

Taxes

Taxes reduce aggregate demand. They take away funds that the household and business sectors could have spent.

Introduction

As soon as humans organized socially for defense, everyone had to contribute to feed the fearless leader. Thus, taxes were born.

There are two ways to pay taxes: directly or indirectly. Direct taxes are paid by the taxpayer directly to the government agency, i.e., cash, check, or credit card payable to the IRS, etc. Indirect taxes are sales taxes, excise taxes, business property taxes that are included in the price of the good or service that is purchased. Consequently in the final analysis, only people pay taxes, whether directly or indirectly. In this light some proposals to eliminate taxes on business income do not seem so ridiculous.

Taxes are assessed according to a tax rate times a tax base. $\text{Tax rate} * \text{tax base} = \text{Tax}$. If taxes are increasing, it could be due to an increase in the tax rate or an increase in the tax base. The most popular tax base is income, closely followed by sales and property value. Let's take the case of Joe property owner. The county appraiser's office has appraised Joe's property value at \$20,000. Local property taxes are assessed at 2%. Joe is assessed \$400 tax. If growth continues next year, the appraised value on his property may increase to \$25,000. Consequently taxes increase to \$500. Although the county didn't specifically increase taxes (i.e., the tax rate), it collects more taxes as the tax base, property values, has increased.

Occasionally, Congress will declare it is cutting taxes. As CPA's know, very often a tax cut is financed by expanding a tax base in another area. While income tax rates may decline slightly, more types of income are taxed, thereby expanding the tax base. Congress has to pay for its spending, so overall tax revenues may change little.

Taxes can also be classified by method of assessment. A tax based on percentage of value is called an ad valorem tax. This term is most often applied to real estate taxes, but a sales tax is an ad valorem tax also. A tax that collects a constant amount per unit is often called a unit tax or specific tax. Gasoline taxes, computed as so many cents per gallon, is an example of this.

Another type of tax worth mentioning is the value added tax. It is a tax levied on the value added by firms in the production process. For example, raw rubber sold to Dayton would be taxed the tires sold to Detroit are taxed and the car sold in Lakeland, Florida is taxed. The value added is the difference between the sale price and the purchase price. The final consumer does not know what percentage of the price can be attributed to taxes. It would take an army of accountants to figure out what each supplier and subsupplier paid and allocate taxes paid to that one unit of product. A 6% VAT could easily boost the final price by 20%. Value added taxes penalize consumption, therefore encouraging savings. Because lower income classes spend a higher percentage of their income on consumption, they spend a higher percentage on taxes. Thus VAT is a regressive tax. Note that businesses must pay this tax regardless of whether or not they are earning a profit. Many countries finance central government operations through the VAT. Americans traveling to these countries and purchasing certain items are eligible for a refund of a portion of the VAT since they shouldn't be expected to pay the equivalent of a foreign income tax.

Taxes by level of government

Each level of government seems to have a unique mix of financing. The Federal government relies on the personal income tax and social security tax (which is really another form of income tax when you think about it) to finance 80% of its needs. Corporate taxes supply approximately 8% and the

remainder are indirect and misc. taxes.

Is this fair? Consider the chart below outlining the distribution of National Income by Sector.

Components of National Income, 1997

\$ Billions

	\$	%
Compensation of Employees	4,448.5	72.3
Proprietor's Income	527.3	8.6
Corporate Profits	670.2	10.8
Rental Income	115.0	1.8
Interest	403.3	6.5
	6,146.2	100.0

Source: Survey of Current Business

Proprietor's Income is Schedule C of the 1040. It is the income earned on our private unincorporated businesses. In short, it is personal income. Add it to the compensation of employees and voila it equals approximately the percentage financing the Federal government. From this simple reality test it is hard to argue that businesses and individuals are not paying their share of taxes.

Comparative Government Revenue Sources, 1997

\$ Billions

	Federal	State and Local
Personal Income Taxes	769.1	219.9
Corporate Income Taxes	210.0	36.0
Sales and Excise Taxes	75.1	261.5
Property Taxes	0.0	209.1
Fees and Other	19.4	364.8
Total	1,719.9	1,094.3

Sources: Survey of Current Business

At the State level, there is considerably more variation in financing. Some states do not have personal income taxes. Those states that have personal income taxes have different rates. But taken as a whole, a pattern does tend to emerge. Sales and excise taxes constitute the bulk of revenues generated. Next comes corporate, then personal income taxes.

