. "Most of our participants are either engineers, doctors—we have every kind of doctor, even veterinarians—physicists, biotechnologists, rocket scientists, pharma people, IT types, you name it," says general manager, Shelda Megan Wills.

We interviewed some of the participants, and here is a sampling of their comments following the first week's macro course.

Dr. Lenny Hartley, from Omaha, Nebraska, remarked, "I finally understand **(a)** why consumption does not fall in proportion to a correction in the stock market! And I'm a cardiologist who, until last week had no idea how the economy worked!" He adds, "I am worried about the **(b)** 'triple whammy', though…"

Gerhard Muller, a bona fide Austrian rocket scientist from Vienna, was confused about investment. "If capital investment increases with lower interest rates, **(c)** why then did Japan's capital investment not soar when they had those zero rates for all those years in the late 1990s and early 2000s? And the same goes for the US in 2007-15, when interest rates were pushed down?"

"This confuses me too", concurs Meadow Pellagrino, a marine biologist from Daytona, Florida, "and I am also puzzled as to why the **(d)** classical econ-omists could not come up with Keynes' policies much earlier? Also, if we have equilibrium in the goods market at E_0, **(e)** shouldn't there be no unemployment at this point, too?"

Jasmine Bhargava, a con-sultant in the biotechnology sector in Cambridge, Massachusetts, loved the design and content of the course. But she feels that she is still not sure "how we can simply 'move up' from one equilibrium point to another. I understand this occurs by increasing government spending. But doesn't this mean that

the government borrows x dollars from one group of people and pays the same x dollars to another group?"

At this point, Dr. Fountelroy, interjects, "Excellent question! Store this away as it forms the **(f)** beginning of our session next time! Superb!"

(g) "China and the US clearly enact such polices and maybe now I'll understand the mechanism," exclaims Yong-Suk Choi, a lawyer from San Francisco specializing in US-Far East trade, "but I guess I'll have to wait till next class!"

"You've got us all worked up," laughed Meadow, the marine biologist. "We want to know right away!"

Now this reporter can see why the Macro Retreat has been so successful. The participants can't wait for something they keep referring to as the "engine room"; but maybe that's for a future article!

Article 4.2 CRASHES IN CONFIDENCE AND THE FLIGHT TO SAFETY

Giles Mellon, USA MacroSoft, Inc.

This article extends the NSI analysis by incorporating material from Chapter 3.

It happens every time. Every time the stock market or the housing sector corrects significantly (not just in the US but, really, anywhere), every time bad news roils the headlines, or some emerging economies get hammered by macro-shocks, or Mother Nature lashes out at humankind, some analyst dutifully describes the day's investment as the classic "flight to safety".

MacroSoft sends a team of reporters to understand this ubiquitous phrase. The first and obvious stop is a chat with the macro giant, Professor Lyko, who happens to be speaking at the local architect's conference here in Atlantic City, NJ. We ask her in the coffee break why, typically, US Treasury bonds' interest rates (yields) fall in the so-called "flight to safety".

Lyko replies, between delicate bites of almond-glazed pastry, "The participants of the conference should be able to answer this. There is a massive and sudden increase in the supply of loanable funds into the safe haven country—the United States, in this case, as **(a)** some unseen trigger suddenly deflates consumer and investor confidence. Panicked investors want to 'park' their money in safe-haven assets such as T-bills and T-bonds, and maybe even precious metals. **(b)** This accounts for the drop in yields during a flight to safety; there is often a firming of the US dollar here too."

"And I love that", interjects Michaela Townsend, an architect from Montana, after she washes down her truffle tart with a mocha steamer. "This reassures me and proves to me that we've still 'got it'. We, the US, are still fine in terms of Safe Haven!"**(c)**

We then ask Dr. Ron Farnsworth, the CEO of Investing.Com, why prices

of Treasurys typically rise in the flight to safety, and he replies, "Any student of finance will tell you that prices of bonds move opposite to the yield (interest, for now) on bonds."

Prof. Lyko adds, carefully putting aside a plateful of tiny Polish cakes, "Well, the intuitive answer is as follows. There is an auction for **(d)** discounted safe-haven (US) government bonds. In this very simple example, Uncle Sam promises to pay you the face value of $1000 in 3 years. The best bid in the auction today is, say, $950. So the simple 'interest' after 3 years on the $950 that you lent to the government—ignore 'compounding' for now—is ($1000-$950)/$950. **(e)** But if there is panic in the economy due to some crisis in the stock market, in the housing sector, or, say, in Asia, we then have a stampede to the safe haven debt. At this point desperate lenders at the bond auctions are now willing to bid up their best offers for the Treasury bonds to, say, $980. The price has consequently 'risen' and the interest rate (yield) is now 'lower'; ($1000-$980)/$980". This is why, intuitively, bond yields move inversely with their price."

