ANSWERS TO THE EXERCISES

IN

MACROECONOMICS:
An Introduction

2010 Internet Edition

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Exercises from Chapter 1

An Overview of Economics

Exercises 1.1

A.   LAND CANNOT BE CHANGED AT ALL, EXCEPT IN HOLLAND. LABOR IS NOT JUST THE NUMBER OF WORKERS BUT ALSO THEIR SKILLS, AND THAT CAN BE ENHANCED BY TRAINING AND EDUCATION. CAPITAL IS ALL HUMAN-MADE AND SO WE CAN MAKE MORE OF IT; MORE COMPUTERS AND FASTER COMPUTERS FOR EXAMPLE. ENTREPRENEURSHIP IS PARTLY AN ABILITY THAT SOME PEOPLE HAVE (READING ONE OF THE EXCELLENT BOOKS ABOUT BILL GATES IS HIGHLY RECOMMENDED), BUT BUSINESS SCHOOLS SHARPEN ENTREPRENEURIAL SKILLS AND TRY TO MAKE MANAGEMENT MORE SYSTEMATIC.

B.   EDUCATION IS AN INVESTMENT, JUST LIKE BUYING A NEW COMPUTER. IT COSTS MONEY, BOTH DIRECTLY AND IN TIME SPENT, AND IT RAISES PRODUCTIVITY AND THE STANDARD OF LIVING.

C.   SWITZERLAND HAS A MUCH LARGER AMOUNT OF MODERN CAPITAL PER WORKER AND A HIGHER LEVEL OF EDUCATION ON AVERAGE.   SINCE BOTH COUNTRIES HAVE A VERY HIGH POPULATION DENSITY (PERSONS PER SQUARE MILE), IN FACT THE DENSITIES ARE ROUGHLY EQUAL, IT MUST BE THE DIFFERENCE IN PHYSICAL CAPITAL AND HUMAN CAPITAL THAT ACCOUNT FOR THE DIFFERENCE. BOTH HAVE ABLE ENTREPRENEURS, BUT SWISS MANAGERS WILL AGAIN HAVE MORE TRAINING ON AVERAGE.

D.   IT CAN INVEST IN NEW CAPITAL EQUIPMENT WITH BETTER TECHNOLOGY, AND OR TRAIN AND EDUCATE WORKERS WHO CAN USE IT. IT CAN ENACT REGULATIONS THAT HARMONIZE PUBLIC AND PRIVATE INTEREST. IT CAN AFFECT THE DISTRIBUTION OF INCOME IN THE LONG RUN BY AFFECTING THE DISTRIBUTION OF EDUCATION TODAY. ECONOMICS CANNOT ANSWER IF A HIGHER STANDARD OF LIVING RAISES PEOPLE'S HAPPINESS!

Exercises 1.2

A.   1. CAPITAL. 2. LABOR. 3. CAPITAL. 4. LAND. 5. CAPITAL. 6. LAND. 7. ENTREPRENEUR. 8. LABOR

B.   WILLIAM GATES III FOUNDED MICROSOFT CORPORATION, WHICH HAS BECOME ONE OF THE MOST SUCCESSFUL TECHNOLOGY COMPANIES IN THE WORLD.

C.	1. HOUSEHOLD. 2. BUSINESS. 3. GOVERNMENT. 4. AS PUBLIC UNIVERSITY IT IS PART OF GOVERNMENT, BUT IT IS MUCH MORE INDEPENDENT THAN MOST GOVERNMENT AGENCIES AND IN MANY WAYS OPERATES MORE LIKE A FIRM IN THE BUSINESS SECTOR. 5. BUSINESS. 6. REST-OF-THE-WORLD SECTOR SINCE IT IS A FOREIGN FIRM.

D.	1. TRANSFER PAYMENTS. 2. PROVIDES THE RULES OF THE GAME FOR THE AIRLINE INDUSTRY. 3. RULES OF THE GAME. 4. TAXATION. 5. PROVIDING GOODS AND SERVICES. SOME WOULD ARGUE THAT THE FERRY SYSTEM IS A PUBLIC GOOD, BUT THERE ARE PRIVATE FERRY SYSTEMS IN MANY PLACES. 6. RULES OF THE GAME.

E.	RUSSIA NEEDS TO DEVELOP A LEGAL FRAMEWORK WHICH PROVIDES THE "RULES OF THE GAME" FOR THE OPERATION OF A MARKET ECONOMY. THIS INCLUDES LAWS DEFINING PROPERTY RIGHTS, COMMERCIAL RELATIONSHIPS, AND CORPORATIONS.

Exercises 1.3

A.	THEY ARE: 1) WHAT WILL BE PRODUCED? 2) HOW SHOULD IT BE PRODUCED? 3) WHO WILL CONSUME IT?

	HOW MANY PEOPLE WILL TRAVEL AND HOW OFTEN WILL THE SERVICE BE? WILL PEOPLE TRAVEL BY SHIP OR BY PLANE? WHO WILL TRAVEL TO HONG KONG?

	TECHNOLOGY IN THE FORM OF JET AIRLINERS HAS DRASTICALLY REDUCED THE COST OF TRAVEL BOTH IN MONETARY TERMS AND IN TIME REQUIRED. THE RESULT HAS BEEN TREMENDOUS GROWTH IN THE NUMBER OF PEOPLE TRAVELING TO HONG KONG, AND MANY WHO COULD NOT HAVE AFFORDED THE TRIP IN THE DAYS OF OCEAN LINERS ARE NOW GOING THERE ON VACATION.

B.	PEOPLE DO THINGS THAT WE WANT THEM TO DO, LIKE MAKING MICROWAVE OVENS AND CUTTING OUR HAIR, MAINLY BECAUSE THEY GAIN FROM DOING SO RATHER THAN BECAUSE THEY ARE JUST NICE PEOPLE. THE PRIVATE ENTERPRISE ECONOMY WORKS BY HARNESSING THE MOTIVATION OF SELF INTEREST TO ACTIVITIES THAT BENEFIT SOCIETY.

C.	EMISSIONS FROM POWER PLANTS ARE AN EXAMPLE OF AN EXTERNALITY. ACID RAIN WILL AFFECT PEOPLE WHO ARE NOT PARTY TO THE PURCHASE OF ELECTRIC POWER FROM A PARTICULAR UTILITY. THE UTILITY WILL BE RELUCTANT TO INSTALL SCRUBBERS ON ITS OWN BECAUSE OF THE COST. HOWEVER, IF THE COST TO SOCIETY OF HAVING ACID RAIN IS GREATER THAN THE COST OF THE SCRUBBERS THEN THE

WELFARE OF SOCIETY WOULD BE IMPROVED BY REQUIRING THE POWER PLANTS TO INSTALL SCRUBBERS.

Exercises 1.4

A.   1. MICRO 2. MACRO 3. MACRO 4. MICRO 5. MACRO 6. MICRO

B.   THE OBJECTIVE HERE IS TO DRAW STUDENTS INTO DISCUSSION, NOT TO PROVIDE A REAL ANALYSIS OF THE ISSUES - THAT REQUIRES (AT LEAST) THE REST OF THE COURSE. WHAT DO THEY THINK THE TWIN DEFICITS MEAN AND WHY DO PEOPLE WORRY ABOUT THEM? WHAT WORRIES PEOPLE ABOUT THE SUCCESS OF JAPAN AND OUR LARGE TRADE DEFICIT WITH JAPAN? DOES JAPAN'S SUCCESS HURT US? HOW WILL THE GENERATION NOW IN COLLEGE BE AFFECTED BY THE SOCIAL SECURITY SYSTEM AND MEDICARE OR NATIONAL HEALTH CARE? HOW WILL MEDICAL TECHNOLOGY AFFECT THE RELATIONSHIP BETWEEN THE OLD AND YOUNG? INFLATION, RECESSION OR BOTH? IS ALWAYS TOPICAL BECAUSE THERE IS ALWAYS DISCUSSION AND SPECULATION IN THE MEDIA ABOUT THE DIRECTION OF THE ECONOMY.

Exercises for Microeconomics Supplement

A. YOUR DEMAND SCHEDULE SHOULD REFLECT THE LAW OF DEMAND, THAT THE QUANTITY DEMANDED IS GREATER THE LOWER THE PRICE. IF YOUR INCOME RISES, YOU WILL ALMOST SURELY BUY MORE OF THE GOOD AT ANY GIVEN PRICE.

B. THE IDEA HERE IS TO MULTIPLY YOUR DEMAND AT EACH PRICE BY THE NUMBER OF CONSUMERS IN THE U.S., MAKING THE ASSUMPTION THAT THEY ARE LIKE YOU. IF YOU THINK YOU ARE UNUSUAL, THE WORLD'S GREATEST CONSUMER OF WHATEVER, THEN YOU SHOULD ADJUST YOUR NUMBERS ACCORDINGLY. YOUR TABLE AND GRAPH SHOULD AGAIN REFLECT THE LAW OF DEMAND; HIGHER QUANTITY DEMANDED AT LOWER PRICES. THAT MEANS A DOWNWARD SLOPING DEMAND CURVE IN YOUR GRAPH. WHEN CONSUMERS ENJOY AN INCREASE IN INCOME, THE QUANTITIES DEMANDED PRESUMABLY INCREASE AT EVERY PRICE (CAN YOU THINK OF GOODS THAT ARE EXCEPTIONS TO THIS?) AND YOUR DEMAND CURVE SHIFTS TO THE RIGHT.

C. A SUBSTITUTE CAN BE ANY GOOD THAT YOU WOULD CONSIDER BUYING INSTEAD; IT NEED NOT BE PHYSICALLY SIMILAR. FOR EXAMPLE, A NEW CAR AND A VACATION TO HAWAII MAY BE SUBSTITUTES. IF THE PRICE OF THE SUBSTITUTE FALLS, THE DEMAND FOR THE ORIGINAL GOOD WILL FALL, SHIFT TO THE LEFT.

D. BOTH SUPPLY CURVES SLOPE FROM LOWER LEFT TO UPPER RIGHT, A POSITIVE SLOPE. THE SHORT RUN SUPPLY CURVE WILL BE STEEPER, THOUGH, BECAUSE IT TAKES A BIGGER PRICE INCREASE TO ELICIT ANOTHER UNIT OF OUTPUT IN THE SHORT RUN THAN IT DOES IN THE LONG RUN WHILE NEW CAPACITY AND SOURCES OF SUPPLY CAN COME ON LINE. A FACTORY FIRE WILL SHIFT THE SHORT RUN SUPPLY CURVE LEFTWARD, BECAUSE AT ANY PRICE FEWER UNITS WILL BE PRODUCED THAN BEFORE. THE LONG RUN SUPPLY CURVE IS UNCHANGED, BECAUSE IN THE LONG RUN THAT FACTORY CAN BE REPLACED. THE DEMAND CURVE WILL NOT SHIFT UNLESS PEOPLE ANTICIPATE FURTHER SUPPLY CONTRACTIONS IN THE FUTURE. THE LEFTWARD SHIFT IN THE SHORT RUN SUPPLY CURVE WILL MOVE THE INTERSECTION OF SUPPLY AND DEMAND LEFT AND UP TO A HIGHER PRICE AND LOWER QUANTITY.

E. IF THE PRICE OF A GOOD RISES AND STAYS UP, CONSUMERS WILL ADJUST OVER TIME BY FINDING SUBSTITUTES, LEARNING TO DRINK TEA INSTEAD OF COFFEE, OR BY ADOPTING DIFFERENT TECHNOLOGIES OF CONSUMPTION, A SAIL BOAT INSTEAD OF AN OUTBOARD. THAT MEANS THAT THE SHORT RUN DEMAND CURVE IS STEEPER THAN THE LONG RUN DEMAND CURVE. THUS IF THE SUPPLY OF COFFEE IS RESTRICTED, SAY BY A TRADE EMBARGO, THE IMMEDIATE RESPONSE OF PRICE WILL BE A LARGE INCREASE, BUT THE PRICE WILL COME DOWN OVER A COUPLE OF YEARS AS MORE CONSUMERS FIND A BLEND OF TEA THEY LIKE AND BUY MORE EFFICIENT COFFEE MAKERS THAT EXTRACT MORE OUT OF THEIR COFFEE GROUNDS.

Exercises from Chapter 2

National Income

Exercises 2.1

A. fishing net INVESTMENT, fish CONSUMPTION, chair CONSUMPTION, spear GOVERNMENT, look-out tower GOVERNMENT, cleared garden plot INVESTMENT. Similarly, classify: theater ticket CONSUMPTION, car CONSUMPTION, taxi INVESTMENT, Boeing 747 INVESTMENT, stealth fighter GOVERNMENT.

Exercises 2.2

A.   ALL OF THE DOLLAR AMOUNTS DOUBLE, SO INCOME MEASURED IN DOLLARS DOUBLES BUT IN TERMS OF THE REAL VALUE OF WHAT IS PRODUCED IT REMAINS THE SAME.

B.   INCOME RISES BECAUSE NOW 120 CARS ARE PRODUCED. WAGES WILL RISE IF THE SHARES OF INCOME DISTRIBUTED TO LABOR AND CAPITAL REMAIN ROUGHLY STABLE. IF THE WAGE IS $9,000 AND A CAR STILL COSTS $10,000 THEN NATIONAL PRODUCT AND INCOME IS $1,200,000, WAGES ARE $900,000, AND PROFITS ARE $300,000.

Exercises 2.3

A.   NOW THERE ARE TWO LESS CARS PRODUCED, SO CONSUMPTION IS 88 CARS X $10,000 = $880,000, INVESTMENT IS 6 TRUCKS X $20,000 = $120,000, SO NATIONAL PRODUCT IS STILL $1,000,000 WHICH IS $880,000 + $120,000.
     WORKERS ARE SHIFTED FROM THE AUTO INDUSTRY TO THE TRUCK INDUSTRY, SO THERE IS STILL A TOTAL OF 100 WORKERS X $8,000 PAID IN WAGES IN THE ECONOMY WAGES AND PROFITS ARE THE SAME AS BEFORE, $800,000. LOOKING AT TABLES 2.2 AND 2.3, AND GIVEN THE WAGE AND PRICES, THE PROFIT PER CAR IS $2,000 AND THE PROFIT PER TRUCK IS $4,000, SO PROFITS WILL BE 88 CARS X $2,000 = $176,000, PLUS 6 TRUCKS X $4,000 = $24,000, FOR A TOTAL OF $200,000 AS BEFORE. THUS, NATIONAL INCOME IS AGAIN $800,000 + $200,000 = $1 MILLION, AND IS OF COURSE THE SAME AS NATIONAL PRODUCT.

B.   (1) THE PRODUCTION POSSIBILITIES FRONTIER IS NOW
$$cars/1.1 + trucks \bullet 2 = 100 \text{ workers}$$
SO THE ECONOMY CAN PRODUCE A MAXIMUM OF 1.1X100=110 CARS. (2) IF THE ECONOMY STILL PRODUCES 5 TRUCKS THEN THERE WILL STILL BE 90 WORKER MAKING CARS AND THEY WILL PRODUCE 1.1X90 = 99 CARS. (3) THE NEW PRODUCT AND FACTOR INCOME STATEMENT FOR AUTO FIRMS IS

Auto Firms' Product and Factor Income in Model II, 2.3.B

Value of Goods Produced		Factor Incomes	
Sales to Households (99 cars @ $10,000)	990000	Wages (90 workers @ $8,800)	792000
		Profit of $198,000 allocated to-	
		Capital investment (5 trucks @ $20,000)	100000
		Dividend payment to shareholders	98,000
Value of Product	990000	Total Factor Income	990000

AND FOR TRUCK FIRMS

Truck Firms' Product and Factor Income in Model II, 2.3.B

Value of Goods Produced		Factor Income	
Sales (5 trucks @ $20,000)	100000	Wages (10 workers @ $8800)	88,000
		Profit of $12,000 to- Dividend payment to shareholders	12,000
Value of Product	100000	Total Factor Income	100000

(4) NOW THE NATIONAL INCOME AND EXPENDITURE ARE

National Product and Income in Model II, 2.3.B

Value of Goods Produced		Factor Income	
Consumption goods	$990,000	Wages	$880,000
Investment goods	100,000	Profits	210,000
National Product	1,090,000	National Income	1,090,000

VERIFYING THAT SAVINGS OF $100,000 (INCOME OF $1,090,000 LESS CONSUMPTION OF $990,000) EQUALS INVESTMENT.

C.   SINCE INVESTMENT EQUALS SAVINGS, A LOW LEVEL OF SAVINGS WILL MEAN THAT WE CANNOT BE INVESTING MUCH IN MODERN TECHNOLOGY FOR OUR INDUSTRIES. THAT RAISES CONCERNS THAT THE LONG TERM GROWTH OF OUR ECONOMY MAY BE LESS THAN WE WOULD LIKE.

D.   1) THE PRODUCTION POSSIBILITIES FRONTIER IS DERIVED FROM THE FACT THAT

PIZZA MAKERS + OVEN MAKERS = 50 WORKERS

SO WE HAVE THAT

(1/1000) X NUMBER OF PIZZAS + 0.5 X NUMBER OF OVENS = 50

OR, MULTIPLYING THROUGH BY 1000 WE HAVE

PIZZAS + 500 X OVENS = 50,000

TO GRAPH THIS, PUT PIZZAS ON THE Y AXIS AND OVENS ON THE X AXIS. NOTE THAT IF THE ECONOMY PRODUCES NO OVENS IT CAN PRODUCE 50,000 PIZZAS, AND THAT GIVES YOU A POINT AT 50,000 ON THE Y AXIS. IF IT PRODUCES NO PIZZAS, IT CAN PRODUCE 100 OVENS AND THAT GIVES YOU THE POINT 100 ON THE X AXIS. SINCE THIS EQUATION IS LINEAR, WE OBTAIN THE WHOLE FUNCTION BY CONNECTING THOSE TWO POINTS. THE ECONOMY CANNOT OPERATE ABOVE THAT LINE.