At the local level, again some variation exists. Although the vast bulk of funding is provided by property taxes, some jurisdictions also collect local sales and income taxes.

Why is there such a discrepancy among funding mixes? Part of the answer lies in the business cycle. One of the interesting patterns to emerge from studies of the business cycle is the observation that consumption does not vary as much as income. In other words, we engage in consumption smoothing. Which is to say that we try to maintain a constant standard of living, even as our income fluctuates up and down.

OK, so what you say! Consider again the main source of revenue for the Federal government, the income tax. It is also going to vary with the income over the business cycle. Federal expenditures, however, do not vary in lockstep with the business cycle. They can be relatively constant. That means there will be periods of deficits and surpluses. Balancing the budget is nearly impossible and not desirable if fiscal policy is to be used to smooth economic fluctuations. Of course, it is expected that surpluses and deficits will average zero. Remember the Federal government can run deficits, as it has the ability to repay debt by printing money. Chances of default are really low.

Now let's take a second look at state financing. States only have limited borrowing ability as they cannot print money. Consequently, any deficit would have to be short and small. In fact, many states

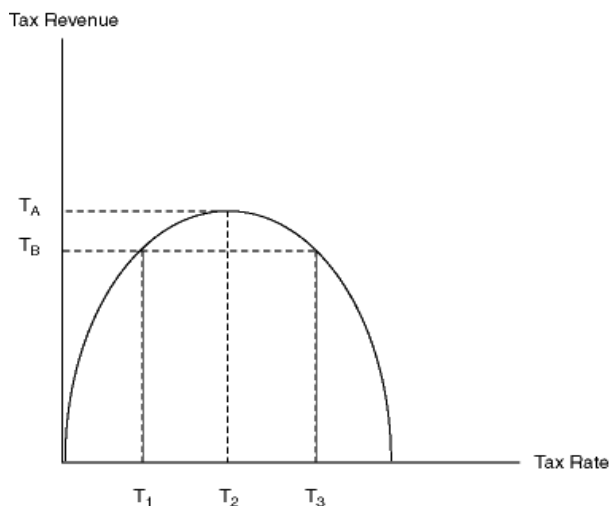
are required to maintain balanced budgets by their constitutions. State treasurers would like to have a tax that is easy to administer, collect, and does not vary as much as income during the business cycle. Sales taxes are the prime candidate. Unlike property taxes, appraisers and collectors are not needed to go from home to home. Businesses can easily collect and remit these taxes to their state government. Because sales taxes are based on consumption and consumption does not vary as much as income, variability in tax revenue is lessened

Consider an example of a local government, let's take the case of the school board. Expenditures for the school board are very constant and mostly labor, i.e., teachers. The administrator tells a teacher, "We have to cut your salary 5% this year because of poor tax collections. But we will give it back to you next year." Do you think the teachers will be happy? Do you think they believe all their salary will be restored? Would you? Only by collecting from a revenue source that doesn't vary with income can this situation be avoided. Property taxes work nicely. However, they have their problems. I leave this to you for further research.

The Laffer Curve

One issue that all governments face is, what should be the level of taxation? Can a government tax too much, such that the increased tax rates bring in less revenue? In that situation, would lowering the tax rate actually bring in more tax revenue? An economist by the name of Arthur B. Laffer has asserted exactly that. His arguments have been diagrammed into the Laffer Curve.

Figure 3.0



From figure 3.0, called the Laffer Curve, let's say the tax rate is currently T_3 , and tax revenues are T_B . By lowering the tax rate to T_2 tax revenues increase to T_A . But if tax rates are lowered from T_2 to T_1 , then tax revenues fall from T_A to T_B . Contrary to belief, lowering tax rates isn't always beneficial.

To understand the argument behind Laffer's idea, the relationship between tax rates, hours of work supplied, and tax revenue has to be understood. Under income taxation, for tax revenues to increase when tax rates are cut, labor hours worked must increase, and they must increase more than proportionally to the tax cut. An example would help. Let's say that at a tax rate of 30% and wage rate of \$20 per hour that 2,000 labor hours are supplied. That would generate \$12,000 in taxes. Let's cut the tax rate to 20%. To generate \$12,000 in taxes would require 3,000 labor hours supplied (\$12,000/\$4 tax paid per hour). That would be a 50% increase in labor hours supplied. In other words, the labor supply is very elastic

