A Primer on Real Estate and the Aggregate Economy: Know Your Macro Indicators

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Comments Appreciated

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I first drafted a simple version of this teaching note around 1992, inspired by a presentation by my colleague in UW's Economics Department, Don Nichols. Since then it's grown. While the current version has something like 60 charts and tables, every time I pick it up I think of 10 charts that would be useful to add or some discussion to expand. But not today! Despite the 30 or 40 charts I left out, if you read this note you'll know more about the stylized facts of the U.S. economy than 90 percent of the professionals in the real estate industry. (A secret – you'll know more than some economists!) I suggest you keep this on your shelf next to your copy of Morris Davis' *Macroeconomics for MBAs*.

I revise this teaching note every semester or two, so comments and criticisms are particularly welcome.

Thanks to Morris Davis, and many students in Real Estate 720 and other classes, for comments and discussion. They are not responsible for remaining errors.

Contents

I. Introduction

The purpose of this teaching note is to explore how real estate fits into the aggregate economy. In many respects this handout complements your macro text by Morris Davis, especially his Chapter 1. There are many interesting and important questions that arise regarding the effects of real estate markets on the aggregate or macro economy, and vice versa, for example:

* What is the effect of increasing (or decreasing) housing and real estate wealth on consumption and the overall economy?

* How do changes in interest rates (or other "macro" variables) affect real estate markets?

* What role does real estate play in the development and maintenance of a strong financial system? How do flows of funds affect real estate markets, in turn?[1]

* To what extent are changes in the economic outlook capitalized into the value of land and real estate?

* Does the form of ownership affect the economy? For example, are homeowners in some sense more (or less) productive than others? Do corporations improve their bottom line when they improve the management of their real estate assets?

* How do real estate and labor markets interact? Do higher housing prices reduce regional growth in employment? Are higher housing costs partially or fully passed through to higher wages? How "progressive" or "regressive" is the impact of rising housing prices and rents on low income households?

Fully answering these and many other questions related to real estate and the macroeconomy would require a book, at least. Because this is an introductory note, after some preliminary definitions and concepts, we focus on some flow accounting basics, namely:

* How do we decompose the aggregate economy into its main components?

* How does real estate fit into Gross Domestic Product (GDP), the most basic "flow" measure of the economy?

* What role does real estate investment play in recessions, and recovery from the same?

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[1] Clearly, events of the past decade have many lessons about how *not* to organize real estate and its finance; about which more in other handouts.

* How does employment, another important driver of real estate performance, behave over the business cycle?

We also tackle some "stock" topics, including:

* Describe some of the basic stock data on the national capital stock, including human capital, real estate, and other capital like equipment and durable goods.

* Review briefly concepts introduced in Davis (2009), including the aggregate production function, and how me measure labor and total factor productivity; and how these map into incomes.

* We then look at credit markets, interest rates, and inflation.

Let me make something very clear:

This teaching note is not a textbook on macroeconomics!

This teaching note is not an economic forecast, or an "outlook paper!"

Rather, this teaching note is primarily about the data, and its interpretation. It is intended to complement macro textbooks; and it can make the reader a more informed consumer of forecasts. While theory plays an important role in interpreting the data, in this note theory is mostly "off-stage." We do provide references to some of the relevant theory behind our discussion at the end of the note. Overall, Morris Davis' *Macroeconomics for MBAs and Masters of Finance* is a great place to start.

You'll also notice that in this note we're all about describing the nature of the data, and past patterns and relationships. We don't have a whole lot to say in this note about forecasting. Some things are easier to forecast than others. I'd rather bet on my 5 year forecast of U.S. population than my 5 year forecast of mortgage interest rates. Nevertheless, understanding the nature and properties of the data, as we do here, is a necessary precondition for any forecasting exercise.[2]

With only a few exceptions, our discussion in this teaching note will focus on national aggregates. Much of the rest of the course will very much take a more disaggregated look at the economy, by regions, states, metro areas, central cities/suburbs, countries and

[2] There is no shortage of interesting forecasts available. Among those I regularly consult are those by UW Economics' Don Nichols, our own David Shulman, and the annual real estate and economic outlooks by Principal and by Price Waterhouse Coopers.

occasionally census tracts or zip codes. But this note sets the stage for that work with the aggregate picture.

This teaching note begins with some preliminaries on things like periodicity, seasonal adjustment, real versus nominal variables, some time series jargon, and the difference between stocks and flows. The next major section discusses a few demographic facts that underpin the aggregate economy. Section IV is in some ways the heart of the paper, which explores the key national income identity, Y = C + I + G + (X-M). Section V examines employment. Section VI. Examines productivity and incomes. Section VII presents some interesting observations on credit and financial markets. The teaching note concludes with some final remarks and an annotated reading list.

II. Some Preliminaries

Basic Data Types

There are three basic kinds of quantitative data. Data can be categorical, ordinal, or cardinal.