2) THE OPPORTUNITY COST TO THIS SOCIETY OF PRODUCING ONE MORE OVEN IS OBTAINED BY SOLVING THE EQUATION FOR PIZZAS, SO WE HAVE

PIZZAS = 50,000 - 500 times the number of OVENS

WHICH SAYS THAT INCREASING PRODUCTION OF OVENS BY ONE REDUCES PRODUCTION OF PIZZAS BY 500. OR NOTE THAT ONE OVEN TAKES HALF A WORKER TO MAKE, AND HALF A WORKER CAN PRODUCE 0.5 X 1,000 = 500 PIZZAS PER YEAR. SO THE OPPORTUNITY COST OF AN OVEN IS 500 PIZZAS.

3) THE ACCOUNTS FOR THIS ECONOMY WHEN IT PRODUCES 6 OVENS AND THEREFORE 50,000 - 500 X 6 = 47,000 PIZZAS IS AS FOLLOWS:

PIZZA Firms' Product and Factor Income, 2.3.D

Value of Goods Produced		Factor Incomes	
Sales to Households		Wages	
(47K PIZZAS @ $10)	470000	(47 workers @ $9,000)	423000
		Profit of $47,000 allocated to-	
		Capital investment	
		(6 OVENS @ $5,000)	30,000
		Dividend payment to	
		shareholders	17,000
Value of Product	470000	Total Factor Income	470000

OVEN Firms' Product and Factor Income, 2.3.D

Value of Goods Produced		Factor Income	
Sales		Wages (3 workers	
(6 OVENS@ $5,000)	30,000	@ $9000)	27,000
		Profit of $3,000 to-	
		Dividend payment to	3,000
		shareholders	
Value of Product	30,000	Total Factor Income	30,000

National Product and Income, 2.3.D

Value of Goods Produced		Factor Income	
Consumption goods	$470,000	Wages	$450,000
Investment goods	30,000	Profits	50,000
National Product	$500,000	National Income	$500,000

SAVINGS IS NATIONAL INCOME OF $500,000 LESS CONSUMPTION OF $470,000 = $30,000 WHICH EQUALS INVESTMENT OF $30,000.

Exercises 2.4

A.   INCOME OF $960,000 LESS CONSUMPTION OF $900,000 IS $60,000 WHICH EQUALS NET INVESTMENT OF $60,000.

B.   YES, IT COULD PRODUCE 100 CARS THIS YEAR BY NOT REPLACING THE TRUCKS THAT WEAR OUT, BUT THE NEXT YEAR THE AUTO INDUSTRY WOULD HAVE TWO LESS TRUCKS TO HELP IN MAKING CARS, AND THEREFORE IT COULD NOT CONTINUE TO PRODUCE AT ITS PREVIOUS LEVEL OF 100 CARS. OVER TIME, THE RATE OF PRODUCTION OF CARS WOULD DECLINE AS THE CAPITAL GOODS USED TO MAKE THEM WEAR OUT.

C.   FOR THE AUTO FIRMS WE WOULD HAVE THEN

Auto Firms' Product and Factor Income in Model III, 2.4.C

Value of Goods Produced		Factor Incomes	
Sales to Households		Wages	
(90 cars @ $10,000)	900000	(90 workers @ $8,000)	720000
		Profit of $120,000 allocated to	
		-	
Gross value of product		Net investment	
	900000	(2 trucks @ $20,000)	40,000
less Depreciation		Dividend payment to	
(3 trucks @ $20,000)	-60,000	shareholders	80,000
Net Value of Product	840000	Total Factor Income	840000

AND FOR THE ECONOMY

National Product and Income in Model III, 2.4.C

Value of Goods Produced		Factor Income	
Consumption goods	900000	Wages	800000
Gross Investment	100000	Profits	140000
Gross National Product	1000000		
less Depreciation	-60,000		
Net National Product	940000	National Income	940000

THE TABLES FOR THE TRUCK FIRMS WILL REMAIN UNCHANGED.

D.   WE WOULD HAVE THE FOLLOWING TABLES FOR THIS ECONOMY:

Ovens at beginning of year	40
Ovens produced during year	+6
Ovens scrapped during year (depreciation)	-4
Ovens at end of year	42

Gross National Product (unchanged from before)	$500,000
less Depreciation: 4 ovens x $5,000	-20,000
equals Net National Product	$ 480,000

Gross Investment 6 ovens x $5,000	$30,000
less Depreciation	-20,000
equals Net Investment	$ 10,000

Pizza Firms' Profits in 2.4.D

Sales: 47,000 pizzas @ $10	$470,000
less Wages: 47 workers @ $9,000	-423,000
less Depreciation: 4 ovens @ $5,000 =	-20,000
equals Profit	$27,000

Pizza Firms' Product and Factor Income in 2.4.D

Value of Goods Produced		Factor Incomes	
Sales to Households:		Wages:	
47,000 pizzas @ $10 =	470000	47 workers @ $9,000 =	423000
Gross value of product	470,000	Profit of $27,000 allocated to -	
		Net investment:	
		2 ovens @ $5,000 =	10,000
less Depreciation:		Dividend payment to	
4 ovens @ $5,000 =	-20,000	shareholders	17,000
Net Value of Product	450000	Total Factor Income	450000

SINCE WE HAVE ASSUMED IN THIS MODEL THAT ONLY THE PIZZA (CONSUMER GOODS) FIRMS HAVE DEPRECIATION COSTS, NO REVISION IS NECESSARY FOR THE OVEN FIRMS WHICH MAKE THE CAPITAL GOODS FOR THE PIZZA FIRMS.

SUMMARIZING THE NATIONAL PRODUCT AND INCOME OF THIS ECONOMY WE HAVE:

National Product and Income in 2.4.D

Value of Goods Produced		Factor Income	
Consumption goods	$470,000	Wages	$450,000
Gross Investment	30,000	Profits	30,000
Gross National Product	$500,000		
less Depreciation	-20,000		
Net National Product	$480,000	National Income	$480,000

Exercises 2.5

A.   SINCE THE ECONOMY IS CONSTRAINED TO OPERATE ON THE PRODUCTION POSSIBILITIES FRONTIER, THE PRODUCTION OF MORE TRUCKS WAS POSSIBLE ONLY BY CUTTING BACK ON THE PRODUCTION OF CARS.

B.   THE PRODUCTION POSSIBILITIES FRONTIER TELLS US THAT IF MORE DEFENSE GOODS ARE PRODUCED THEN THERE MUST BE LESS PRODUCTION OF OTHER GOODS INCLUDING CAPITAL GOODS THAT INCREASE LABOR PRODUCTIVITY AND STANDARD OF LIVING.

C.   IF THE ADDITIONAL TAX ON HOUSEHOLDS IS THE ONLY CHANGE IN THE MODEL WE WILL HAVE

(DI-C)	+	UP	+	(T-G)	=	I
$795,400 - $800,000				$126,600 - $120,000		
-$4,600	+	$38,000	+	$6,600	=	$40,000
Household Savings	+	Business Savings	+	Government Savings	=	Net Investment

AND THERE IS NO CHANGE IN NET INVESTMENT. BUT IF HOUSEHOLDS REDUCE CONSUMPTION SPENDING BY $20,000 THAT FREES UP ENOUGH PRODUCTION CAPACITY TO PRODUCE ONE TRUCK (=2 CARS) WORTH $20,000.

NOW THE SAVINGS=INVESTMENT EQUATION IS

(DI-C)	+	UP	+	(T-G)	=	I
$795,400 - $780,000				$126,600 - $120,000		
$15,400	+	$38,000	+	$6,600	=	$60,000
Household Savings	+	Business Savings	+	Government Savings	=	Net Investment

D.   THE HOUSEHOLD SECTOR WILL BE RECEIVING A TOTAL PAYMENT OF $1,000 FROM THE GOVERNMENT. THE SECTOR ACCOUNTS THAT ARE AFFECTED ARE

Households' Income and Expenses in Model IV, 2.5.D	
Wages (100 @ $80,000)	$800,000
plus Dividends	106,000
plus transfer payment	1,000
equals Personal Income	$907,000
less Income Tax of 10%	-90,600
equals Disposable Income	$816,400
less Consumption Spending	-800,000
equals Personal Savings	$16,400

Government's Income and Expenses in Model IV, 2.5.D

Income Tax Revenue from -	
Business Sector	$16,000
Household Sector	90,600
equals Total Tax Revenue	$106,600
less transfer payments	-1,000
less Government Spending	-120,000
equals Government Surplus or Deficit	-$14,400

NATIONAL PRODUCT AND INCOME ARE NOT AFFECTED. WE ALSO HAVE

(DI-C)	+	UP	+	(T-G)	=	I
$16,400	+	$38,000	+	(-$14,400)	=	$40,000
Household Savings	+	Business Savings	+	Government Savings	=	Net Investment

THIS SHOWS THAT THE TRANSFER PAYMENT INCREASES THE GOVERNMENT DEFICIT, SO THE GOVERNMENT WILL BE BORROWING THE ADDITIONAL $1,000 BACK FROM THE HOUSEHOLD SECTOR WHICH NOW HAS AN ADDITIONAL $1,000 TO LEND.

E.   INTRODUCING GOVERNMENT SPENDING MEANT THAT SOCIETY HAD TO GIVE UP ENOUGH CONSUMPTION AND INVESTMENT TO FREE UP THE RESOURCES TO PRODUCE SIX TRUCKS FOR THE GOVERNMENT. THIS DOES NOT DEPEND ON WHETHER THE GOVERNMENT FINANCES THE PURCHASE THROUGH TAXES OR BORROWING.

F.   THE ADDITIONAL REVENUE IS DUE TO THE FACT THAT DIVIDENDS ARE TAXED TWICE, ONCE AS PART OF PROFITS AND A SECOND TIME AS PART OF HOUSEHOLD INCOME.

Exercises 2.6

A.   LARGE HOUSEHOLD SAVINGS IN JAPAN MAKE ROOM FOR NEGATIVE ROW SAVINGS, THAT IS JAPAN CAN HAVE A LARGE TRADE SURPLUS WITH THE ROW, SO IM<EX, WHICH IT USES TO LEND TO THE ROW INCLUDING THE U.S.

(DI-C)	+	UP	+	(T-G)	+	(IM-EX)	=	I
Larger	+		+		+	**Negative**	=	
Household Savings	+	Business Savings	+	Gov't Savings	+	ROW Savings	=	Net Invest

B.   LARGER HOUSEHOLD SAVINGS IN THE U. S. WOULD MAKE POSSIBLE SMALLER SAVINGS BY OTHER SECTORS, INCLUDING A REDUCED TRADE DEFICIT, OR MORE CAPITAL INVESTMENT.

(D-C)	+	UP	+	(T-G)	+	(IM-EX)	=	I
Larger	+	Smaller?	+	Smaller?	+	Smaller?	=	Larger?
Household Savings	+	Business Savings	+	Government Savings	+	ROW Savings	=	Net Invest

C.   WE KNOW THAT U.S. GNP WILL STILL BE THE TOTAL VALUE OF ALL GOODS PRODUCED AND THAT IS

$$Cons + Gross\ I + Gov + (EX\text{-}IM) = GNP,$$

SO A LARGER (LESS NEGATIVE) AMOUNT OF NET EXPORTS MEANS THAT THERE MUST BE A FALL IN CONSUMPTION OR IN INVESTMENT OR IN GOVERNMENT PURCHASES, OR IN ALL OF THEM.

D.   IF HIGHER TAXES CAUSE HOUSEHOLDS TO REDUCE THEIR CONSUMPTION SPENDING, THEN A SMALLER GOVERNMENT DEFICIT CAN BE COMPATIBLE WITH A SMALLER TRADE DEFICIT. WE WOULD HAVE

(less DI-less C)	+	UP	+	(more T-G)	+	(less IM-EX)	=	I
	+		+	**Larger**	+	**Smaller**	=	
Household Savings	+	Business Savings	+	Gov't Savings	+	ROW Savings	=	Net Invest

THE REDUCTION IN TRADE DEFICIT DEPENDS ON HOW SIGNIFICANTLY CONSUMPTION RESPONDS TO AN INCREASE IN TAX.

Exercises 2.7

A. ACCORDING TO 'SURVEY OF CURRENT BUSINESS' (JULY 2003) INVESTMENT IS NOT MATCHED BY SAVINGS. THERE IS ALWAYS A 'STATISTICAL DISCREPENCY'. FOR EXAMPLE, ACCORDING TO 'SURVEY OF CURRENT BUSNIESS' THE STATISTCAL DISCREPENCY BETWEEN

INVESTMENT AND SAVINGS FOR THE FIRST QUARTER OF 2003 IS 91.4 BILLION DOLLAR. FOREIGN SAVING IS A LARGE COMPONENT OF TOTAL SAVINGS. IF THE FOREIGN INVESTORS DO NOT INVEST IN US ECONOMY, TOTAL INVESTMENT WILL DECLINE. THE REAL CONSEQUENCE WILL BE A DECREASE IN FUTURE GROWTH OF US ECONOMY.

Exercises from Chapter 3

Savings and Investment

Exercises 3.1

A.   FINANCIAL INTERMEDIARIES BRING TOGETHER THE HOUSEHOLD SAVERS WHO ARE A SOURCE OF FUNDS TO LEND TO THE FIRMS IN THE BUSINESS SECTOR WHO WOULD LIKE TO BORROW TO PAY FOR INVESTMENT SPENDING ON PLANT AND EQUIPMENT.

        THE FUNDAMENTAL SERVICES THAT FINANCIAL INTERMEDIARIES PROVIDE TO THE HOUSEHOLD SECTOR ARE 1) LOWER TRANSACTION COSTS, 2) LOWER INFORMATION COSTS, 3) DIVERSIFICATION, AND 4) LIQUIDITY.

        A MUTUAL FUNDS ECONOMIZES ON TRANSACTIONS COSTS BY POOLING THE PURCHASES OF MANY SAVERS INTO A SMALL NUMBER OF LARGE TRANSACTION, THEREBY BEING ABLE TO OBTAIN A BETTER PRICE AND PAY LOWER SALES COMMISSIONS. THE FUND'S MANAGERS SPECIALIZE IN CERTAIN INDUSTRIES WHICH THE INDIVIDUAL SAVER CANNOT STUDY CAREFULLY. THE FUND'S PORTFOLIO CONTAINS MANY MORE STOCKS THAN COULD AN INDIVIDUAL'S AND SO IS MUCH MORE DIVERSIFIED. THE FUND STANDS READY TO REDEEM ITS SHARES EVERY DAY AT MARKET VALUE, AND SO THE SHAREHOLDER HAS A HIGH DEGREE OF LIQUIDITY. IN SOME CASES, SHARES OF SMALLER COMPANIES CANNOT BE SOLD QUICKLY, THE CASH IS NOT AVAILABLE FOR SEVERAL DAYS, AND THE SALES COST CAN BE CONSIDERABLE (SO, AGAIN, LOWER TRANSACTIONS COST WITH A MUTUAL FUND).

B. BANKS, S&LS, SAVINGS BANKS, INSURANCE COMPANIES, MUTUAL FUND FAMILIES, AND SO FORTH.

C.   MAJOR TYPES OF MUTUAL FUNDS THAT ARE SEEN IN THE TABLE ARE STOCK FUNDS (GROWTH, FOREIGN, INDUSTRY OR "SECTOR" SPECIFIC), BOND FUNDS (GOVERNMENT, CORPORATE, LONG TERM, SHORT TERM, INTERNATIONAL, MUNICIPAL, HIGH YIELD), AND MONEY MARKET FUNDS. AMONG THE LARGEST FAMILIES OF FUNDS ARE FIDELITY FUNDS AND VANGUARD FUNDS. THE TOTAL RETURN IS THE PERCENTAGE GAIN OR LOSS INCLUDING BOTH DIVIDENDS AND PRICE CHANGE, AND RESULTS FOR AN INDIVIDUAL FUND WILL REFLECT THE MARKET THAT THE FUNDS INVESTS IN; IN 1999 ALMOST ALL STOCK FUNDS ENJOYED LARGE RETURNS THAT REFLECTED A GENERAL RISE IN STOCK PRICES THAT AVERAGED ABOUT 20%.

D.   CUSTOMERS CAN BUY OR SELL SHARES OF OPEN-ENDED FUNDS AT

A PRICE EQUAL TO THE NET ASSET VALUE OF THE FUNDS HOLDINGS (I.E. THE PRICE OF THE INDIVIDUAL STOCKS OR BONDS THAT COMPOSE THE FUND). IT IS IMPOSSIBLE TO COMPUTE SUCH PRICE ON A CONTINUOUS BASIS FOR ILLIQUID ASSETS SUCH AS REAL ESTATE.

E.   LIFE INSURANCE: DEATH-PAYMENT
        PENSION FUND: NO TAXES PAID ON EARNINGS AS LONG AS THEY REMAIN IN THE PLAN. MINIMUM GUARANTEED PAYMENT REGARDLESS OF INVESTMENT RESULTS.
        MUTUAL FUND: DURING THE PAY-IN PERIOD, WELATH BUILDS UP IN THE MUTUAL FUNDS CHOSEN BY THE CUSTOMER.

Exercises 3.2

A.   THE INTERNET COMPANY BOUGHT AN ACTUAL GOOD THAT WILL BE USED TO PRODUCE MORE GOODS, WHICH WILL RAISE SALES AND EVENTUALLY PROFITS FOR SHAREHOLDERS. THE FINANCIAL INVESTOR BUYS A PIECE OF PAPER (SHARE) REPRESENTING A CLAIM ON THE PROFITS OF THE CORPORATION. THE CORPORATION CAN ONLY CARRY OUT REAL INVESTMENT BECAUSE THERE ARE SHAREHOLDERS WILLING TO FINANCE THIS INVESTMENT.

B.   TRANSPARENCY MEANS THAT INFORMATION THAT IS IMPORTANT TO PARTIES IN A TRANSACTION IS NOT CONCEALED FROM EITHER OR BOTH OF THEM. BY REDUCING THE COST OF ACCESSING INFORMATION, THE INTERNET HAS MADE MARKETS MORE TRANSPARENT.