Victor Morales, a CFO of a drafting company based in Chastity, Utah, wonders aloud, **(f)** "So, given what we have heard at this conference, the objective now would be to do damage control by using a rapid and impressively vigorous fiscal and monetary policy mix, right?" Michaela adds, balancing her walnut mousse and strawberries in a very tiny plate, "Yes, we need to go from E_0 to E_1 in the goods market—just crank that line up. **(g)** Don't you wish it were really that simple?"

On that whimsically philosophical note, our team of reporters finally reaches the dessert station, whereupon all macroeconomic discussion immediately comes to a delicious halt.

Hints And Solutions

Article 4.1 Scientists rate Macro Camp a Success

(a) This is because 'd', the MPC with respect to a unit change in wealth holdings, is a small number in the consumption function.

(b) The "triple whammy" stems from the extended consumption function (including wealth) and is discussed in the text.

(c) This is because investor confidence, I, was dead in the water, and I is the main driver in the investment function.

(d) They had no reason to come up with a Keynesian prescription because the classical model was performing well till the early 1930s. Remember, as discussed in Chap. 2, macroeconomic models are designed to reflect the reality of the economy they are based in. They are contingent on their particular backdrop and are functions of expectations. As these expectations change, macroeconomic models, unlike the models in physics or engineering, also change, and these transitions are known as paradigm shifts. As these changes

occur, new paradigms are ushered in, such as from the classical model to the Keynesian model in the mid-late 1930s.

(e) The goods market equilibrium says nothing about the overall level of employment or unemployment. It simply indicates that the amount produced is exactly equal to planned expenditure, C + I + G + (Exp–Imp), with no excess demand or supply.

(f) Chap. 5 will cover the essence of Keynesian policy prescription. A key Keynesian concept not introduced yet, is the notion of the Keynesian "multiplier" (Chap. 5). Large infrastructure spending will be advocated to reach E_1. The Tennessee Valley Authority (TVA) and the Civilian Conservation Corps (giant infrastructure projects in the US in the years following the Great Depression) are good examples. Massive increases in US government spending on reconstruction and defense, in the wake of 9/11, and then proposed again by President Obama in 2008, could also fall into this category.

(g) Beginning in the late 1990s, China has embarked on an ambitious infrastructure spending campaign on hundreds of miles of new roads, upgraded rail lines, new subway systems and airports, increases in power generation and, of course, the mammoth Three Gorges Dam on the Yangtze river. India is on a similar—though less ambitious—path of boosting productivity via infrastructure growth. In late 2008 China proposed a four trillion yuan expenditure plan to keep growth alive. Eventually, by 2015, it was evident that much of China's government ("fixed asset") spending was, unfortunately, in vast infrastructure projects with diminishing returns to productivity. Examples of ghost cities, ghost ports, train stations with no passengers, and highly subsidized, highly leveraged, and unproductive State Owned Enterprises (SOEs), abound.

Article 4.2 Crashes in Confidence and the Flight to Safety

(a) The final collapse in confidence could come from a variety of sources that could include late breaking news, announcements of new macropolicies, exogenous shocks stemming from political/natural turmoil, or the final bursting of an asset-price bubble to be covered in the following chapter.

(b), (c) relate to the s_{lf} and d_{lf} diagrams from chapter three.

(d) US treasury debt is sold at below face value to the highest bidder (domestic or foreign) at Treasury auctions. In the example provided by Prof. Lyko, the first final bid was $950 for a $1000 face value bond. The bond was therefore sold at a "discount", below final face value, hence "discount bond".

(e) This pertains to one of the factors that attracts capital inflow—domestic safe-haven status. At this time, we side-step issues pertaining to the global mobility of capital. Capital flows vary based on restrictions imposed by different countries, ranging from perfectly mobile global capital to totally immobile.

(f) Note the emphasis on "rapid" and "vigorous" remedial macropolicy—relate this to the discussion on confidence indexes from the chapter.

(g) Refer to the equilibrium points in the goods market diagrams please.