Tax Incidence

Who really pays the tax? This is called tax incidence. There are two views of tax incidence - statutory and economic. Statutory incidence is the legal assessment of the tax. For example, a \$1 dollar tax per pizza levied on pizzerias. Let's say the price of the pizza originally was \$10, if it increases to \$11 then although the tax was levied on producers, consumers pay the full amount of the tax, i.e. the economic incidence of the tax is on the consumers. In this way the producers have shifted the burden of the tax onto consumers. In fact we can define tax shifting as the difference between statutory and economic incidence. Is this tax shifting behavior necessarily bad? Remember that pizzerias must earn a normal rate of profit to attract producers, otherwise the supply of pizza would vanish (and this would be a tragedy of biblical proportions).

Do consumers always pay the full burden of the tax? Suppose the new price of pizza increased to \$10.75 rather than \$11. Consumers are paying .75 and producers .25 of this tax. The burden is now being shared. In supply and demand we work through this concept as an exercise. In the solution to that exercise quantity changes as well as price. Due to the law of demand consumers purchased less of the product. In itself this forces the pizzerias to absorb a loss. To the extent consumers pay taxes they have less to spend on aggregate consumption. Even in the best case where pizza consumption remains unaffected then less money is available to purchase other goods and services. To complete the analysis we would also need to consider the benefits of the government services financed by the tax. I will leave that to a course on public finance.

Tax Equity

What constitutes a fair tax? The reality is that we typically consider several factors when determining the fairness of a tax. We consider how it is spent, how much other people are paying, and how much we pay.

Benefits

When we consider how taxes are spent, we are asking what benefits are we receiving for that cost. However, we tend to evaluate taxes in terms of benefits that we receive. However, some benefits are not directly visible and may extend into the future. An example would be pollution control. Lower levels of emissions may not be visible. The personal benefit to us, a longer healthier life, while desirable, is not immediately felt. Some benefits do not accrue to us, at least directly. A social insurance program such as welfare seems to benefit other people. There are several points to consider. One, all of us have the chance to become ruined. Welfare is insurance against this destitution. In essence, taxes attributable to welfare expenditures can be considered to be an insurance premium.

Secondly, when people are destitute, they often resort to crime or drugs. A very expensive problem to you and society. Welfare helps to avoid this outcome. Instead of losing property, life, or peace of mind, we gain continued participation in the economic system by the formerly destitute. That provides jobs for all of us.

Finally, one of the objectives of welfare is to put able bodied people back to work. Which means they earn income, pay taxes, and replace the welfare expenditures they spent.

Because of the complexities in establishing and estimating benefits, it is common for them to be excluded from analysis and discussion of tax effects.

Horizontal Equity

Many people believe that individuals earning the same income should pay the same amount in taxes, this is the concept of horizontal equity. When special exemptions and certain types of income receive special tax breaks then two people earning the same income may not be paying the same amount in tax. If capital gains income is taxed at a lower rate then someone who earns a higher level of income from

capital pays lower taxes. The person who pays higher taxes because of a higher portion of labor income may not be happy. In the United States capital gain tax rates are lower than the general income tax rate.

Vertical Equity

Vertical equity is conceptually more difficult to evaluate. Vertical equity is the tax burden up and down income classes. This often translates into the ability to pay.

Ability to Pay

Taxation based on ability to pay has a problem in measuring ability to pay. How much more should those that have higher incomes pay? Some people argue that everyone should pay their "fair share." What does that mean? Split taxes equally? Consider the opposite base taxes on an inability to pay. Not only does that sound ridiculous but government would not be able to finance its operations. There is no simple answer.

One possibility in measuring ability to pay is to consider whether the tax is regressive or progressive. To do this we calculate the average tax rate. It is defined as Tax/Income. Taxes are regressive if the average tax rate increases for lower income levels. Taxes are progressive if the average tax rate increases for high income levels. If the average tax rate remains constant then the tax is said to be proportional, this is also known as a flat tax by many politicians.

	Income	Consumption	Tax	Average Tax Rate
Pipi	\$100,000	20,000	2,000	2.0%
Coko	\$10,000	1,000	100	1.0%

To illustrate the concept of progressive and regressive taxes consider two individuals, Pipi (a Pepsi drinker) and Coko (a Coke drinker), Pipi earns \$100,000 while Coko earns \$10,000. Florida imposes a 10% fuel tax. Pipi consumes \$20,000, Coko \$1,000. When tax is computed as a percent of income, Pipi has 2% to Coko's 1%. We say the burden of tax falls more on Pipi but Pipi's income is also higher. This is an example of a progressive tax. Pipi has more ability to pay and does.