C.   THE GLASS-STEAGALL ACT OF 1933 (WHICH WAS REPEALED BY CONGRESS AS THE 2003 EDITION WAS GOING TO PRESS). THE RESTRICTION WAS INTENDED TO PREVENT COMMERCIAL BANKS TO ENGAGE IN RISKY ACTIVITIES.

D.   FOR THE PRICE OF ANY SHARE OF STOCK TO BE POSITIVE, MARKET PARTICIPANTS MUST HAVE THE EXPECTATION THAT AT SOME FUTURE DATE, HOWEVER REMOTE, DIVIDENDS WILL BE PAID. EVEN IF THE STOCK IS NOT EXPECTED TO PAY DIVIDENDS IN THE NEAR FUTURE, INVESTORS WILL GLADLY PURCHASE IT, IF THEY EXPECT TO GAIN FROM A RISE IN ITS PRICE. AT ANY POINT IN TIME, A CHANGE IN THE PRICE MAY OCCUR IF THERE ARE SURPRISES WHICH CAUSE MARKET PARTICIPANTS TO REVISE THEIR EXPECTATION OF THE FUTURE VALUE OF THE FIRM.

E.   THE RESPONSE WILL DEPEND IN LARGE PART ON WHETHER THE NEWS WAS A SURPRISE OR WAS EXPECTED. FOR EXAMPLE, THE STOCK OF A FIRM THAT JUST ANNOUNCED A LOSS RISES BECAUSE INVESTORS HAD EXPECTED AN EVEN WORSE LOSS!

F.   SINCE A MUTUAL FUND IS A PACKAGE OF STOCKS, IT MAY AT FIRST SEEM PUZZLING THAT THERE MAY BE FEWER STOCKS THAN FUNDS. HOWEVER, A SIMILAR SITUATION OCCURS IN MANY OTHER BUSINESSES: FOR EXAMPLE, AT ANY RESTAURANT, THERE ARE MANY MORE THAN THREE DISHES ON THE MENU THAT ARE MADE OF TOMATO, FLOUR AND CHEESE. THE DIFFERENT DISHES EXIST BECAUSE CUSTOMERS HAVE PREFERENCES OVER DIFFERENT COMBINATIONS OF INGREDIENTS THAT HAVE BEEN CAREFULLY IDENTIFIED BY CHEFS (SOME PEOPLE LIKE MORE GARLIC THAN OTHERS ON THE SAME DISH). LIKEWISE, DIFFERENT FUNDS COULD CATER TO SPECIFIC RISK PREFERENCES OF INDIVIDUAL INVESTORS. EVEN IF THERE WERE TWO STOCKS, THERE COULD BE MANY MUTUAL FUNDS OFFERED COMBINING DIFFERENT PROPORTIONS OF THE TWO. YES, NUMBER OF MUTUAL FUINDS IS EXPECTED TO GROW FASTER THAN THE NUMBER OF INDIVIDUAL STOCKS.

Exercises 3.3

A.   THE MAIN DETERMINANT OF VARIATION IN COUPON IS PERCEIVED DEFAULT RISK, SO THE TREASURY PAYS THE SMALLEST COUPON, AND THE MOST RESPECTED FIRMS PAY LESS THAN FIRMS WHOSE FUTURE IS CONSIDERED MORE UNCERTAIN. COMPARE THE ATT BONDS WITH THE BONDS OF OCCIDENTAL PETROLEUM, SHOWBOAT, OR STONE CONTAINER. THEN LOOK AT THE BONDS OF TIME-WARNER, A VERY LARGE "BLUE CHIP" COMPANY.

B.   THE HOLDER OF A CONVERTIBLE BOND HAS THE OPTION TO BECOME A SHAREHOLDER (IF IT IS ADVANTAGEOUS TO DO SO), BUT NOT THE OBLIGATION (IF IT IS HARMFUL). THE RIGHT TO POSSIBLY MAKE A PROFIT WITH NO RISK TO EVER LOOSE COSTS MONEY. THIS COST IS FACTORED IN THE COUPON.

C.   F=DEALT IN FLAT. PRICES ARE SUBSTANTIALLY LOWER THAN PAR SINCE THERE IS A LARGE PROBABILITY THAT THE FACE VALUE WILL NEVER BE PAID.

Exercises 3.4

A.   THE DIFFERENCE OR SPREAD BETWEEN THE BID AND ASKED PRICES IS THE DEALER'S MARK UP. THE DEALER BUYS AT THE BID AND SELLS AT THE ASKED.

MORE HEAVILY TRADED BONDS WILL HAVE A SMALLER SPREAD BECAUSE THERE IS MORE COMPETITION AMONG DEALERS IN SUCH ISSUES, AND BECAUSE THE DEALER CAN FIND BUYERS AND SELLERS MORE QUICKLY AND EASILY.

RISKIER BONDS WILL HAVE A BIGGER SPREAD BECAUSE IT IS RISKIER FOR THE DEALER TO CARRY AN INVENTORY OF THEM.

B.   WHY WOULD ANYONE BE WILLING TO BUY THE BOND WITH THE LOWER YIELD, SINCE THEY ARE OTHERWISE IDENTICAL?   ALL THE INVESTOR CARES ABOUT IS HOW FAST HER MONEY WILL GROW OVER THE YEAR IT IS INVESTED IN THE BOND.

C.   THEY BOTH SELL ABOVE PAR BECAUSE THEIR COUPONS ARE ABOVE THE CURRENT INTEREST RATE OR YIELD.   THE ONE WITH THE LARGER COUPON IS WORTH MORE.   SINCE THEY WOULD HAVE BEEN ISSUED AT PAR, INTEREST RATE MUST HAVE FALLEN IN THE MEANTIME.

D.   THE SPECIFIC ANSWER WILL DEPEND ON CURRENT BOND MARKET CONDITIONS, BUT FOR EXAMPLE ON MAY 24, 2000, WE HAD:

GOVT BONDS & NOTES

Rate	Maturity	Bid	Ask	Chg	Ask Yld.
5 1/4	May 01n	98:14	98:16	....	6.80
6 1/2	May 01n	99:21	99:23	....	6.79

1. (a) YIELD = $(100 + 5.25 - 98.5) / 98.5 = 0.0685$ or 6.85%

(B) YIELD = $(100 + 6.5 - 99.71875) / 99.71875 = 0.0680$ or 6.8%

2. THE SECOND BOND IS WORTH MORE SINCE ITS COUPON IS LARGER.

3. INTEREST RATES HAVE GONE UP SINCE THESE BONDS WERE ISSUED. AT ISSUE THEIR YIELD WOULD HAVE BEEN EQUAL TO THEIR COUPON.

4. WITH A COUPON OF ABOUT 6.8%, IT WOULD SELL AT PAR.

Exercises 3.5

A.   SINCE BILLS ARE ISSUED EVERY WEEK, THEN THEY ALSO MATURE EVERY WEEK, INCLUDING FOUR WEEKS AFTER EVERY WEEK. SO THERE IS AT LEAST ONE BILL WITH ABOUT 27-34 DAYS TO MATURITY ON ANY DAY.

B.1.   THE YIELD CAN BE EXPRESSED AS

YIELD = $(100 - 98 + 6)/ 98 = 2/98 + 6/98 = .02 + .06 = .08$

SO THE 8% YIELD IS MADE UP OF 2% PRICE APPRECIATION YIELD

COMBINED WITH A 6% COUPON YIELD.

2.　　THE NEW PRICE BASED ON A YIELD OF 6% FOR AN EXISTING ONE YEAR BOND WITH COUPON OF $6 IS GIVEN BY:

PRICE = (100 + 6)/1.06 = 100

3. THE PRICE HAS JUMPED BY $2 AS A RESULT OF THE YIELD FALLING FROM 8% TO 6%. THE BOND IS MORE VALUABLE NOW BECAUSE AT $100 IT HAS A COMPETITIVE YIELD WHILE BEFORE IT HAD TO SELL AT A DISCOUNT TO BE COMPETITIVE. THE COUPON YIELD IS NOW 6/100 = .06 AND THE PRICE APPRECIATION YIELD IS (100-100)/100 = 0 SINCE THE BOND IS RIGHT AT PAR.

C. FOR THE BONDS QUOTED THE BREAK-DOWN IS:

FIRST BOND: 5.625 COUPON, ASK PRICE 101

COUPON YIELD = 5.625/101 = 5.57%;
APPRECIATION YIELD = -1/101 = -0.99%,
A TOTAL YIELD OF 5.57-0.99 = 4.58%

SECOND BOND: 7.75 COUPON, ASK PRICE 103.03125

COUPON YIELD = 7.75/103.03125 = 7.52%;
APPRECIATION = 3.03125/103.03125 = -2.94%;
TOTAL YIELD OF 7.52-2.94 = 4.58%

D.1. IN THE CASE OF THESE BONDS ON JAN 30, 1991:

COUPON YIELD = 11.625/104.59375 = .111 or 11.1%
PRICE APPRECIATION YIELD=(100-104.59375)/104.59375= -.044 or -4.4%

COUPON YIELD = 8.125/101.34375 = .080 or 8%
PRICE APPRECIATION YIELD=(100-101.34375)/101.34375= -.013 or -1.3%

2. BOTH PRICES WOULD HAVE RISEN.

Exercises 3.6

A.　　FROM THE WSJ BOND TABLE FOR BOND PRICES JAN 13, 1997:

ONE YEAR MATURING JAN 1998: 7 7/8 NOTE, ASK OF 102:03, YIELD 5.70

YIELD = (100 - 102.09)/102.09 + 7.875/102.09 = -2% PRICE APPREC YIELD + 7.7% COUPON YIELD = 5.7% YIELD

FIVE YEAR BOND MATURING FEB 2002: 14 1/4 COUPON, ASK 133:27(!), YIELD OF 6.36.

THE FIRST YEAR YOU GET A COUPON YIELD OF 14.25/133.84375 = 10.6%

EACH YEAR YOU LOSE AN AVERAGE OF 33.84/5 = 6.77 IN PRICE, S0 PRICE APPRECIATION (REALLY DEPRECIATION) YIELD IS -5%.

YIELD THEN IS 10.6% - 5% = 5.6% BY THIS ROUGH CALCULATION, BUT THE WSJ SAYS 6.36%. THIS PRICE CHANGE IN THIS CASE IS SO EXTREME THAT LINEAR DEPRECIATION IS NOT A GOOD APPROXIMATION.

THIRTY YEAR BOND MATURING NOV 2026: 6.5 COUPON, ASKING PRICE OF 95:15, YIELD 6.86.

COUPON YIELD IS 6.5/95.46875 = 6.8%

THE BOND APPRECIATES AN AVERAGE OF (100-95.47)/30 OR .151 PER YEAR. THAT IS AN APPRECIATION YIELD OF .151/95.47 = .16%

TOTAL YIELD THEN IS 6.8 + .16 = 6.96%, COMPARED TO WSJ'S EXACT 6.86%. NOT TOO BAD AN APPROXIMATION.

NOW WE SEE IF THE CONSOL FORMULA GIVES GOOD APPROXIMATIONS. THE FORMULA IS PRICE=COUPON/YIELD

FOR THE ONE YEAR BOND, PRICE = 7.875/.057 = 138.16, WAY OFF BECAUSE A CONSOL OF INFINITE MATURITY DOES NOT APPROXIMATE A ONE YEAR BOND.

FOR THE FIVE YEAR BOND, PRICE = 14.25/.0636 = 224, WAY OFF BECAUSE THIS BIG COUPON IS RECEIVED REALLY ONLY FOR 5 YEARS.

NOW FOR THE 30 YEAR BOND, PRICE = 6.5/.0686 = 94.75, NOT FAR DIFFERENT FROM THE ACTUAL PRICE OF 95.47 BECAUSE 30 YEARS IS LONG ENOUGH THAT THE CONSOL IS A GOOD APPROXIMATION. IN THE MATHEMATICS OF INTEREST RATES, 30 IS "CLOSE TO" INFINITY!

B   ON A TYPICAL DAY, THE YIELD CHANGE WILL BE SMALLER FOR LONG TERM BONDS BUT THE PRICE CHANGE WILL BE LARGER. THIS IS NOT THE CASE EVERY DAY. THE AVERAGING OF THE PRICE APPRECIATION OVER YEARS TO MATURITY WILL ACCOUNT FOR PRICE CHANGE REASONABLY WELL AT ALL MATURITIES, BUT THE CONSOL APPROXIMATION, THAT THE % CHANGE IN PRICE IS THE NEGATIVE OF THE % CHANGE IN YIELD, WILL WORK WELL ONLY FOR THE 30 YEAR BOND.

C.   INVERTING THE FORMULA FOR THE PRICE OF A CONSOL, WE HAVE THAT THE YIELD IS THE COUPON DIVIDED BY PRICE. THE YIELD IN THE EXAMPLE IS THEN 5/50 = .10 OR 10%.

Exercises 3.7

A.   FOR THE BILL LOWEST INTEREST RATE WAS OBSERVED IN 2001 AND IT WAS ABOUT 1.75%. INCASE OF BOND, THE LOWEST INTEREST RATE WAS OBSERVED IN 1961, AND IT WAS SLIGHTLY LESS THAN 4%. THE HIGHEST INTEREST RATE FOR THE BILL AND BOND WAS OVER 15% AND 13.75% RESPECTIVELY BOTH OBSERVED IN 1981.

B.   THE RISE IN THE YIELD DURING THE DECADE FROM 1972 TO 1982 TELLS US THAT BOND PRICES WERE FALLING SHARPLY, WHILE JUST THE OPPOSITE OCCURRED IN THE FOLLOWING DECADE. FROM 1972 THROUGH 1982 AN INVESTOR WHO BOUGHT BILLS AND REINVESTED THEM AS THEY MATURED RECEIVED A MUCH HIGHER AVERAGE YIELD THAN AN INVESTOR WHO BOUGHT A BOND IN 1972 AND HELD IT, WHILE THE SITUATION WAS REVERSED IN THE NEXT DECADES.

Exercises 3.8

A.   JUDGING BY THE NEGATIVE SPREAD, INVESTORS EXPECTED SHORT RATES TO FALL IN 1967, 1969, 1974-75, 1979, 1981, 1989, AND 2001. AN UNUSUALLY LARGE POSITIVE SPREAD IMPLIES THAT IN 1961, 1971-72, 1977, 1983, 1986, AND 1993-94, AND 1998 THEY EXPECTED SHORT RATES TO RISE.

B.   THE FALL IN SHORT RATES IN 1985 AND 1986 SEEMS TO HAVE NOT BEEN ANTICIPATED BY THE MARKET SINCE WE DO NOT SEE A NEGATIVE SPREAD PRECEDING IT. THE THEORY ONLY IMPLIES THAT PEOPLE DO NOT MAKE SYSTEMATIC EXPECTATIONAL ERRORS. IT DOES NOT IMPLY THAT MARKET PARTICIPANTS HAVE THE CRYSTAL BALL TO ALWAYS MAKE PERFECT FORECASTS.

C.   A COMPLETE YIELD CURVE WOULD REQUIRE THAT BONDS OF EVERY MATURITY EXIST AND BE QUOTED, BUT WE CAN SURMISE THAT IT WOULD BE SMOOTH RATHER THAN KINKED. WE CAN SKETCH A SMOOTH CURVE THAT TOUCHES THE AVAILABLE POINTS IN THE PLOT AND HAS NO KINKS.

Exercises from Chapter 4

The Cost of Living and Living With Inflation

Exercises 4.1

A. COLLEGE STUDENTS SPEND A LARGER FRACTION OF THEIR BUDGET ON ENTERTAINMENT, TUITION, AND PROBABLY CLOTHING THAN DOES THE TYPICAL FAMILY WHERE FOOD AND HOUSING ARE LARGER COMPONENTS.

B. WE WOULD SEE A MUCH LARGER WEIGHT GIVEN TO ELECTRONICS INCLUDING PERSONAL COMPUTERS WHICH WERE ONLY INVENTED IN THE EARLY 1980'S AND SO DID NOT APPEAR AT ALL IN THAT MARKET BASKET. OTHER CHANGES MIGHT INCLUDE MUCH MORE AIR TRAVEL AND FAST FOOD RESTAURANT MEALS.

C. HOME ENTERTAINMENT ELECTRONICS HAVE IMPROVED GREATLY. CARS HAVE BECOME FAR MORE RELIABLE AND FUEL EFFICIENT AND SAFER. MANY OPERATIONS HAVE BECOME FAR LESS TRAUMATIC BECAUSE OF MICRO INCISION TECHNIQUES, AND IMAGING TECHNOLOGIES LIKE CAT SCAN AND MRI HAVE ENDED THE NEED FOR MANY OPERATIONS.

QUALITY IMPROVEMENTS MEAN THAT INFLATION IS OVERSTATED BY THE CPI. IT IS ESTIMATED THAT THIS OVERSTATEMENT MAY BE AS MUCH AS 1 OR 2% PER YEAR.

D. LARGEST INCREASES: ORANGES, GRAPEFRUIT, GRAPEFRUIT JUICE, APPLES, CANDY BARS, CIGARETTES. SMALLEST INCREASES: EGGS, FLOUR, CHICKEN, BACON.

CALCULATION OF PRICE INDEX REQUIRES ADDING UP COST OF THE PARTICULAR BASKET CHOSEN BY THE STUDENT. FOR EXAMPLE; ASSUME THAT THE REPRESENTATIVE MARKET BASKET CONSISTS OF THE FOLLOWING:

ITEM	QUANTITY	COST* IN 1948	COST IN 1993
ROASTING CHICKEN	5LB	2.75	6.95
BACON	2LB	1.64	5.98
PEANUT BUTTER	25 OZ.	.53	3.79
CANNED SALMON	2 LB	.94	6.92
ORANGES	3LB	.21	5.07
WHOLE MILK	2QT.	.38	1.90
CAMELS	3 PACKS	.48	7.17
RAINER BEER	1 CASE (24)	2.89	13.98
COST OF THE REPRESENATIVE MARKET BASKET		9.82	51.76

* COST = PRICE $\times$ QUANTITY

SO, THE CPI IN 1993 (USING 1948 AS THE BASE YEAR) =

$$100* 51.76/9.82 = 527\%$$

IF ONE ASSUMES A DIFFERENT REPRESENTATIVE MARKET BASKET, THE CPI WILL BE DIFFERENT.