Categorical data are just that – categories. I'll reserve this term for a particular type of category, in which there is no inherent ranking. For example, racial and ethnic groups are categories; property types; males and females, etc.

Ordinal data are categories that can be *unambiguously ranked*. If you receive an A in this class, you have done better than someone who received a B. How much better is at least somewhat fuzzy.

Cardinal data imply both a ranking, and a distance. Someone who received $100 received $10 more than someone who received $90. The "distance" between $20 and $30 is also $10, which is the same increase in purchasing power. Cardinal variables are based on more-or-less continuous scales. I say more or less because in most cases real world "continuous" data is not completely continuous. If we measure money amounts in dollars and cents, but don't measure fractions of a penny, we're not strictly operating with continuous data, in the purest mathematical sense. But we're close enough to continuity for our purposes.[3]

Cardinal measures can be further subdivided into *interval* and *ratio* measures. Interval measures can be compared by subtraction, but not in ratios. For example, if it was 20

[3] As you read this, you're probably thinking of your first calculus course, where you learned that calculus can only be applied to continuous variables. In economics, when we use calculus to figure out the optimal decision, we're assuming the thing we're studying – profits, utility, etc. – can be reasonably represented as a continuous function. There are mathematical techniques, like axiomatic set theory, that can be brought to bear when continuity can't be assumed. But we won't often worry about that in this course.

degrees Fahrenheit one day and 40 days another, we can say that the second day was 20 degrees warmer -- but we couldn't say it was twice as warm, or any other statement regarding ratios. Ratio variables can be compared by subtraction and division, i.e. by a ratio. Generally monetary measures are ratio measures, e.g. we can say $40 is $20 more than $20, and we can also say $40 is twice $20.

Most – not all! – of the variables we examine in this handout are reasonably assumed continuous, and cardinal. Most will work as ratios.

Basic Transformations

When we want to examine a variable, we often transform the data in some way. Among common transformations we can use, especially with the time series data that we will focus on in this handout, we can:

-- Deflate the data (from current dollars, to constant dollars, i.e. from nominal to real measures).

-- Take logarithms.

-- Difference the data, or compute percentage changes.

-- Compute a ratio (rent-to-house price, or taxes as a fraction of GDP, for example).

-- Smooth the data with a moving average process.

This does not exhaust the possibilities, of course.

It is worth noting that it is rarely the case that there is one, and only one, transformation or "functional form" of the data that makes sense. Generally there is value in examining several transformations of the data, in order to see it in different lights.

One particular set of transformations allows us to go back and forth between "stocks" and "flows," and to this important topic we now turn.

Stocks and Flows

In economics and general, and national income accounting in particular, "stock" variables are measures of "what's out there," and in particular there is no time signature attached to a stock variable. "Flow" variables have such a time signature, i.e. they are periodic.

Examples of flow variables are rent (per month? per year?), income (per month? per year?), or dividends (per quarter?). Examples of stock variables are the value of a property, someone's net worth, or the market value of a stock or a bond. A balance sheet is a stock concept; an income statement is a flow concept. In Real Estate 715 you will ponder deeply the relationship between real estate flows (NOI) and stocks (asset prices).

In fact, stock and flow variables are related, as the examples just given suggest. The value of a share of common stock is the present value of its expected dividends. Wealth, a stock variable, yields income, a flow variable. One way of thinking about the stock of real estate is that it is the cumulative value of past investment; and that investment is a flow variable that (along with depreciation, another flow variable) tells us how the stock is changing. More formally,

$$K_t = K_{t-1} + I_t - d(K_{t-1})$$

where K is the capital stock,
I is the flow of investment (e.g. construction put in place)
d is the rate of depreciation of capital (including abandonment)
and t is an index of time (year, month, quarter or whatever).

Other familiar examples of flow data include housing starts, building permits, construction put in place, or completions; or F.W. Dodge data on contracts. Familiar examples and sources of stock data: include the Bureau of Economic Analysis (BEA's) Fixed Reproducible Tangible Wealth data, studies by Miles; Hartzell and colleagues, and Malpezzi, Shilling & Yang.

The stock of capital comprises, in its broadest form, three distinct types; each contributes to the economy's productivity in its own way. *Tangible capital* refers to things that produce other things or services (e.g. real estate, machine tools, computers, cars and trucks, etc.). *Human capital* is embodied in people; it comprises our skills, knowledge and education. *Financial capital* comprises instruments like stocks and bonds, promissory notes, and other contracts that are the claims on the output (income) from tangible and human capital.[4]

[4] Note *that* in a simple *static* view of the world, it's tangible and human capital that we use to create income, and financial instruments can be viewed as a set of rules for the initial allocation of the income from that capital. But taking a *dynamic* view of the world, over time a well functioning capital market actually improves the efficiency of tangible and human capital, and thus is also directly productive. See Demirguc-Kunt and Levine (1996), Fry (1988), and World Bank (1989).