The 10% fuel tax is a marginal tax rate. For every dollar change in fuel consumption, .10 in additional tax is paid. Usually the marginal tax rate is computed as the change in tax divided by the change in income. For example, if the tax changes \$15,000 as an additional \$100,000 is earned as income then the marginal tax rate equals $\$15,000/\$100,000 = 15\%$. Consequently at a marginal tax rate of 30% an additional income of \$40,000 would generate an additional \$12,000 in taxes. As seen above and will be calculated later, the marginal tax rate does not have to equal the average tax rate.

Impact of tax structure

What about sales taxes, progressive or not? Sales taxes are really a form of a consumption tax. Although consumption increases as income rises, savings rises at a faster rate. Consequently, many sales taxes are regressive. One of the reasons Florida does not tax food is that it is a very regressive tax. Why tax food for the poor only to pay it out in additional food stamps?

What about income taxes? By design the federal income tax is progressive. Even if the marginal tax rate is constant, the effect can be that of a progressive income tax when standard deductions and exemptions are allowed. Currently most types of income are taxable, on the tax return they are summed to equal gross income. To this adjustments are made such as IRA contributions and other deductions to arrive at adjusted gross income. From adjusted gross income is subtracted exemptions and a standard deduction (or itemized deductions, if taken) to arrive at taxable income. From which a tax is computed and tax credits are subtracted to equal total tax.

Let's differentiate between a tax deduction and a tax credit. A tax deduction is subtracted from gross income to arrive at taxable income. A tax rate is multiplied by taxable income to calculate tax. From

this "gross" tax is subtracted tax credits to equal the net tax due, otherwise known as the tax liability. A \$1,000 tax credit reduces a \$5,000 tax to \$4,000. A \$1,000 tax deduction, at a 20% marginal tax rate, reduces the tax liability by \$200, from \$5,000 to \$4,800. At a marginal tax rate of 40%, a \$1,000 tax deduction reduces taxes by \$400. The higher the marginal tax rate the more valuable the tax deduction. With a progressive income tax structure, tax deductions hold less value for the lower income classes than for higher income tax payers. Marginal tax rates do not affect tax credits.

Currently, taxpayers have a choice of taking a standard deduction or itemizing deductions. Over 70% of tax returns use the standard deduction. Itemization and tax credit rules are incredibly complex thanks to the many special interest groups and Congress. Even the IRS has a difficult time interpreting the law. While CPA's and tax software companies publicly complain about this complexity, privately they rejoice at the new business.

Reconsider our earlier example of Pipi and Coko. Let's say that a \$7,000 exemption exists and that the marginal tax rate is 15%. To show the progressivity of the tax system, we need to calculate the average tax rate (tax/income).

	Pipi	Coko
Income	\$100,000	\$10,000
Exemptions	7,000	7,000
Taxable Income	93,000	3,000
Tax 15%	13,950	450
Average Tax Rate	13.95%	4.50%
After Tax Income	\$86,050	\$9,550

The tax burden is lighter for Coko because of the 4.5%. As income increases the average tax rate approaches 15% but can never exceed it. One other point needs to be made here. Although Coko pays only 4.5% of his income in taxes, it may be more difficult for Coko to pay it than for Pipi to pay it. To merely maintain a decent standard of living, it may take every dollar of Coko's \$10,000 leaving very little to pay taxes. Yet there is a sense that everyone should pay according to their ability to pay regardless of income status and that the tax burden is fairly distributed among the different abilities to pay. This concept is called vertical equity.

Let's expand on this point. Is a "flat" tax fair or even desirable? A very common type of proposal by political candidates advocates a constant percent applied to all income. It is often presented as a tax simplification idea. Fill in a postcard and send it in to the IRS with your tax payment. Paying taxes will be easier and everyone will benefit, but will they?

Consider a 20% tax, this would very roughly approximate the tax needed to support our current government. Again let's use Pipi and Coko as an example.

	Pipi	Coko
Income	\$100,000	\$10,000
Tax (20%)	20,000	2,000
After tax income	80,000	8,000

It does look simpler, doesn't it? But wait, the government has determined the poverty level for a single person to be around \$14,000! So for someone in poverty another \$2,000 are going to be taken in taxes. If the government has income assistance or welfare programs it may need to pay out an additional \$2,000. If there is no government assistance Coko will be in more misery and may resort to stealing if a second job or source of income is not found.