Exercises 4.2

A.   HIS 1995 REAL WAGE WAS 5.50/1.524 = 3.61 IN CONSTANT 1982-84 $.
       HIS 1996 REAL WAGE WAS 5.66/1.567 = 3.61 IN CONSTANT 1982-84 $.
SO THE REAL WAGE IS UNCHANGED. THIS USES THE JUNE CPI FIGURES GIVEN IN THE TEXT.

    WE COULD ALSO JUST HAVE NOTED THAT THE % CHANGE IN THE WAGE AND THE CPI WERE BOTH ABOUT 2.9%, IMPLYING THAT THE REAL WAGE CHANGED BY 2.9%-2.9%=0%.

B.   THE MINIMUM WAGE WAS CONSTANT IN NOMINAL TERMS BUT WAS DECLINING IN REAL TERMS AS THE COST OF LIVING ROSE. IN 1990 THE CHANGE IN THE REAL MINIMUM WAGE WAS 0%-5.4%=-5.4%.

C.
METHOD 1)
BEGINNING REAL = 10,000/1.419 = 7047
ENDING REAL = 11044/1.458 = 7575
PERCENT CHANGE IS (7575-7047)/7047 = .075 OR 7.5%

METHOD 2)
REAL % CHANGE = NOMINAL % CHANGE - CPI % CHANGE
       = 10.44% - 100% • (1.458-141.9)/141.9 = 10.44 - 2.75= 7.69%

THE DIFFERENCE IS DUE TO THE FACT THAT METHOD 2 IS ONLY AN APPROXIMATION.

D.   THE IDEA IS TO GET THE STUDENTS TO REPLICATE THE DERIVATION

IN THE BOOK FOR THE RELATION BETWEEN REAL AND NOMINAL AMOUNTS, REALIZING THAT IT IS A GENERAL APPROXIMATION FOR ANY VARIABLES THAT HAVE THIS RELATIONSHIP.

Exercises 4.3

A.   THE CPI IN 1968 WAS 34.8, BUT 35 IS CLOSE. IT WAS 118.3 IN 1988, BUT 118 IS CLOSE. THE PERCENTAGE CHANGE IS (118.3-34.8)/34.8 = 2.40 OR 240%.

B.   (1) THE NOMINAL PRICE CHANGED BY (125-18.5)/18.5 = 5.76 OR 576%.
        (2) THE 747 COST 18.5/.35=52.8 MILLION 1982-84 DOLLARS IN 1968 AND IT COST 125/1.18 = 105.9 MILLION 1982-84 DOLLARS IN 1988.
        (3) THE PERCENTAGE INCREASE IS (105.9-52.8)/52.8 = 1.00 OR 100%.
        (4) THE FUEL EFFICIENCY AND CAPACITY OF THE 747 WERE GREATLY IMPROVED, SO THE 1988 VERSION IS A MUCH BETTER AIRPLANE THAN THE ORIGINAL.

C.   I WOULD EXPLAIN THAT THE PRICE OF GAS HAS NOT GONE UP ANY MORE THAN PRICES GENERALLY AS MEASURED BY THE CPI, ACTUALLY SOMEWHAT LESS. THE PRICE OF GAS IN CONSTANT 1982-84 DOLLARS WAS ABOUT $.32/.30 = $1.07 IN THE EARLY 1960'S AND IN 1993 IT WAS ONLY $1.17/1.43 = $.82. THE DRIVE IN MEAL COST $.71/.3 = $2.37 IN 1961 IN CONSTANT DOLLARS AND $3.48/1.43 = $2.43 IN 1993 IN CONSTANT DOLLARS, ALMOST THE SAME.

A: SINCE THEY AGREE THAT THE REAL WAGE SHOULD RISE AT ABOUT 2% PER YEAR, AN INFLATION RATE OF 10% WOULD REQUIRE A WAGE SETTLEMENT CALLING FOR A 12% RATE OF WAGE INCREASE. INSTEAD OF TRYING TO GUESS WHAT INFLATION MIGHT BE THEY COULD AGREE TO USE A COST OF LIVING ALLOWANCE SO THAT THE WAGE WOULD BE ADJUSTED EACH YEAR ACCORDING TO THE ACTUAL AMOUNT OF THE INFLATION RATE OVER THE PAST YEAR.

B.   THE PROBLEM WITH STATING A NOMINAL AMOUNT LIKE $10,000 IS THAT YOU CAN'T BE SURE WHAT PURCHASING POWER IT WILL HAVE IN THE FUTURE. THE WILL COULD BE WRITTEN TO PROVIDE THE AMOUNT OF $10,000 TIME THE RATIO OF THE CPI WHEN THE PAYMENT IS MADE TO THE VALUE OF THE CPI TODAY. THAT WAY THE PAYMENT WILL BE ADJUSTED TO REFLECT THE CHANGE IN THE COST OF LIVING.

C.   I WOULD WANT TO AVOID CONTRACTS THAT PROMISE TO PAY ME A FIXED AMOUNT, LIKE A LONG TERM BOND OR A LEASE OR EMPLOYMENT CONTRACT. ANTICIPATING RISING INTEREST RATES, I WOULD INVEST MY SAVINGS IN US TREASURY BILLS BECAUSE THEY MATURE RAPIDLY AND SO CAN BE REINVESTED AT HIGHER RATES AS INTEREST RATES RISE. I MIGHT ALSO BORROW AS MUCH AS I FEEL COMFORTABLE WITH ON MY HOUSE AT A FIXED INTEREST RATE AND INVEST THE PROCEEDS IN ASSETS I FELT WOULD INCREASE IN VALUE WITH INFLATION, LIKE LAND OR GOLD. INFLATION WILL DIMINISH THE BURDEN OF THAT MORTGAGE WHILE INCREASING THE VALUE OF THE REAL ESTATE.

D.   IF INFLATION DECLINES THEN INTEREST RATES WILL DECLINE, SO BOND PRICES WILL RISE. I WOULD THEREFORE INVEST HEAVILY IN LONG TERM US TREASURY BONDS THAT HAVE NO DEFAULT RISK BUT WILL RISE IN PRICE AS INTEREST RATES FALL. I MIGHT CONVERT THE MORTGAGE ON MY HOME TO A FLOATING RATE MORTGAGE THAT WILL CHARGE ME A DIMINISHING INTEREST RATE AS INTEREST RATES DECLINE.

Exercises 4.5

A.   THE AVERAGE IS ABOUT 1%. THE NOMINAL T BILL YIELD SHOULD BE ABOUT 1% + 4% = 5%.

B.   1) The nominal yield on T bills = 6%.
         2) The after-tax nominal yield on T bills = 6% - .33 x 6% = 4%
         3) The before-tax real yield on T Bills = 6% - 5% = 1%
         4) The after-tax real yield on T bills = 4% - 5% = -1%
         5) The real after-tax yield on a $100 bill = 0% - 5% = -5%
         6) The opportunity cost of holding a $100 bill for one year:
         IT IS THE DIFFERENCE BETWEEN THE AFTER-TAX REAL YIELD ON

AN ALTERNATIVE INVESTMENT, IN THIS CASE T BILLS, AND THE AFTER-TAX REAL YIELD ON THE $100 DOLLAR BILL. SO IT IS -1% - (-5%) = 4% WHICH TURNS OUT TO BE JUST THE AFTER-TAX NOMINAL YIELD ON T BILLS SINCE THE INFLATION RATE DOES NOT CONTRIBUTE TO THE DIFFERENCE BETWEEN THE TWO REAL YIELDS. IN FACT, WE CAN EASILY SEE THAT THIS IS A GENERAL RESULT THAT HOLDS REGARDLESS OF THE PARTICULAR RATE OF INFLATION: THE (AFTER TAX) NOMINAL INTEREST RATE IS THE OPPORTUNITY COST OF HOLDING CASH.

C.   1) The nominal yield on T bills. = 9%.
      2) The after-tax nominal yield on T bills. = 9% - .33 x 9% = 6%
      3) The before-tax real yield on T Bills. = 9% - 8% = 1%
      4) The after-tax real yield on T bills. = 6% - 8% = -2%
      5) The real after-tax yield on a $100 bill. = 0% - 8% = -8%
      6) The opportunity cost of holding a $100 bill for one year:
      = -2% - (-8%) = 6%, WHICH IS THE AFTER TAX YIELD ON T BILLS.

BECAUSE THE TAX RATE APPLIES TO NOMINAL INTEREST INCOME, A PART OF THE INCREASED NOMINAL INTEREST RATE GOES TO TAXES INSTEAD OF COMPENSATING FOR INFLATION.

FOR THE REASON GIVEN ABOVE, THE REAL AFTER-TAX YIELD WILL TEND TO DECLINE AS INFLATION INCREASES.

THE DEFINITION OF TAXABLE INCOME COULD BE CHANGED TO INCLUDE REAL INTEREST INCOME ONLY. THIS WOULD INVOLVE SUBTRACTING FROM NOMINAL INTEREST INCOME THE LOSS FROM INFLATION WHICH IS THE INFLATION RATE TIMES THE AMOUNT INVESTED. IF SOMEONE HAD $1000 IN THEIR SAVINGS ACCOUNT AND THE INFLATION RATE WAS 6% THEN THEY COULD SUBTRACT .06•$1000 = $60 FROM THE INTEREST RECEIVED FROM THE BANK BEFORE CALCULATING THEIR TAX OWED.

D.   ON MAY 24, 2000, THE JULY02 NOMINAL BOND WAS PRICED TO YIELD 6.79% WHILE THE REAL BOND WITH THE SAME MATURITY YIELDED 4.036%. IMPLICIT INFLATION IS ABOUT 2.75% PER ANNUM FOR THE NEXT TWO YEARS. IF YOU EXPECT A HIGHER INFLATION, YOU SHOULD BUY THE REAL BOND, OTHERWISE THE NOMINAL.

Exercises 4.6

A.   IF BANKS HAVE TO PAY 25% TO ATTRACT SAVERS IT MUST BE THAT THEY ARE HAVING TO COMPENSATE SAVERS FOR A VERY HIGH RATE OF INFLATION. IF THE REAL INTEREST RATE IS ABOUT 2%, THEN EXPECTED INFLATION WOULD BE ABOUT 23%. IT IS NOT POSSIBLE THAT THE INFLATION RATE THERE IS ONLY 5%; NO BORROWER WOULD BE WILLING

TO PAY A 20% REAL INTEREST RATE SINCE THAT IS WAY OUT OF LINE WITH EXPERIENCE AND WHAT IS AVAILABLE AROUND THE WORLD.

B.   WITH NEARLY ZERO INFLATION, THE NOMINAL INTEREST RATE IN SWITZERLAND IS NEARLY THE REAL RATE, WHICH WE EXPECT TO BE AROUND 2%. TO PAY 25% WOULD PUT SWISS REAL INTEREST RATES FAR OUT OF LINE WITH EXPERIENCE AND OTHER COUNTRIES.

C.   WE CAN BE MORE CONFIDENT MAKING A GUESS FOR SWITZERLAND SINCE THE FIRST COUNTRY MAY HAVE MUCH MORE UNPREDICTABLE INFLATION THAT IS HIGHLY VOLATILE, AND THERE MAY WELL BE A RISK PREMIUM TO COMPENSATE FOR THAT UNCERTAINTY WHICH WOULD RAISE THE REAL AND NOMINAL RATES FURTHER ABOVE THE INFLATION RATE.

D.   THE NOMINAL RATE SHOULD BE ABOUT 104% PER ANNUM. NOTE THAT FOR SUCH HIGH INFLATION FIGURES, THE APPROXIMATION IN THE TEXT IS INACCURATE. THE EXACT COMPUTATION WOULD BE

(1+REAL RATE)*(1+EXPECTED INFLATION) = 1 + NOMINAL RATE

WHEN INFLATION GETS BACK TO 5% PER ANNUM, NOMINAL RATES SHOULD FALL TO ABOUT 7%. THE APPROXIMATION IS QUITE ACCURATE IN THIS SITUATION.

Exercises from Chapter 5

Growth and Recession
in the U.S. Economy

Exercises 5.1

A.   WHENEVER THERE IS POSITIVE INFLATION, NOMINAL GDP WILL GROW BY MORE THAN REAL GDP. **CONVERSELY, IF INFLATION IS NEGATIVE (i.e. DEFLATION), NOMINAL GDP WILL GROW MORE SLOWLY THAN REAL GDP (corrected 2/10).**

B.   THE MOST RECENT RECESSION WAS IN 2001-02. IT WAS AMONG THE SHORTEST POSTWAR RECESSIONS. SEVERITY IS MEASURED BY THE NUMBER OF QUARTERS THAT A RECESSION LASTS.

C.   IN THE FIGURES WHERE RECESSIONS ARE MARKED, SUCH AS FIG 5.3, EACH TRIANGLE STANDS FOR ONE CALENDAR QUARTER. THE FIRST TRIANGLE MARKS THE PEAK AND THE LAST MARKS THE TROUGH, SO THE LENGTH OF THE RECESSION IS ONE LESS THAN THE NUMBER OF TRIANGLES SINCE THAT IS THE NUMBER OF QUARTERS FROM THE PEAK TO THE TROUGH. WE COUNT FOUR TRIANGLES OR 4 QUARTERS FOR THE 1960-61 RECESSION, SO THAT RECESSION LASTED 3 QUARTERS FROM PEAK TO TROUGH. THE SHORTEST RECESSION WAS IN 2001-02, ONLY 1 QUARTER LONG (2 TRIANGLES LESS 1). THE LONGEST RECESSONS WERE 1973-75 AND 1981-82, ALL LASTING 5 QUARTERS. BUT SHOULD 1980 BE COUNTED AS A SEPARATE RECESSION? THERE IS NO OBVIOUS RELATION BETWEEN THE LENGTH OF ONE RECESSION AND THE LENGTH OF THE NEXT. SAME IS TRUE ABOUT EXPANSIONS.

D.   THE KEY FEATURE OF THE 90'S WAS THE RELATIVE STABILITY OF GROWTH AROUND THE LONG RUN MEAN GROWTH. THE ECONOMY SEEMS SO STRONG BECAUSE THESE STABLE GROWTH RATES HAVE PERSISTED FOR VERY LONG.

E.   WE CAN USE TRIAL AND ERROR, OR LOGARITHMS. BY TRIAL AND ERROR WE HAVE:

$$1.05 \wedge 13 = 1.89$$
$$1.05 \wedge 14 = 1.98$$
$$1.05 \wedge 15 = 2.08$$

THUS, A LITTLE OVER 14 YEARS IS RIGHT. (NOTE ^ MEANS "TO THE POWER.")

USING LOGS WE WRITE THE EQUATION

$$(1.05)^N = 2$$

WHERE "N" IS THE NUMBER OF YEARS NEEDED TO DOUBLE. NOW TAKING THE NATURAL LOG, ln, ON BOTH SIDES WE HAVE

$$N \cdot \ln(1.05) = \ln(2); \ N = \ln(2)/\ln(1.05) = 14.21 \text{ YEARS.}$$

NOTICE THE EFFECT OF COMPOUND GROWTH: IT TAKES LESS THAN 15 YEARS FOR AN ECONOMY TO GROW 100% AT A 5% RATE BECAUSE THE 5% APPLIES EACH YEAR NOT ONLY TO THE ORIGINAL GDP BUT ALSO TO AMOUNT IT HAS GROWN ALREADY, "INTEREST ON THE INTEREST." IF THE GROWTH RATE HAD BEEN 3%, IT WOULD HAVE TAKEN OVER 23 YEARS TO DOUBLE.

F.   I WOULD BE SKEPTICAL, BECAUSE THERE SEEMS TO BE LITTLE TENDENCY FOR RAPID GROWTH TO BE FOLLOWED BY MORE RAPID GROWTH FOR VERY LONG. THE QUARTER TO QUARTER GROWTH RATES IN FIG 5.4 SHOW LITTLE PERSISTENCE; THEY ARE JAGGED RATHER THEN LONG WAVES OF CONTINUED GROWTH OR STAGNATION. SO A STRONG QUARTER OF 4.8% GROWTH COULD EASILY BE FOLLOWED BY A YEAR OF SLOW GROWTH, LIKE 1972 WHICH WAS FOLLOWED BY RECESSION, OR 1978 WHICH WAS ALSO FOLLOWED BY RECESSION.
G.   BY 1%. THE CORRECTED LONG TERM AVERAGE GROWTH RATE OF REAL GDP WILL BE 4.4%. THE DOUBLING TIME FOR REAL GDP WILL BE 16.09 YEARS RATHER THAN 20.73 YEARS.

Exercises 5.2

A.   (1) UNEMPLOYED (2) UNEMPLOYED (3) NOT IN THE LABOR FORCE (4) NOT IN THE LABOR FORCE

B.   SINCE YOUNGER WORKERS TEND TO HAVE LONGER AND MORE FREQUENT PERIODS OF UNEMPLOYMENT, THE AGING OF THE LABOR FORCE SHOULD LOWER THE NATURAL RATE OF UNEMPLOYMENT.

C.   YOUR ANSWER SHOULD MAKE USE OF THE LAG OF INFLATION BEHIND THE BUSINESS CYCLE. INFLATION NEXT YEAR IS LIKELY TO REFLECT THE STRENGTH OF THE ECONOMY DURING THE YEAR PAST.

D.   AS THE ECONOMY EXPANDS, INFLATION TENDS TO PICK UP. SINCE NOMINAL INTEREST RATES TEND TO MOVE TOGETHER WITH INFLATION, THEY TOO WILL TEND TO RISE DURING AN EXPANSION.

E.   INTEREST RATES ARE PRO-CYCLICAL. STRONG GROWTH IS THEN LIKELY TO PRODUCE HIGHER INTEREST RATES IN THE FUTURE. THE

COUPONS AND PRINCIPAL TO BE COLLECTED IN THE FUTURE GET DISCOUNTED AT A HIGHER RATE WHEN GROWTH LOOKS STRONG. SO THE PRICE FALLS.

F.   ON THE CONTRARY, EXPERIENCE SHOWS THAT INFLATION BOTTOMS OUT WELL AFTER THE REAL ECONOMY DOES.

G.   NOTE DEFEATS OF BUSH AND CARTER DURING WEAK YEARS.

H.   IT DOES NOT SAY ANYTHING ABOUT DISTRIBUTION OF INCOME, ENVIRONMENTAL QUALITY, FAMILY STABILITY, CRIME, AND NUMEROUS OTHER FACTORS THAT AFFECT PEOPLE'S WELL BEING.

I.   ASSUME THAT IN THE DEFAULT SITUATION, THE SHIPPING INDUSTRY ONLY REPLACES THE SCRAPPED TRUCK (ONE TRUCK). WHEN SHIPPING VOLUME GROWS BY 2%, IT WILL ORDER THREE TRUCKS IN TOTAL, FOR A 200% INCREASE IN TRUCK ORDERS OVER THE DEFAULT SITUATION. IF SHIPPING VOLUME DOES NOT CHANGE, TRUCK ORDERS FALL BACK TO 1 TRUCK PER YEAR FOR A 0% INCREASE. THE COMPANY WHICH PRODUCES INVESTMENT GOODS GETS AN AMPLIFIED VERSION OF THE BUSINESS CYCLE.

J.   CATERPILLAR MAKES EARTH MOVING EQUIPMENT USED IN LARGE CONSTRUCTION PROJECTS. WHEN CONSTRUCTION ACTIVITY LEVELS OFF, THE DEMAND FOR NEW EQUIPMENT WILL FALL SHARPLY BECAUSE CONSTRUCTION FIRMS CAN GET ALONG WITH THEIR OLD EQUIPMENT.

K. PROFESSIONAL LIKE TEACHERS AND ACCOUNTANTS USUALLY HAVE CONTRACTUAL AGREEMENT WITH THE EMPLOYER, AND THEREFORE, THEIR SALARY CANNOT VARY MUCH WITH BUSINESS CYCLES. BUT PROFITS OF SMALL BUSINESSES DEPENDS ON TOTAL SALES, WHICH VARY HIGHLY WITH BUSINESS CYLCE. DURING ECONOMIC BOOM, UNEMPLOYMENT GOES DOWN AND TOTAL DISPOSABLE INCOME OF THE NATION INCREASES. AS A RESULT, TOTAL SALES AND PROFITS OF SMALL BUSINESSES INCREASE. DURING ECONOMIC RECESSION, UNEMPLOYMENT INCREASES AND DISPOSABLE OF THE NATION DECREASES. AS A RESULT, SALES AND PROFITS OF THE SMALL BUSINESSES DECREASE.

L. SUPPOSE WE WANT TO COMPARE THE LEVEL OF DISPOSABLE INCOME BETWEEN 1993 AND 2003 IN THE DOLLARS OF 2003, WE HAVE TO MULTIPLY THE INCOME OF 1993 BY THE RATIO OF CPI OF 2003 TO CPI OF 1993. THE ESTIMATED LEVEL OF INCOME OF 1993 IS COMPARABLE WITH THE CURRENT INOCME OF 2003. TO MAKE THIS COMPARISON FOR INDIVIDUAL AMERICAN WE HAVE TO DIVIDE THE ESTIMATED INCOME OF 1993 AND CURRENT INCOME OF 2002 BY THE POULATION OF THE CORRESPONDING YEARS.

Exercises 5.3

A.   PRICES OF STOCK IN THE FUTURE WILL REACT TO SURPRISES ABOUT THE STATE OF THE ECONOMY. IF YOU CAN FORECAST FUTURE NEWS BETTER THAN THE CROWDS, THEN YOU CAN MAKE MUCH MONEY.

B.   RECESSIONS TEND TO BE ANTICIPATED BY STOCK MARKET FALLS. SAMUELSON HAD LOOKED AT A PLOT LIKE 5.12.

C.   USE AN N IN FRONT A VARIABLE TO DENOTE THAT IT IS NOMINAL. THE SAME DERIVATION AS IN THE BOOK GIVES,

$$NP = NP/NE * NE/NGDP * NGDP$$

THE RATIOS OF NOMINAL STUFF MAKE THE NOMINAL PART DROP OUT, SO THIS SIMPLIFIES TO

$$NP = P/E * E/GDP * NGDP$$

ONLY THE LAST FACTOR CHANGES, IT IS NOW NOMINAL GDP.

D.   IT WILL IMMEDIATE RAISE P/E. WHEREAS E IS CURRENT EARNINGS, THE PRICE REFLECTS THE CAPITALIZED PRESENT VALUE OF FUTURE EARNINGS. IF EARNINGS ARE EXPECTED TO BE MUCH LARGER THAN CURRENT ONES, THEN P/E WILL SHOOT UP. IT IS NOT OBVIOUS THAT E/GDP WILL CHANGE. AGAIN, FUTURE GDP IS EXPECTED TO BE MUCH GREATER THAN CURRENT GDP WHEN SUCH AN INVENTION TAKES PLACE.

Exercises from Chapter 6

Money, Banks and
The Federal Reserve

Exercises 6.1

A.   1) IT IS THE MEDIUM OF EXCHANGE, 2) IT IS A COMMON UNIT OF ACCOUNT, 3) IT IS A STORE OF VALUE.

RAPID AND ERRATIC INFLATION MAKES MONEY LESS USEFUL AS A UNIT OF ACCOUNT BECAUSE ITS VALUE IS NOT STABLE AND PREDICTABLE (IT WOULD BE LIKE USING A SHRINKING YARDSTICK), AND IT BECOMES LESS RELIABLE AS A STORE OF VALUE.

B.   AS BLACK SHELLS BECOME MORE PLENTIFUL, THEIR VALUE WILL TEND TO FALL, AND THAT WILL CONTINUE UNTIL THE PURCHASING POWER OF BLACK SHELLS FALLS TO THAT OF THE REMAINING WHITE SHELLS. THE COUNTERFEITING OF BLACK SHELLS HAS DESTROYED THE PREMIUM VALUE THAT THEY HAD WHEN THEY WERE RARER THAN WHITE SHELLS.

THIS IS AN ILLUSTRATION OF GRESHAM'S LAW THAT BAD MONEY DRIVES OUT GOOD MONEY, BUT WITH A TWIST. WHEN THE US INTRODUCED THE SANDWICH COIN IN THE MID 1960S, PEOPLE COULD TELL THE DIFFERENCE BETWEEN THE OLD SILVER COINS, WHICH HAD EARLIER DATES, AND THE NEW COINS WHICH WERE DATED LATER AND HAD A VISIBLE BAND OF COPPER AROUND THE EDGE. PEOPLE HOARDED THE SILVER COINS AND PASSED ON THE SANDWICH COINS. IN THE CASE OF THE NATURAL BLACK SHELLS, THEY DISAPPEARED BY BECOMING INDISTINGUISHABLE   FROM   DYED   BLACK   SHELLS,   AND INDISTINGUISHABLE IN VALUE FROM WHITE SHELLS. PEOPLE WHO HAD PAID A PREMIUM FOR BLACK SHELL SIMPLY LOST THAT PREMIUM AS THE NATURAL BLACK SHELL CEASED TO EXIST AS AN IDENTIFIABLY DISTINCT COIN.

C.   THE VERY LOW INCIDENCE OF PERSONAL VIOLENCE IN JAPAN MAKE CARRYING CURRENCY MUCH LESS RISKY THAN IN THE U.S. AMERICANS ARE MORE LIKELY TO USE CHECKS BECAUSE THERE IS NO RISK OF LOSS (CHECKS CAN ONLY BE USED BY THE ACCOUNT HOLDER AND ARE EASILY REPLACED).

D.   1) A TREASURY BILL: EXTREMELY LIQUID,

2) A TREASURY BOND: VERY LIQUID,

3) STOCK IN IBM: VERY LIQUID BUT MORE VARIABLE THAN A T BOND,

4) A CONDO APARTMENT IN A LARGE BUILDING: NOT VERY LIQUID BUT VALUE IS EASILY DETERMINED FROM RECENT SALES OF OTHER SIMILAR APARTMENTS IN THE BUILDING,

5) A LARGE TUDOR STYLE HOUSE IN SEATTLE: RATHER ILLIQUID BECAUSE EACH HOUSE IS DIFFERENT AND WILL APPEAL TO ONLY CERTAIN BUYERS AND SO WILL TAKE WEEKS OR MONTHS TO SELL.

Exercises 6.2

A.   IF THE GOLDSMITH IS COMFORTABLE WITH HAVING GOLD ON RESERVE EQUAL TO ONLY ONE FOURTH THE AMOUNT OF NOTES OUTSTANDING, THEN WITHOUT ANY CHANGE IN THE AMOUNT OF GOLD HE HOLDS IN RESERVE (£100 WORTH) HE CAN HAVE A TOTAL OF £400 IN NOTES OUTSTANDING. THIS MEANS THAT HE CAN LEND OUT ANOTHER £100, BRINGING HIS TOTAL LOANS UP TO £300 AND TOTAL NOTES OUTSTANDING UP TO £400.

B.   SINCE EVERY CURRENCY WAS EQUAL TO A FIXED AMOUNT OF GOLD, ITS VALUE IN TERMS OF GOLD WAS CONSTANT, AND THEREFORE THE RATIOS OF VALUE OR EXCHANGE RATES AMONG CURRENCIES WERE FIXED.

C.   AS LONG AS THE AMOUNT OF GOLD IN EXISTENCE DIDN'T CHANGE VERY RAPIDLY, THE VALUE OF GOLD IN TERMS OF WHEAT OR LEATHER WOULD NOT CHANGE MUCH EITHER OVER LONG PERIODS, THOUGH IT MIGHT FLUCTUATE FOR SHORT PERIODS DEPENDING ON HARVESTS. THE FACT THAT THE DOLLAR WAS EQUIVALENT TO ABOUT 1/20 OUNCE OF GOLD MEANT THAT ITS VALUE IN TERMS OF GOODS WAS ALSO VERY STABLE.

D.   THE BANK HAS RESERVES OF $100 AND WITH A RESERVE RATIO OF .20 THAT IS ONLY ENOUGH TO SUPPORT DEPOSITS OF $500, LEAVING $400 TO LEND OUT. SINCE THE BANK NOW HAS $900 LOANED OUT, IT NEEDS TO SHRINK ITS LOANS BY $500. IT CAN DO THIS BY KEEPING THE MONEY THAT PEOPLE GIVE IT AS THEY REPAY THEIR LOANS, AND USING THAT MONEY IN TURN TO EITHER BUILD UP ITS RESERVES OR TO PAY OFF SOME OF ITS DEPOSITORS. THE QUESTION TELLS US TO ASSUME RESERVES ARE UNCHANGED, SO THE BANK WILL DO THE LATTER AND END UP WITH RESERVES OF $100, LOANS OF $400 ON THE ASSET SIDE, AND DEPOSITS OF $500 ON THE LIABILITIES SIDE.

Exercises 6.3

A.   OBSERVERS ARE USUALLY TRYING TO GUESS WHETHER THE FED WILL RAISE OR LOWER INTEREST RATES, DEPENDING ON WHETHER THE BOARD IS MORE WORRIED ABOUT INFLATION OR UNEMPLOYMENT. PEOPLE ARE INTERESTED IN THE FED'S ACTIONS BECAUSE INTEREST RATES AFFECT SO MANY ECONOMIC DECISIONS AND THE FED'S POLICY WILL EVENTUALLY AFFECT INFLATION AND UNEMPLOYMENT.

Exercises 6.4

A.   THE CHANGE IN MONEY SUPPLY WILL BE THE INCREASE IN BANK DEPOSITS. THIS WILL BE $1,000,000 \cdot (1/.2) = $5 MILLION.

THE CHANGE IN BANK DEPOSITS OF $5 MILLION IS ACCOUNTED FOR BY THE $1 MILLION INCREASE IN RESERVES PLUS A $4 MILLION INCREASE IN BANK LOANS.

B.   BANKS WOULD HAVE TO REDUCE THEIR LOANS TO AVOID HAVING INADEQUATE RESERVES.

THIS PUTS THE EXPANSION PROCESS INTO REVERSE, RESULTING IN A $5 MILLION DROP IN BANK DEPOSITS WHICH IS ACCOUNTED FOR BY THE REDUCTION IN RESERVES OF $1 MILLION AND A DECLINE IN BANK LOANS OF $4 MILLION.

C.   THE AMOUNT OF BANK RESERVES WOULD THEN BE EFFECTIVELY FIXED BY THE QUANTITY OF GOLD, NOT BY ACTIONS OF THE FED. THE QUANTITY OF GOLD DEPENDS ON HOW MUCH HAS BEEN MINED, AND THE FED CANNOT CONTROL THAT.

IF THE FED HAD A HOARD OF GOLD IT COULD INFLUENCE THE AMOUNT AVAILABLE FOR PRIVATE BANK RESERVES TO A LIMITED EXTENT. THE "GOLD STANDARD" WHICH BASES MONEY ON RESERVES OF GOLD USED TO BE THE PREVAILING MONETARY SYSTEM AND STILL HAS THE APPEAL OF TAKING CONTROL OF THE SUPPLY OF MONEY OUT OF THE HANDS OF PEOPLE WHO CAN BE INFLUENCED BY POLITICAL PRESSURE.

D.   THE FAKE BILLS WILL BE JUST LIKE A FED OPEN MARKET PURCHASE. BANKS WILL BE ABLE TO HOLD THE $20,000 AS ADDITIONAL RESERVES (ASSUMING THAT THE PUBLIC'S DESIRE TO HOLD CURRENCY IS NOT AFFECTED). THIS WILL SET OFF THE SAME PROCESS OF MONEY MULTIPLICATION THAT WOULD OCCUR IN A FED OPEN MARKET OPERATION.

Exercises from Chapter 7

The Demand for Money

Exercises 7.1

A.

TRANSACTIONS MOTIVE: HOW IMPORTANT TO YOU? BECAUSE MONEY SERVES AS THE MEDIUM OF EXCHANGE. IT IS THE MOST LIQUID FORM OF ASSETS.

PRECAUTIONARY MOTIVE: HAVE CREDIT CARDS REDUCED THIS MOTIVE? MONEY IS WHAT A CAB DRIVER WILL ACCEPT AT 2AM BECAUSE IT IS RECOGNIZED AS LIQUID.

PORTFOLIO MOTIVE: IMPORTANCE DEPENDS ON YOUR FINANCIAL POSITION, AGE, ATTITUDE TOWARD RISK. THE FACT THAT MONEY IS LIQUID MEANS THAT ITS VALUE IS RELATIVELY STABLE, SO IT IS A LOW RISK ASSET.

B.

1. TRANSACTIONS VERY IMPORTANT TO OWNER OF A SMALL BUSINESS, SOMEWHAT FOR THE CIVIL SERVANT. PRECAUTIONARY IS PROBABLY ALSO MORE IMPORTANT FOR BUSINESS OWNER. PORTFOLIO MAY BE MORE IMPORTANT FOR CIVIL SERVANT; TEND TO BE PEOPLE WHO AVOID RISK.

2. TRANSACTIONS AND PRECAUTIONARY MOTIVES NOT SO IMPORTANT FOR OLD PERSON WHO DOESN'T GET OUT MUCH. BUT PORTFOLIO MOTIVE MORE IMPORTANT FOR OLD PERSON WHO WANTS SECURITY.

3. A RETAIL STORE HAS VERY LARGE TRANSACTIONS DEMAND. HARD TO SAY FOR LAW OFFICE.

4.   TRAVELING SALESPERSON HAS LARGE TRANSACTIONS AND PRECAUTIONARY MOTIVE, BUT SCHOOL TEACHER MAY BE MORE RISK AVERSE AND HAVE LARGER PORTFOLIO DEMAND.

C.   IT IS CLEAR THAT IF INCOMES ARE HIGHER, WHETHER DUE TO HIGHER PRICES OR HIGHER REAL INCOMES, PEOPLE WILL WISH TO HOLD MORE MONEY AT ANY GIVEN INTEREST RATE. THAT IMPLIES THAT THE DEMAND CURVE TODAY LIES TO THE RIGHT OF WHERE IT WAS A YEAR AGO. SINCE THE VOLUME OF TRANSACTIONS WILL BE 5% HIGHER, IT SEEMS REASONABLE TO SHIFT THE DEMAND CURVE RIGHT BY 5%.

D.   A DOLLAR CAN BE EXCHANGED FOR A DOLLAR SO THAT IS ITS

PRICE. THE FIRST STATEMENT IS CORRECT. HOWEVER, THE COST OF HOLDING A DOLLAR FOR AN INTERVAL OF TIME IS THE INTEREST RATE. PEOPLE ARE WILLING TO TRADE A DOLLAR TODAY FOR A DOLLAR NEXT PERIOD AT A RATE OF 1+INTEREST RATE. THE SECOND STATEMENT IS NOT SO PRECISE THOUGH ECONOMISTS COMMONLY USE IT.

Exercises 7.2

A.   IF THE FED CUTS THE REQUIRED RESERVE RATIO THAT MEANS THAT THE BANKS WILL SUDDENLY HAVE EXCESS RESERVES. THEY WILL LEND THOSE RESERVES OUT, AND THERE WILL BE A CHAIN REACTION OF ADDITIONAL DEPOSITS IN THE BANKS.   THE RESULT IS THAT THE QUANTITY OR SUPPLY OF MONEY IS INCREASED. THE SITUATION WILL BE LIKE FIG. 7.4 WHERE THE SUPPLY OF MONEY INCREASED, SO THE INTEREST RATE FALLS, MEANING THAT BOND PRICES RISE.