Some modifications have been proposed to this flat tax by adding exemptions so that lower income classes have less of a tax burden. To recover this lost tax revenue the tax rate must be increased 1% to

5%.

There are other problems with this "simple" tax structure. What is considered income? Are fringe benefits included, income from the sale of assets, gifts,...etc? If costs are incurred to produce that income then shouldn't they be deductible? Which of them are legitimate? How much of your housing expense is deductible if your business is run out of your home? Can you keep a set of books? This is basic accounting and it is not a common skill nor is it necessarily easy to acquire. Clearly then for many people, particularly those who own investments and run their own businesses, this format cannot work.

In the United States as taxable income increases, the tax rate to which it is subject increases. Marginal tax rates are not constant. Tax rates range from 15% to 37%. Special provisions in the tax code such as depreciation recapture, minimum alternative tax regulations, limitations on capital losses and loss carryforwards make the computation of taxes very complex. Consequently, the effective marginal rate may be very different than that printed in the tables. Let's calculate a marginal tax rate. Suppose that increasing Pipi's income from \$100,000 to \$150,000 causes the income tax liability to increase from \$13,950 to \$23,950. The marginal tax rate is calculated as the change in tax divided by the change in income: $(23,950 - 13,950) / (150,000 - 100,000) = 20\%$.

Tax Efficiency

Taxes cause us to change consumption and savings patterns. Often (if not always) the loss of welfare (due to decreased consumption) from the imposition of the tax exceeds the tax revenue collected. In the public finance literature, this is called excess burden. If the welfare generated by the government expenditures exceeds this impact then the tax may be justified. Analysis of tax impact is complex as it must take into account secondary effects as well as the direct impact of lost purchasing power. For example, let's say that a tax is assessed on beer. Not only the loss of consumption utility (happiness) to beer drinkers must be accounted for, but also the loss to producers of hops who now may switch production to wheat which drives down wheat prices thereby imposing a loss to existing wheat farmers that also must be accounted for. An efficient tax minimizes these types of problems. Another issue, is minimizing the administrative cost of collection of taxes. The point here, is to devise a tax system that minimizes these disturbances balanced against our desire for fairness while fulfilling the major role of taxation, to finance government operations. A detailed description of these analytics is beyond the scope of this course.

Taxes and Inflation

There is yet another aspect of taxation to be explored, the effect on taxes by inflation. This is illustrated below. Let's posit a typical taxpayer and name her JQ Public. Year 1's income is \$20,000. Let's say taxes are calculated from the following rate table.

Income Level	Average Tax Rate	
Below 30,000	10%	
30,000	20%	
35,000	30%	
40,000 & above	40%	
Year	1	2
J Q Public: Income	\$20,000	\$40,000
Taxes	2,000	16,000
After Tax Income	18,000	24,000
Gov't: Revenue	2,000	16,000
Expenditures	2,000	4,000
Surplus (Deficit)	0	12,000

Year 1 JP pays \$2,000 leaving take home income of \$18,000. The government receives \$2,000 and spends it. Between years one and two the price level doubles causing JP's income to double to \$40,000 as does JP's expenses to \$36,000 in order to maintain the same standard of living. But wait, JP's tax bill doesn't double to \$4,000, it increases eight times to \$16,000. To pay these taxes JP may face a lower standard of living.

JQ Public suffers from bracket creep Higher income moves JP up the rate chart. It wasn't a real income increase however as his purchasing power would only have remained the same if it were not for taxes. The solution is to index the tax rate tables to inflation. This removes the incentive for government to engage in inflationary policies. Fiscal drag is present here. As JP moves up the rate table, purchasing power (aggregate demand) is being removed from the economy since the government is not spending the surplus, thus preventing the economy from reaching full employment.

One last point before we leave the subject of taxes, the cost-benefit principle applies here. Taxes finance operations and programs. Those services provide real benefits. To cut taxes means that services must be cut. Just cutting taxes does not make government more efficient! (In fact, sometimes it becomes more inefficient when you cut capital expenditures for computerization.)

Let's talk about the bottom line, are we overtaxed in the United States? Compare relative tax rates among the industrialized countries and you will find that the US tax rates are quite favorable. My personal belief is that while there is room for improvement (such as simplification of the tax code), we do not seem to be that far from where we should be.