       THE SITUATION FOR AN INCREASE IN REQUIRED RESERVES IS THE OPPOSITE. BANKS WILL FIND THEY ARE SHORT OF RESERVES, SO THEY NEED TO CONTRACT THEIR LOANS TO BUILD UP THEIR RESERVES. THE CHAIN REACTION THROUGH THE BANKING SYSTEM RESULTS IN A SHRINKAGE IN THE TOTAL QUANTITY OF DEPOSITS IN THE BANKS. THIS MEANS THAT THE QUANTITY OR SUPPLY OF MONEY HAS DECLINED. PUTTING FIG. 7.4 INTO REVERSE, WE SEE THAT THE INTEREST RATE MUST RISE, MEANING THAT BOND PRICES FALL.

B.   OUR MODEL SAYS THAT THE DEMAND FOR MONEY IS PROPORTIONAL TO INCOME WHICH WE MEASURE BY GDP. THEREFORE A FALL IN INCOME MEANS THAT THE AMOUNT OF MONEY DEMANDED AT ANY GIVEN INTEREST RATE IS LESS. THIS CAN BE REPRESENTED BY PUTTING FIG. 7.5 INTO REVERSE. THE MONEY DEMAND CURVE SHIFTS LEFT, SO THE INTEREST RATE FALLS.

C.   OUR MODEL SAYS THAT THE DEMAND FOR MONEY IS PROPORTIONAL TO NOMINAL GDP AT ANY GIVEN INTEREST RATE. IF GDP INCREASES BY 7% THEN THE DEMAND FOR MONEY INCREASES BY 7% AT ANY GIVEN INTEREST RATE. THE FED CAN KEEP MONEY SUPPLY EQUAL TO MONEY DEMAND AT THAT INTEREST RATE JUST BY INCREASING THE MONEY SUPPLY BY 7% ALSO.

       TO PROVE THIS ALGEBRAICALLY WE SET THE QUANTITY OF MONEY SUPPLY EQUAL TO THE QUANTITY OF MONEY DEMANDED ACCORDING TO OUR MODEL. WE USE UNDERLINED VARIABLES TO DENOTE ACTUAL VALUES AT THE BEGINNING OF THE YEAR:

$$\underline{M} = k(\underline{i}) \cdot \underline{GDP}$$

THIS SAYS THAT THE ACTUAL QUANTITY OF MONEY SUPPLIED, M, WAS EQUAL TO THE QUANTITY DEMANDED, WHICH WAS THE FUNCTION k(i) EVALUATED AT THE ACTUAL INTEREST RATE i TIMES ACTUAL GDP WHICH WAS GDP. NOW IF GDP RISES BY 7%, EITHER M OR k(i) MUST CHANGE TO PRESERVE THE EQUALITY OF SUPPLY AND DEMAND.

THE QUESTION STATES THAT i SHOULD STAY THE SAME, WHICH MEANS THAT k(i) STAYS THE SAME. THE NEW VALUE OF GDP IS (1.07) • GDP 333333333333333333AND THE NEW VALUE OF M, WHICH WE EXPRESS AS SOME UNKNOWN FACTOR X TIMES M, WILL HAVE TO SATISFY THE EQUATION:

$$M \cdot X = k(i) \cdot [GDP \cdot (1.07)]$$

THE ONLY WAY TO PRESERVE THE EQUALITY IS TO HAVE M INCREASE BY THE SAME FACTOR, (1.07). THEN WE HAVE

$$M \cdot (1.07) = k(i) \cdot [GDP \cdot (1.07)]$$

GRAPHICALLY, WE HAVE THE SUPPLY CURVE SHIFTING RIGHTWARD AT A RATE OF 7% WHILE THE DEMAND CURVE IS SHIFTING RIGHTWARD AT THE SAME RATE. THIS KEEPS THE INTERSECTION AT A CONSTANT LEVEL OF THE INTEREST RATE.

D.   PART 1: HOLIDAY DEMAND FOR MONEY TO SETTLE TRANSACTIONS MEANS THAT THE DEMAND CURVE SHIFTS RIGHTWARD TEMPORARILY. IF THE FED TAKES NO ACTION ON THE MONEY SUPPLY IN RESPONSE, THERE WILL BE A TEMPORARY INCREASE IN THE INTEREST RATE. OUR MODEL THEREFORE PREDICTS THAT THERE SHOULD BE A SEASONAL PATTERN IN INTEREST RATES, WITH THE PEAK DURING THE YEAR OCCURRING IN DECEMBER.

PART 2: EVIDENTLY, THE FED SUPPLIES MORE MONEY IN DECEMBER AND THEN TAKES IT OUT OF THE BANKING SYSTEM AFTER THE HOLIDAYS. THIS ACCOMMODATION OF THE SEASONAL DEMAND FOR MONEY MEANS THAT WE DO NOT SEE A SEASONAL PATTERN IN INTEREST RATES.

AS A MATTER OF HISTORICAL FACT, THERE USED TO BE A SEASONAL PATTERN IN INTEREST RATES BEFORE THE FED CAME INTO EXISTENCE AND UNDERTOOK TO SUPPLY ADDITIONAL MONEY TO SATISFY SEASONAL DEMAND. THE DATA ON MONEY SUPPLY THAT THE FED PUBLISHES IS "SEASONALLY ADJUSTED" TO REMOVE THE SEASONAL PATTERN IN THE MONEY SUPPLY SINCE WE ARE NOT GENERALLY INTERESTED IN STUDYING SEASONAL VARIATION BUT RATHER CHANGES IN THE MONEY SUPPLY THAT ARE ASSOCIATED WITH BUSINESS CYCLES

Exercises 7.3 – REV. DEC 30, 2009

A.   WHEN THE INTEREST RATE IS 150%, PEOPLE FIND IT VERY COSTLY TO HOLD MONEY SO THEY WILL HOLD LITTLE OF IT RELATIVE TO THEIR INCOME. THAT MEANS THAT THE RATIO M/GDP WILL BE SMALL, WHILE VELOCITY, THE RATIO OF INCOME TO MONEY, WILL BE HIGH, COMPARED TO A COUNTRY WITH LOW INTEREST RATES AND A LOW COST OF HOLDING MONEY. SO RUSSIA WILL HAVE THE HIGHER VELOCITY OF MONEY.

B.   OVER SHORT PERIODS OF TIME, VARIABLES BESIDES GDP MAY AFFECT THE DEMAND FOR MONEY. FOR EXAMPLE, THE VOLUME OF TRADING ON THE NEW YORK STOCK EXCHANGE, OR SALES OF EXISTING HOUSES WHICH WILL AFFECT THE TRANSACTIONS DEMAND FOR MONEY DIRECTLY. IN GENERAL, THE BUYING AND SELLING OF EXISTING ASSETS, THOUGH NOT RELATED TO THE PRODUCTION OF GOODS AND SERVICES COUNTED IN GDP, INCREASES THE DEMAND FOR MONEY SINCE IT IS USED TO SETTLE THESE TRANSACTIONS.

OVER LONGER PERIODS OF TIME, THE DEMAND FOR MONEY WILL BE AFFECTED BY THE TECHNOLOGY OF SETTLING TRANSACTIONS. PEOPLE HAVE PREDICTED THAT CREDIT CARDS WOULD CREATE A "CASHLESS SOCIETY" AND NOW THERE ARE DEBIT CARDS THAT ACCESS BANK ACCOUNTS DIRECTLY FROM A STORE. ALTHOUGH THERE SEEMS TO BE NO OBSERVABLE EFFECT YET ON THE DEMAND FOR MONEY, A "CASHLESS SOCIETY" WOULD BE ONE WHERE PEOPLE NEED TO HOLD MUCH LESS MONEY FOR A GIVEN LEVEL OF INCOME, SO THE DEMAND FOR MONEY PER DOLLAR OF GDP WOULD BE REDUCED.

C.   THE T BILL YIELD WAS IN "DOUBLE DIGITS" IN THE LATE 1970S. A RETURN TO THOSE LEVELS WOULD MEAN A VERY LARGE RISE IN INTEREST RATES FROM TODAY'S LEVELS. OUR MODEL TELLS US THAT THE DEMAND FOR MONEY VARIES INVERSELY WITH THE INTEREST RATE, AND HISTORY CONFIRMS THAT RELATIONSHIP. THEREFORE, WE COULD EXPECT THAT THE DEMAND FOR MONEY PER DOLLAR OF GDP WOULD FALL IF THAT HAPPENS. CONVERSELY, VELOCITY VARIES POSITIVELY WITH THE INTEREST RATE, SO VELOCITY WOULD BE MUCH HIGHER AS "PEOPLE RUN FASTER TO THE BANK TO TAKE ADVANTAGE OF THOSE HIGHER INTEREST RATES."

D.   DOES CARRYING A CREDIT CARD SUBSTITUTE FOR CARRYING MONEY? IT PROBABLY DOES, TO SOME EXTENT.   THE SALES OF TRAVELERS' CHECKS (PART OF M1) HAS FALLEN CONSIDERABLY SINCE THE SPREAD OF CREDIT CARDS. IT SEEMS LIKELY, THEN, THAT IF WE

WERE ALL FORCED TO GIVE UP OUR CREDIT CARDS, IT WOULD BE NECESSARY TO CARRY MORE CURRENCY AND HOLD LARGER BALANCES IN OUR CHECKING ACCOUNTS. THE DEMAND FOR MONEY PER DOLLAR OF GDP WOULD THEREFORE RISE.

THAT IMPLIES A HIGHER INTEREST RATE TO RATION THE AVAILABLE SUPPLY OF MONEY. PEOPLE WOULD BE SELLING BONDS, DRIVING INTEREST RATES UP, IN AN ATTEMPT TO INCREASE THEIR MONEY HOLDINGS. EQUILIBRIUM WOULD BE RESTORED WHEN THE INTEREST RATE HAD RISEN ENOUGH SO THAT PEOPLE WERE CONTENT TO HOLD ONLY THE AVAILABLE MONEY SUPPLY IN SPITE OF THEIR GREATER DEMAND AT ANY GIVEN INTEREST RATE.

E. (new) UNCERTAINTY WILL MAKE PEOPLE WANT TO HOLD MORE PRECAUTIONARY RESERVES OF MONEY AGAINST THE POSSIBILITY OF LOSING THEIR JOB OR BEING DENIED CREDIT. SO THE DEMAND FOR MONEY WOULD GO UP, RELATIVE TO THEIR INCOME AND WEALTH, AS COMPARED TO NORMAL TIME. THIS ACTUALLY HAPPENED IN 2009!

Exercises from Chapter 8

How the Fed Moves the Economy

Exercises 8.1

A.   THE SAVINGS WILL BE 150•$40 = $6,000 PER YEAR FOR EACH WORKSTATION. THE RESALE VALUE AFTER ONE YEAR IS .5• $10,000 = $5,000. THE ROI THEN IS

$$ROI = (5,000 + 6,000 - 10,000)/10,000 = 1,000/10,000 = .10 = 10\%$$

IT WILL BUY THE NEW WORKSTATIONS BECAUSE THE RATE OF RETURN, OR RETURN ON INVESTMENT, 10%, IS GREATER THAN THE COST OF BORROWING, 7%. ANOTHER WAY TO LOOK AT IT IS THAT THE INTEREST COST AT 7% IS $700 PER WORKSTATION, WHILE THE NET GAIN IS $1,000 PER WORKSTATION, SO PROFITS INCREASE AS A RESULT OF THE PURCHASE.

AT AN INTEREST COST OF 10% THE FIRM WOULD BE INDIFFERENT BECAUSE THE ROI WOULD THEN BE NO HIGHER THAN THE COST OF CAPITAL TO THE FIRM. THE NET EFFECT ON PROFITS WOULD BE ZERO.

AT AN INTEREST COST OF 15% THE FIRM WOULD LOSE BY MAKING THE PURCHASE BECAUSE THE COST OF CAPITAL EXCEEDS THE ROI, AND PROFITS WOULD DECLINE IF THE PURCHASE WERE MADE, SO IT WOULD NOT BUY THE WORKSTATIONS.

B.   IF THE PRICE OF THE WORKSTATION IS SLASHED TO $8,000 THE ROI BECOMES

$$ROI = (4,000 + 6,000 - 8,000)/8,000 = 2,000/8,000 = .25 = 25\%$$

THE ROI IS SUBSTANTIALLY INCREASED BECAUSE THE AMOUNT OF DEPRECIATION IS CUT FROM $5,000 TO $4,000, AND BECAUSE THE AMOUNT INVESTED IS LESS. THUS, THE NUMERATOR INCREASES AND DENOMINATOR DECREASES, BOTH EFFECTS PUSHING ROI UPWARD.

NOW THE WORKSTATION IS AN UNAMBIGUOUS "BUY" WHETHER THE INTEREST RATE IS 7, 10, OR 15%. THIS HELPS EXPLAIN WHY CHANGES IN THE INTEREST RATE BY THE FED MAY HAVE LITTLE IMPACT IN AREAS WHERE TECHNOLOGY IS RAISING ROI'S RAPIDLY.

Exercises 8.2

A.   THE NEW DEMAND CURVE WOULD BE ROUGHLY PARALLEL TO THE THICK LINE BUT EVEN FURTHER TO THE RIGHT IN BOTH DIAGRAMS. THAT SAYS THAT MORE TRUCKS AND MORE OF MANY THINGS ARE DEMANDED AT A GIVEN PRICE THAN WERE BEFORE. THIS COULD BE THE RESULT OF A SHARP FALL IN INTEREST RATES AS THE RESULT OF THE FED CAUSING A VERY LARGE INCREASE IN THE MONEY SUPPLY THROUGH BOND OPEN MARKET OPERATIONS.

THE RESULT WILL BE MOSTLY A RISE IN PRICES OF TRUCKS AND OTHER GOODS RATHER THAN MUCH INCREASE IN QUANTITY PRODUCED, BECAUSE WE ARE MOVING ALONG A VERY STEEP SECTION OF THE SUPPLY CURVE BOTH IN THE TRUCK INDUSTRY AND IN THE ECONOMY.

Exercises 8.3

A.   1. UNTRAINED WORKERS ARE MORE LIKELY TO BE UNEMPLOYED UNTIL THEY GAIN SKILLS AND EXPERIENCE, SO THE NATURAL RATE OF UNEMPLOYMENT WOULD RISE.
2. THE UNEMPLOYMENT RATE TENDS TO BE LOWER FOR OLDER, MORE EXPERIENCED WORKERS, SO THIS SHOULD REDUCE THE NATURAL UNEMPLOYMENT RATE.
3. SHOULD REDUCE IT BECAUSE BETTER TRAINED WORKERS TEND TO HAVE LOWER UNEMPLOYMENT RATES.
4. WOULD REDUCE IT BECAUSE HEALTH PROBLEMS ARE ONE REASON PEOPLE BECOME UNEMPLOYED.

B.   THE UNEMPLOYMENT RATE HAD DECLINED SHARPLY TO LEVELS AT WHICH INFLATION HAD TENDED TO INCREASE IN THE PAST. CAPACITY UTILIZATION HAD RISEN SHARPLY, ALSO TO LEVELS WHERE INFLATION HAD TENDED TO INCREASE IN THE PAST. HOWEVER, AS A RESULT OF THE RECESSION, UNEMPLOYMENT INCREASED AND CAPACITY UTILIZATION DECREASED, SUGGESTING THAT INFLATION WAS UNLIKELY TO PICK UP. BY 1993 THE ECONOMY HAD RECOVERED SUFFICIENTLY, AS REFLECTED IN LOWER UNEMPLOYMENT AND HIGHER CAPACITY UTILIZATION, THAT THE FED BEGAN TO BE CONCERNED AGAIN ABOUT THE POSSIBILITY OF A RISE IN INFLATION.

C.   THE COEXISTENCE OF LOW INFLATION WITH UNEMPLOYMENT BELOW 5% IS UNUSUAL GIVEN THE RECORD SINCE 1950. THE MAIN EXPLANATION IS BASED ON REDUCTIONS IN THE NATURAL RATE OF UNEMPLOYMENT DUE TO DEMOGRAPHICS AND ON EFFICIENCY GAINS THAT ALLOWED TO RAISE REAL WAGES WITHOUT INCREASING PRICES.

Exercises 8.4

A.   IF THE FED INCREASES THE MONEY SUPPLY BY 20% THERE WILL BE A VERY SHARP FALL IN INTEREST RATES IN ORDER TO GET PEOPLE TO BE WILLING TO HOLD SO MUCH MORE MONEY, AS IN FIG 7.2.

WITH INTEREST RATES SHARPLY LOWER, AS IN FIG 8.1, THE COST OF BORROWING FALLS. FIRMS WILL BE MORE INCLINED TO BUY INVESTMENT GOODS AND HOUSEHOLDS MORE LIKELY TO BUY DURABLE.

HIGHER DEMAND FOR INVESTMENT GOODS AND DURABLE GOODS WILL SHIFT DEMAND IN THOSE MARKET TO THE RIGHT AS IN FIG 8.3. THAT MEANS THAT AGGREGATE DEMAND WILL ALSO SHIFT TO THE RIGHT, AS IN FIG 8.4.   PRICES WILL RISE, AND SO WILL OUTPUT AND EMPLOYMENT.

AN UNEMPLOYMENT RATE OF 4.9% MEANS THAT THE ECONOMY IS ALREADY AT "FULL EMPLOYMENT" OR THE "NATURAL RATE OF OUTPUT." THIS MEANS THAT WORKERS WILL DEMAND HIGHER WAGES SINCE THEY CAN EASILY FIND WORK ELSEWHERE AS IN FIG 8.5. HIGHER WAGES MEAN THAT COSTS OF PRODUCTION RISE, SO SUPPLY CURVES SHIFT UP AS IN FIG 8.6 AND THE AGGREGATE SUPPLY CURVE SHIFTS UPWARD AS IN FIG 8.7. WHEN THAT HAPPENS, PRICES AND WAGES (FIG 8.8) RISE MORE, BUT OUTPUT AND EMPLOYMENT START TO FALL BACK TO THEIR "NATURAL" LEVELS AS IN FIG 8.7.

MEANWHILE, RISING PRICES MEAN THAT THE DEMAND FOR MONEY IS INCREASING BECAUSE IT IS PROPORTIONAL TO NOMINAL GDP WHICH IS THE PRICE LEVEL TIMES OUTPUT. AS GDP RISES, THE DEMAND CURVE FOR MONEY SHIFTS RIGHT AS IN FIG 8.11. THAT TENDS TO PUSH THE INTEREST RATE BACK UP TOWARDS ITS ORIGINAL LEVEL.

OUR FORECAST THEN IS THAT THERE WILL BE A TEMPORARY BOOM IN THE ECONOMY, BUT WHEN IT IS OVER THE NET EFFECT WILL ONLY BE A HIGHER PRICE LEVEL, HIGHER BY 20% MINUS THE 3% TREND GROWTH OF REAL GDP. IF THE ADJUSTMENT TAKES ONE YEAR, THEN THE PRICE LEVEL WILL HAVE RISEN BY 20% - 3% = 17%.

B.   THE ECONOMY IS ALREADY AT "FULL" EMPLOYMENT WITH MEASURED UNEMPLOYMENT AT 5%, SO REAL GROWTH WILL NOT BE FASTER THAN THE LONG TERM GROWTH RATE OF 3%. YOU KNOW THAT WITH INFLATION AT 2% AND REAL GROWTH AT 3% THAT THE DEMAND FOR MONEY WILL GROW AT 2%+3%=5%, AT ANY GIVEN INTEREST RATE. THEREFORE, IF YOU INCREASE THE SUPPLY OF MONEY AT A 5% RATE PER YEAR, THERE WILL BE NO TENDENCY FOR THE INTEREST RATE TO CHANGE. GRAPHICALLY, THE SUPPLY CURVE WILL BE MOVING TO THE RIGHT AT THE SAME SPEED AS THE DEMAND CURVE, SO THE

INTERSECTION OF THE TWO DOES NOT MOVE UP OR DOWN.

C.   MONEY DEMAND THEORY, AND HISTORICAL EVIDENCE, TELL US THAT THE DEMAND FOR MONEY IS RELATED TO THE INTEREST RATE AND IS FAIRLY STABLE. THAT IMPLIES THAT MONEY AND PRICES ARE LINKED BY THE EQUATION M = k(i) • P • Q. IF THE CENTRAL BANK OF RUSSIA INCREASES M BY SEVERAL TIMES, THEN THERE CANNOT BE THAT BIG A CHANGE IN Q SINCE THE ECONOMY HAS A NATURAL RATE OF OUTPUT AND IS LIMITED BY PHYSICAL CAPACITY. UNLESS THE NOTION OF MONEY DEMAND IS COMPLETELY FALSE, THERE MUST BE A LARGE IMPACT ON P TO SATISFY THIS EQUATION.

D.   M(1999) * V(1999) = P(1999) * Y(1999)   (where * means multiply)

SUBSTITUTING FROM THE DATA IN PROBLEM, WE HAVE,

      7.9 * M(1960) * V(1999) = 4.9 * P(1960) * 3.5 * Y(1960)

REARRANGING, THIS SIMPLIFIES TO

      V(99) = 2.17 * [P(60)*Y(60)/M(60)] = 2.17 * V(60),

SO INDEED VELOCITY INCREASED BY ABOUT 117% FROM 1960 UNTIL 1999. SINCE VELOCITY IS THE INVERSE OF k(i) THE STORY FOR THIS RISE IS THE SAME AS GIVEN IN THE BOOK FOR THE FALL OF k(i).

Exercises 8.5

A.   WE WILL HAVE INFLATION AT A RATE OF 4%-3% = 1%. ADDING THIS INFLATION RATE TO THE HISTORICAL AVERAGE REAL T BILL YIELD OF 2% WE GET 3% FOR THE T BILL YIELD.

B.   ACCORDING TO THE QUANTITY THEORY OF MONEY, INFLATION IS A RESULT OF THE MONEY SUPPLY GROWING FASTER THAN OUTPUT. THEREFORE, WE EXPECT THAT COUNTRY X HAS A MUCH HIGHER RATE OF GROWTH OF MONEY SUPPLY THAN DOES COUNTRY Y.

      INTEREST RATES REFLECT MAINLY THE LEVEL OF INFLATION, SO COUNTRY X WILL HAVE INTEREST RATES IN EXCESS OF 25%, BUT COUNTRY Y WILL HAVE LOW INTEREST RATES.

      THE DEMAND FOR MONEY PER DOLLAR OF INCOME WILL BE LOWER IN THE HIGH INFLATION COUNTRY, BECAUSE IT IS MORE EXPENSIVE THERE TO HOLD MONEY.

THE VELOCITY OF MONEY VARIES DIRECTLY WITH THE INTEREST RATE. COUNTRY X WILL HAVE A MUCH HIGHER VELOCITY OF MONEY THAN COUNTRY Y.

Exercises from

Chapter 9

Monetary Policy

Exercises 9.1 (new 1/10)

A. Former Fed Chairman Paul Volcker has surfaced again recently in the economic news. What role is he playing in monetary policy now, and what has been his primary contribution?

HE HAS BEEN A SENIOR ADVISOR TO PRES OBAMA AND IN JAN 2010 RECEIVED CREDIT FROM THE PRES AS THE PRIMARY AUTHOR OF THE PRES'S PROPOSED NEW RULES FOR BANKING. THESE ESSENTIALLY RESTORE THE GLASS-STEAGALL ACT, WHICH WAS REPEALED IN 1999, BY SAYING THAT BANKS CANNOT ENGAGE IN INVESTMENT BANKING.

B. What accomplishments were attributed to former Fed Chairman Alan Greenspan that earned him the accolade of 'national treasure'?

THE LONG PERIOD OF THE 'GREAT MODERATION' FROM THE MID 1980S UNTIL THE FINANCIAL CRISIS OF 2008 WAS VIEWED AS BEING DUE TO GREENSPANS SKILL IN GUIDING THE ECONOMY AROUND ANY OBSTACLES TO CONTINUED GROWTH ACCOMPANIED BY LOW INFLATION. HE MADE VIGOROUS USE OF THE FED'S CONTROL OF INTEREST RATES TO HEAD OFF ANY THREAT TO EITHER GROWTH OR INFLATION. SINCE HE SEEMED TO HAVE AN UNCANNY SKILL AT THIS HE BECAME VIEWED AS A KIND OF WIZARD OF MONETARY POLICY.

C. If the Fed holds interest rates too low too long, what is likely to be the eventual result? Why is the called a paradox?

WE KNOW FROM EXPERIENCE, AND FROM THE THEORY OF MONETARY POLICY DISCUSSED IN CHAPTER 8, THAT THE FED CAN PUSH INTEREST RATES BELOW A LEVEL CONSISTENT WITH MAINTAINING THE CURRENT INFLATION RATE, BUT IT CAN DO THIS ONLY UNTIL OVERHEATING OF THE ECONOMY CAUSES THE INFLATION RATE TO RISE. THEN INTEREST RATES START TO CHASE INFLATION UPWARDS, DEFEATING THE EFFORT TO KEEP INTEREST RATES LOW.

D. Based on Figure 9.1, how would you describe the Fed's response to 9-11? Why do you think it responded as it did to that situation?

FOLLOWING THE SEPT 11, 2001 ATTACK ON THE WORLD TRADE CENTER IN NYC, THE FED MOVED TO LOWER INTEREST RATES DRAMATICALLY BY FLOODING THE BANKING SYSTEM WITH ADDITIONAL RESERVES. THUS, THE QUANTITY OF MONEY ROSE SHARPLY. THE OBJECTIVE WAS TO MAKE SURE FIRMS AND HOUSEHOLD HAD ACCESS TO ADDITIONAL LIQUIDITY IN A TIME OF UNCERTAINTY AND FEAR.

E. Some economists recommend a steady rate of growth in the supply of money and a very cautious monetary policy response to economic shocks, allowing the economy time to right itself. Would that be an adequate description of monetary policy under Alan Greenspan?

NO, GREENSPAN ACTED VIGOROUSLY DURING HIS LONG TENURE AT THE FED. WE SEE THIS IN THE WIDE SWINGS IN BOTH THE INTEREST RATE AND GROWTH RATE OF MONEY IN FIG 9.1 AFTER THE MID 1980S AS COMPARED TO THE PERIOD BEFORE THAT.

Exercises 9.2

A.   IT SEEMS TO TAKE ABOUT 2 YEARS, BASED ON FIG 9.3.

        THE FED DOES NOT SEE THE EFFECT OF THEIR ACTIONS ON INFLATION FOR ABOUT TWO YEARS. IT IS THEREFORE HARD TO TELL IF MONETARY POLICY HAS BEEN TOO TIGHT OR TOO EASY UNTIL TWO YEARS LATER. THEN IT HAS TO WAIT TWO YEARS MORE TO SEE THE EFFECTS OF ITS CORRECTIVE ACTION.

B.   THIS IS A CHANCE TO RELATE OUR DISCUSSION TO THE CURRENT NEWS ABOUT FED POLICY.

        DURING THE FINANCIAL CRISIS AND 'GREAT RECESSION' THAT FOLLOWED IT THE FED WAS CONCERNED WITH THE STABILITY OF THE BANKS AND THE FINANCIAL SYSTEM, AND WITH DETERIORATING ECONOMIC ACTIVITY. INFLATION WAS A SECONDARY CONCERN, BUT HOPES FOR AN ECONOMIC RECOVERY RISING IN 2010 MORE PEOPLE STARTED TO WORRY THAT THE FED WOULD NOT WITHDRAW STIMULOUS SOON ENOUGH TO AVOID A BOUT OF INFLATION A COUPLE OF YEARS IN THE FUTURE. THIS FEAR IS BASED ON PAST EXPERIENCE!

        POLITICAL PRESSURES FROM CONGRESS, FEARING PUBLIC FUROR

OVER RECESSION AND UNEMPLOYMENT, INTENSIFIED AROUND THE REAPPOINTMENT OF FED CHAIR BERNANKE IN JAN 2010. IT RAISES CONCERNS ABOUT THE CONTINUED INDEPENDENCE OF THE FED IN THE FUTURE, AND CONGRESS SEEMS INTENT ON DIRECTING MONETARY POLICY AND BANKING REGULATION.

C.   IF THE FED LOWERS INTEREST RATES NOW, THE RESULT WILL BE A BOOM IN THE ECONOMY AND HIGHER INFLATION DOWN THE ROAD. THOSE FACTORS WILL PUSH INTEREST RATES UP INSTEAD OF DOWN. THAT COULD LEAD THE FED TO TRY EVEN HARDER TO LOWER INTEREST RATES, LEADING TO EVER FASTER INFLATION. A SOUND POLICY FOR LOWERING INTEREST RATES IS THE ONE FOLLOWED BY THE FED UNDER VOLCKER: HIGHER INTEREST RATES NOW LEAD TO LOWER INFLATION AND LOWER INTEREST RATES IN THE FUTURE.

D.   THE TAYLOR RULE SAYS THE FED SHOULD SET THE FED FUNDS RATE AT

$FF \approx 2\% + P\% + .5*(Gap) + .5*(P\% - 2\%);$

THE QUESTION TELLS US TO ASSUME A 6% RATE OF INFLATION, AND A GAP OF -4%. THUS WE HAVE

$FF \approx 2\% + P\% + .5*(Gap) + .5*(P\% - 2\%) = 2 + 6 + .5*(-4) + .5*(6-2)$

$= 2 + 6 - 2 + 2 = 8\%$

SO THE FED SHOULD SET THE FED FUNDS RATE AT 8%.

IF THE PUBLIC ASSUMES INFLATION WILL CONTINUE AT 6% IT WILL PERCEIVE THE REAL INTEREST RATE TO BE 8% - 6% = 2%.
THIS MEANS THAT MONETARY POLICY IS NEUTRAL, THE REAL INTERST RATE IS RIGHT AT ITS LONG RUN OR NATURAL LEVEL OF 2%. THIS MAKES SENSE BECAUSE THE FED CANNOT FIGHT BOTH INFLATION AND HIGH UNEMPLOYMENT WITH ONE POLICY TOOL, SO IT COMPROMISES BY DOING NEITHER.

BUT IF INFLATION JUMPS TO 8% THEN THE RULE TELLS THEM TO RAISE THE FED FUNDS RATE BY 1.5 TIMES THE INCREASE, FROM 8% TO 11%. THEN THE REAL RATE IS 3% AND THE FED IS LEANING MORE AGAINST THE INFLATION THAN AGAINST A WEAK ECONOMY.

THIS PROBLEM ILLUSTRATES THE CHALLENGE OF DEALING WITH STAGFLATION WITH ONLY MONETARY POLICY – THE FED CAN ONLY DO ONE OR THE OTHER.

E. TO ANSWER THIS QUESTION WE NEED TO KNOW THE LEVEL OF INFLATION, AND OUTPUT GAP.

THE ANNUAL RATE OF INFLATION IN 2009 WAS 2%. BUT THE OUTPUT GAP WAS LARGE, ROUGHLY -7%, ACCORDING TO THE CONGRESSIONAL BUDGE OFFICE.
THE TARGET RATE FOR FED FUNDS SHOULD THEREFORE BE

$$FF \approx 2\% + P\% + .5*(Gap) + .5*(P\% - 2\%)$$

$$= 2 + 2 + .5*(-7) + .5*(2-2)$$

$$= 2 + 2 - 3.5 + 0 = 0.5\%$$

THE ACTUAL FED FUNDS RATE WAS VERY LOW, ABOUT .125% DURING 2009!! SO THE FED WAS FOLLOWING AN AGGRESSIVE POLICY AIMED AT STIMULATING THE ECONOMY, CONSISTENT WITH THE TAYLOR RULE.

WHY NOT EXACTLY? BECAUSE EVEN IF THE INTENT IS TO FOLLOW THE TAYLOR RULE FED ECONOMISTS MAY ESTIMATE THE GAP DIFFERENTLY OR HAVE SLIGHTLY DIFFERENT ASSUMPTIONS FOR THE REAL INTEREST RATE OR INFLATION TARGET. NO DOUBT THE FOMC ALSO EXERCISES ITS JUDGMENT IN SETTING THE FED FUNDS RATE AS WELL.

Exercises 9.3

A.   JUDGING FROM FIG 9.6, THE AVERAGE LEVEL OF THE UNEMPLOYMENT RATE OVER ALL THE CYCLES SEEM TO BE ABOUT 6%.

B.   IF WERE STARTING UNDER CONDITIONS MUCH LIKE THE EARLY 1960S: LOW INFLATION AND LOW INTEREST RATES, WITH THE ECONOMY NOT FAR FROM ITS NATURAL RATE OF OUTPUT, AND THE FED BEGAN TO INCREASE M AT 10% WE WOULD SEE A PATH MUCH LIKE FIG 9.4, WITH UNEMPLOYMENT DECLINING WHILE INFLATION SPEEDS UP.

PERHAPS INFLATION WOULD SPEED UP FASTER NEXT TIME BECAUSE PEOPLE UNDERSTAND BETTER WHAT IS HAPPENING!

AT SOME POINT THE FED WOULD PUT ON THE BRAKES, AND THEN WE WOULD DO A LOOP LIKE IN FIG 9.5.

Exercises from Chapter 10

Fiscal Policy:
Government Spending and Taxation

Exercises 10.1

A. TAXES ARE SET BY LAW AND THE PRESIDENT CANNOT SIMPLY CHANGE THE TAX LAWS. THE PRESIDENT PROPOSES FISCAL LEGISLATION TO CONGRESS WHICH MAY OR MAY NOT FOLLOW UP ON ALL OR PART OF IT, OR MAY SUBSTITUTE ITS OWN PROGRAM. A NEWLY ELECTED PRESIDENT, SUCH AS REAGAN AND CLINTON WERE WHEN THEY PROPOSED THEIR TAX PROGRAMS, IS, HOWEVER, OFTEN SUCCESSFUL IN GETTING CONGRESS TO AGREE.

B. SUPPOSE THAT YOU FELT THAT IT MIGHT NOT BE NECESSARY TO HAVE A DEPT OF AGRICULTURE WITH MORE EMPLOYEES THAN THERE ARE FARMERS. A CUT IN ITS BUDGET WOULD BE VIGOROUSLY OPPOSED BY THOSE EMPLOYEES AND BY FARMERS AND OTHERS SUCH AS FIRMS THAT SELL SUBSIDIZED EQUIPMENT TO FARMERS. SUPPORT WOULD BE DIFFUSE AND WEAK SINCE NO TAXPAYER WILL BENEFIT DRAMATICALLY FROM SUCH A CUT.

C. FEDERAL EXPENDITURES WERE ABOUT 22% OF GDP TODAY IN THE FIRST QUARTER OF 2003, AND ALL GOVT ABOUT 37%. THE TREND WILL DEPEND ON THE AGING OF THE POPULATION WITH MORE DEMAND FOR MEDICARE SERVICES, AMONG MANY FACTORS.

D. IN A MAJOR RECESSION THE BUDGET BALANCE WILL ALMOST CERTAINLY MOVE IN THE MINUS DIRECTION TOWARD A DEFICIT OR WORSE DEFICIT. THAT IS BECAUSE TAX REVENUES ARE STRONGLY PRO-CYCLICAL WHILE EXPENDITURES ARE COUNTER-CYCLICAL. THIS RELIABLE PATTERN MAKES US CONFIDENT OF OUR PREDICTION.

E. THE NATIONAL DEBT IS ABOUT $13,000 PER PERSON WHICH IS ABOUT 0.46 OF DISPOSABLE INCOME FOR ONE YEAR (28000, FIG. 5.9). THUS IT WOULD TAKE ABOUT 4.6 YEARS IF WE EACH DEVOTE 10% OF OUR INCOME TO THIS TASK.

F. MOST US STATES INCLUDING WASHINGTON STATE ARE PROHIBITED IN THEIR CONSTITUTION FROM FINANCING OPERATING EXPENSES BY TAKING DEBT. THIS HAS KEPT STATES FROM GETTING INTO THE SITUATION THAT THE FEDERAL GOVT IS IN. IN CONTRAST, THE CANADIAN PROVINCES HAVE NO SUCH RESTRICTIONS AND MANY ARE HEAVILY IN DEBT.

Exercises 10.2

A.   IT HAS EXPANDED ITS ROLE FROM THAT OF LARGELY NATIONAL DEFENSE TO BEING THE GUARANTOR OF INCOME SECURITY AND MEDICAL CARE, THE SOCIAL SAFETY NET.

B.   THE BABY BOOMERS, BORN BETWEEN 1945 AND 1965, WILL START TO RETIRE ABOUT 2010 AS THEY REACH 65. MEANWHILE, THE BIRTH DEARTHERS BORN AFTER 1965 WILL REPLACE THEM IN THE LABOR FORCE. IN ADDITION, PEOPLE ARE LIVING MUCH LONGER AND COLLECTING BENEFITS MUCH LONGER.

C.   OPTIONS INCLUDE RAISING THE PAYROLL TAX, MAKING BENEFITS PART OF TAXABLE INCOME (ALREADY PARTIALLY), RAISING THE RETIREMENT AGE, REDUCING BENEFITS, GREATER INCENTIVES FOR THE ELDERLY TO CONTINUE WORKING AND PAYING TAXES.

Exercises 10.3

A.   (1) WOULD RISE TO ABOUT THE RATE OF INCREASE OF MONEY LESS 3%.

(2) WOULD FALL TEMPORARILY BUT THEN INCREASE TO REFLECT THE INCREASED RATE OF INFLATION.

(3) WOULD FALL SINCE THE PURCHASING POWER OF THE FRANC IS STABLE BUT THE PURCHASING POWER OF THE DOLLAR WOULD BE FALLING.

(4) WOULD SHOW A TEMPORARY BOOM, BUT THEN SUBSIDE AFTER A PERIOD OF STAGFLATION TO AROUND 3% AGAIN.

Exercises from Chapter 11

Keynesian Fiscal Policy and the Multipliers

Exercises 11.1

A.   THE KENNEDY CUT WAS A KEYNESIAN CUT TO STIMULATE THE ECONOMY, THE REAGAN CUT WAS SUPPOSED TO INCREASE THE INCENTIVES TO WORK AND INVEST, AND CLINTON RAISED TAXES TO REDUCE THE DEFICIT RATHER THAN TO DEPRESS THE ECONOMY. G.W. BUSH CUT WAS SUPPOSED TO INCREASE INCOME AND JOB.

B.   THE IDEA WAS THAT FISCAL AND MONETARY POLICY COULD BE USED TO KEEP THE ECONOMY OPERATING CLOSE TO FULL EMPLOYMENT. NO ONE BELIEVES THAT FINE TUNING IS POSSIBLE TODAY.

C.   UNDER A PROGRESSIVE TAX, IF INCOME FALLS THERE IS A LARGE FALL IN TAX REVENUES BECAUSE PEOPLE FALL ONTO LOWER TAX BRACKETS. IF THERE WAS A LOWER SINGLE FLAT RATE THEN THE TAX OWED WOULD FALL BY A SMALLER % OF THE INCOME THAT IS LOST. THE STABILIZING EFFECT UNDER THE PROGRESSIVE STRUCTURE IS STRONGER BECAUSE IT PRODUCES A LARGER AUTOMATIC TAX CUT.

Exercises 11.2

A.   (1) .75
        (2) $1/(1-MPC) = 1/(1-.75) = 1/.25 = 4$
        (3) $[1/(1-MPC)]-1 = 4 - 1 = 3$
        OR IT CAN BE CALCULATED AS $MPC/(1-MPC) = .75/.25 = 3$

(4)   BECAUSE THE TWO SPENDING STREAMS DIFFER BY THE $1 OF ADDITIONAL GOV'T SPENDING THAT IS INCLUDED IN GDP WHEN GOV'T SPENDING RISES BY $1.

B.   YOU COULD INCREASE THE AMOUNT YOU SPEND, SAY BY BUYING A NEW BIKE, BY REDUCING YOUR SAVINGS, THEREBY SETTING OFF A STREAM OF ADDITIONAL EXPENDITURES IN THE ECONOMY EQUAL TO $(1 + MPC + MPC^2 + ETC)$ TIMES THE COST OF THE BIKE. YOU COULD PERFORM THE EQUIVALENT OF A TAX CUT BY FORGIVING SOME MONEY THAT SOMEONE OWES YOU, SAY YOUR FRIEND OWES YOU $20 AND YOU TELL THEM TO JUST FORGET IT. YOUR FRIEND WOULD THEN INCREASE HER SPENDING BY MPC SO WE WOULD HAVE A SPENDING STREAM OF $(MPC + MPC^2 + ETC)$ TIMES $20, JUST LIKE A TAX CUT.

Exercises 11.3

A.   SUPPOSE THAT THE APC OF THE US IS ABOUT .95. THAT IS WE SPEND ABOUT 95% OF OUR INCOMES ON CONSUMPTION GOODS AND SERVICES. IF THE MPC WERE ALSO .95 THE SPENDING MULTIPLIER WOULD BE 1/(1-.95) = 1/.05 = 20. THE TAX CUT MULTIPLIER IS ONE LESS, OR 20-1 = 19. IF THE APC=MPC WERE 0.99 THE SPENDING MULTIPLIER WOULD BE 100 ON THE ASSUMPTIONS OF THE KEYNESIAN MODEL.

B.   THE MPC IS .5 BECAUSE THAT IS THE INCREASE IN CONSUMPTION THAT RESULTS FROM $1 OF ADDITIONAL INCOME.

(2) PUTTING IN A ZERO FOR INCOME, y, WE HAVE c = $4,000.

(3) AT AN INCOME OF $10,000 THE FAMILY'S CONSUMPTION IS

$$c = \$4,000 + .5 \bullet \$10,000 = \$4,000 + \$5,000 = \$9,000$$

SO APC=0.9.

C.   (1) $30,000, THEIR EXPECTED AVERAGE INCOME IN THE FUTURE.

(2) .9 TIMES PERMANENT INCOME, OR .9 • $30,000 = $27,000.

(3) $1,000 HIGHER, OR $31,000 BECAUSE THEY HAD REVISED UPWARD THEIR ESTIMATE OF THEIR AVERAGE FUTURE INCOME.

(4) .9 OF PERMANENT INCOME, .9 • $31,000 = $27,900.

THEIR CONSUMPTION DEPENDS ONLY ON PERMANENT INCOME. CURRENT INCOME ONLY AFFECTS CURRENT CONSUMPTION IF IT LEADS TO A REVISION OF PERMANENT INCOME. IN THIS CASE,

$$C = 0.9 \bullet [30,000 + 0.1 \bullet (Y - 30,000)\ ]$$

Exercises 11.4

A.   THE MPC IS THE SLOPE OF THE CONSUMPTION FUNCTION, WHICH IS 0.5 IN THIS CASE. THAT IS THE CHANGE IN CONSUMPTION PER DOLLAR CHANGE IN INCOME, Y.

Y, DISPOSABLE INCOME, IS (GDP-T), SO WHEN GDP IS 7 AND T IS 1 WE HAVE Y = 7 - 1 = 6 TRILLION $.

NOW TO GET CONSUMPTION WE HAVE C = 2 + .5 • Y = 2 + .5 • (6) = 5; AND THE APC IS C DIVIDED BY Y, SO APC = C/Y = 5/6

G-T = 1.1 - 1 = .1; A $0.1 TRILLION DEFICIT.

B.   TAX CUT MULTIPLIER IS MPC/(1-MPC) = .5/(1-.5) = 1 WHICH WE CAN ALSO GET BY TAKING THE G MULTIPLIER, WHICH IS 2, AND SUBTRACTING ONE, GIVING 1.

THE NEW VALUE OF T IS 0.5, SO CONSUMPTION FUNCTION IS NOW

C = 2 + 0.5 • Y = 2 + 0.5 • (GDP-T) = 2 + 0.5 • (GDP - 0.5) = 1.75 + 0.5 • GDP

NOTE THAT THE INTERCEPT HAS INCREASED BY .25 FROM 1.5 TO 1.75. THAT MEANS THAT THE CONSUMPTION FUNCTION SHIFTS UPWARD BY THAT AMOUNT AT EVERY LEVEL OF GDP.

SINCE THE OTHER COMPONENTS OF AGGREGATE DEMAND DO NOT CHANGE IN THIS PROBLEM, THE UPWARD SHIFT IN AGGREGATE DEMAND WOULD ALSO BE BY THE AMOUNT 0.25 AT EVERY VALUE OF GDP.

THE FORMULA FOR GDP GIVES US:

GDP = (1/1-b)•(a + I + G +X) - (b/1-b)•T

GDP = 2 • (2 + 1 + 1.1 + (-.1)) - 1 • 0.5 = 8 - 0.5 = 7.5

THIS IS AN INCREASE IN GDP OF 0.5, WHICH SQUARES WITH A TAX CUT MULTIPLIER OF .5/1-.5 = 1 AND A TAX CUT OF .5.

GRAPHICALLY, AD SHIFTS UP BY HALF AS MUCH AS IT DID WHEN G WAS INCREASED IN FIG 11.2. THAT TELLS US THAT THE INTERSECTION OF AS AND AD MUST BE HALF WAY IN BETWEEN THE TWO INTERSECTIONS PORTRAYED IN FIG 11.2, SO IT IS AT A GDP OF $7.5 TRILLION, AN INCREASE OF $.5 TRILLION FROM THE TAX CUT.

AN INCREASE IN G OF $.5 TRILLION ADDS THAT MUCH TO AD DIRECTLY, IN ADDITION TO THE EFFECT THIS HAS ON CONSUMPTION. WHEN T IS CUT BY $.5 TRILLION, THERE IS ONLY THE EFFECT ON CONSUMPTION. THE DIFFERENCE IS $.5 TRILLION, AND THAT IS THE DIFFERENCE WE SEE IN THE EFFECTS OF THE TWO POLICIES ON GDP.

C.   WITH UNEMPLOYMENT AT 4.2% THE ECONOMY IS ALREADY AT FULL EMPLOYMENT. ADDITIONAL AGGREGATE DEMAND WOULD JUST RESULT IN A TEMPORARY INCREASE IN PRODUCTION AND EMPLOYMENT BUT QUICKLY GIVE WAY TO INFLATION. THUS THE ADDITIONAL ROAD CONSTRUCTION WOULD CROWD OUT OTHER KINDS OF GOODS AND SERVICES.   THAT MEANS THAT THERE WOULD BE MORE GOV'T

PURCHASES BUT LESS CONSUMPTION, INVESTMENT, OR NET EXPORTS.

Exercises from Chapter 12

The International Economy

Exercises 12.1

A.   WE HAVE THAT US$ 1 = ¥125.

SOLVING FOR ¥1 WE GET ¥1 = US$ 1/125 = US$0.008 = 0.8 US CENTS. THAT MEANS THAT ONE YEN COSTS US$ .008 OR 8/10 THS US CENTS.

B.   THE BRITISH POUND IS QUOTED AT, SAY, US$ 1.49.

SOLVING FOR US$1, US$ 1 = £1/1.49 = £0.79 OR 79 BRITISH PENCE.

C.   THE DEMAND FOR CANADIAN DOLLARS WILL BE REDUCED BECAUSE US UTILITIES WILL NOT NEED TO BUY AS MANY CANADIAN DOLLARS TO PAY FOR IMPORTED GAS FROM CANADA.

     REDUCED DEMAND FOR CANADIAN DOLLARS WILL MEAN THAT THE PRICE OF THE C$ IN TERMS OF US$ WILL FALL. SINCE THE PRICE OF THE US$ IN TERMS OF C$ IS THE INVERSE OR RECIPROCAL OF THAT, IT WILL RISE. IN OTHER WORDS, THE US$ WILL BECOME MORE COSTLY FOR CANADIANS.

Exercises 12.2

A.   THE DEMAND FOR RUBLES WILL RISE, SO THE VALUE OF THE RUBLE IN TERMS OF US$ WILL RISE.

     THE MORE VALUABLE RUBLE WOULD DISCOURAGE RUSSIAN EXPORTS BY MAKING THEM MORE EXPENSIVE, BUT ENCOURAGE IMPORTS TO RUSSIA BECAUSE THEY BECOME CHEAPER. RUSSIA'S BALANCE OF TRADE WILL THEREFORE MOVE IN THE DIRECTION OF A TRADE DEFICIT.

     SINCE THE TRADE BALANCE IS A MAJOR PART OF BALANCE ON CURRENT ACCOUNT, WE WOULD EXPECT IT TO ALSO MOVE TOWARDS A DEFICIT. THE BALANCE ON CURRENT ACCOUNT WILL REFLECT THE FACT THAT RUSSIA IS SELLING ASSETS TO FOREIGN INVESTORS, SO IT WILL MOVE TOWARD A SURPLUS.

     THE BALANCE OF PAYMENTS WILL STILL BE ZERO BECAUSE IT IS ALWAYS ZERO. RUSSIA WILL JUST BE EXPORTING MORE ASSETS AND IMPORTING MORE GOODS.

Exercises 12.3

A.   THEY WERE UNPLEASANTLY SURPRISED. THE REAL EXCHANGE RATE HAD CHANGED SO THAT THE US DOLLAR HAD FALLEN CONSIDERABLY IN TERMS OF THE DM. IN OTHER WORDS, THE PURCHASING POWER OF THE DOLLAR HAD FALLEN RELATIVE TO THE PURCHASING POWER OF THE DM.

FIGURE 12.3 SHOWS THAT THE REAL DM PER US$ EXCHANGE RATE HAD FALLEN SHARPLY BETWEEN 1984 AND 1988.

B. RECENTLY, REAL EXCHANGE RATE FOR US DOLLAR HAS DECREASED AGAINST ALL MAJOR CURRENCIES. IDEALLY, IT SHOULD INCREASE THE FOREIGN TOURISTS IN USA AND REDUCE THE AMERICAN TOURISTS ABROAD. BUT WE DID NOT SEE LARGE NUMBER OF FOREIGN TOURISTS IN USA. POSSIBLY THE UNFAVORABLE GLOBAL POLITICAL SITUATION WAS RESPONSIBLE FOR THAT.

Exercises 12.4

A.   THE FED WAS PUSHING US REAL INTEREST RATES DOWN AT THE SAME TIME THAT THE BUNDESBANK WAS PUSHING REAL INTEREST RATES IN GERMANY UP. THE DIFFERENTIAL BETWEEN THE REAL INTEREST RATE IN GERMANY AND THE REAL INTEREST RATE IN THE US WILL INCREASE. THIS MEANS THAT INVESTORS WILL WANT TO PURCHASE DM IN ORDER TO BUY RELATIVELY HIGH-YIELDING GERMAN ASSETS. THIS DEMAND FOR THE DM MARK WILL MAKE IT MORE VALUABLE AND THE US$ LESS VALUABLE, RESULTING IN THE US$ FALLING RELATIVE TO THE DM IN REAL TERMS.

B.   HAVING A COMMON CURRENCY REDUCES THE COST OF PERFORMING TRANSACTIONS AND SO INCREASES WELFARE. INDIVIDUAL COUNTRIES GIVE UP MONETARY POLICY THAT THEY COULD USE IN ORDER TO FIGHT A RECESSION.

Exercises 12.5

A.   NAFTA WAS HOTLY DEBATED DURING THE FALL OF 1993.

        IN 1994 WE HAD AGAIN BEEN MORE CONCERNED ABOUT OUR TRADE RELATIONS WITH JAPAN. OUR TRADE DEFICIT WITH JAPAN HAD CONTINUED TO BE VERY LARGE IN SPITE OF JAPAN'S PROMISES TO REDUCE IT. TALKS BETWEEN THE TWO COUNTRIES HAD BROKEN DOWN. THERE WAS TALK OF A "TRADE WAR" IN WHICH EACH COUNTRY ACTS TO LIMIT IMPORTS FROM THE OTHER.

        THE ADMISSION OF CHINA TO THE WORLD TRADE ORGANIZATION

(WTO) WAS ANOTHER HOTLY DEBATED ISSUE IN 1999-2000. IN LATE 1999, PROTESTERS PARTLY BLOCKED THE WTO MINISTERIAL MEETING IN SEATTLE.   MANY U.S. INTEREST GROUPS REPRESENTING SECTORS THAT ARE LESS EFFICIENT THAN THEIR INTERNATIONAL COUNTERPARTS OPPOSE INTERNATIONAL TRADE. ECONOMIC THEORY STRONGLY SUGGESTS THAT THE GAINS FROM INTERNATIONAL TRADE MORE THAN OUTWEIGH THE COSTS. SOME OPPONENTS OF TRADE ARGUE THAT POOR WORKING CONDITIONS IN LESS DEVELOPED NATIONS ARE CAUSED BY INTERNATIONAL TRADE. THEY IGNORE THAT IF THOSE COUNTRIES WERE NOT ALLOWED TO TRADE, LOCAL CONDITIONS WOULD BE EVEN WORSE.

B.   ISSUES BEING DISCUSSED: LIBERALIZATION OF AGRICULTURE TRADE IN EUROPE, REDUCING TARIFFS WORLDWIDE, INTERNATIONAL PROTECTION OF INTELLECTUAL PROPERTY RIGHTS. CRITICS ADVOCATE THAT ENVIRONMENTAL ISSUES ARE IGNORED BY THE WTO.