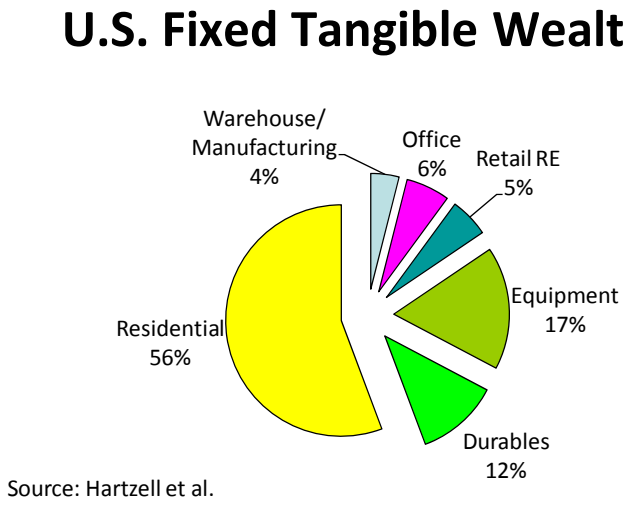

Figure 1

Figure 1, from Malpezzi, Shilling and Yang (2001) but based on original study by Hartzell *et al*., examines the *stock* of real estate capital. Note that over half the tangible capital in the U.S. economy comprises housing; another 15 percent is commercial real estate (office, retail, industrial buildings and so on). In dollar terms, estimates vary, but a recent BEA estimate of current tangible assets in the U.S. suggests that we have about $37 trillion in real estate ($11 trillion in private nonresidential, $17 trillion in private residential, and $9 trillion in government real estate), and $11 trillion in other tangible wealth.

Periodicity

The first thing to remember about data is that, like other goods, more is preferred to less. Fifty years of data can tell us a lot more than 20, much less 10. That's particularly true of real estate markets, in which cycles are often long, given the durability of the good and the time it takes to develop. We'll discuss that at several points during the semester, but for now simply note the fact.

It must be admitted that data are like other goods, in that you can have too much of a good thing. Ever have a little too much chocolate cake? Or beer?[5] We are often faced with too

[5] Or worse, too much chocolate cake *and* beer. Ask me about my grad school micro professor's favorite example of unusual utility functions, where each good is "good" by itself, but are "bads" when combined.

much data, as opposed to information. Analysis – this course – is largely about turning data into information.

In addition to duration, we need to think about the periodicity of the data. Is the data provided on an annual, quarterly, monthly, daily, or some other basis? A lot of basic national income accounts data (e.g. GDP) come quarterly; so do the most-used data on commercial real estate prices, and most metropolitan level housing prices. Most basic employment data are readily available on a monthly basis, as are national house prices. Interest rates are readily available on a daily basis. At the other extreme, detailed data on government budgeting are usually presented on an annual basis.

Suppose you want to match up (say) quarterly national income account data with monthly employment data? Do you know how to convert one period to another?

If you are going to use quarters as your "unit of observation," then it's easy to convert the monthly series to quarterly. First, figure out whether the series are expressed in their "native" months or quarters, or are expressed in annual rates. Second, consider how to aggregate the monthly data. Do you average, sum, or exponentiate them? For example, if the monthly employment data you are converting to quarters are "seasonally adjusted at annual rates," you'd average January, February and March to obtain the first quarter measure. If the data were not seasonally adjusted, [6] you'd add them. [7]

If you have a lot of data to "compress" in this way, it can be convenient to use Excel's Pivot Tables to average or sum monthly data to annual, i.e. from a higher periodicity to a lower one.

Going the other way, say from quarterly to monthly, requires some interpolation. How do we do this? We can use linear interpolation, or perhaps a constant growth rate.

If you are going from a lower periodicity to a higher one, and have a number of interpolations to perform, it can be convenient to write a VBA function in Excel's macro language to perform the calculations. If time permits I'll present a brief demonstration in class.

Seasonal Adjustment

When we look at one month (or quarter) of data and compare it to the previous period, we often wish to somehow account for regular and fairly predictable changes due to seasonality. For example, it wouldn't be terribly informative to announce that retail sales were lower in

[6] Don't know what seasonal adjustment means? Read about it later in this section, then re-read this discussion.
[7] If the higher periodicity data are percentage changes, adding gives an approximation; because of compounding, a more precise answer requires multiplication. Example: suppose you have four quarters, growing at 2%, 2%, 4%, and 4%, respectively. The approximate annual growth is 12%. The exact answer is (1.02)(1.02)(1.04)(1.04)-1 = 12.53%.

January than in the previous month. Well, duh. In the U.S. holiday shopping creates strong seasonality in retail sales. Weather affects construction – more new houses are started in May than in February for obvious reasons (at least in Wisconsin).

Many time series, then come two ways – seasonally adjusted (usually expressed at annual rates), or not seasonally adjusted. Figure 2 illustrates with the aforementioned retail sales.[8] The seasonal pattern is obvious, with unadjusted sales spiking hugely every December, and collapsing the following January.

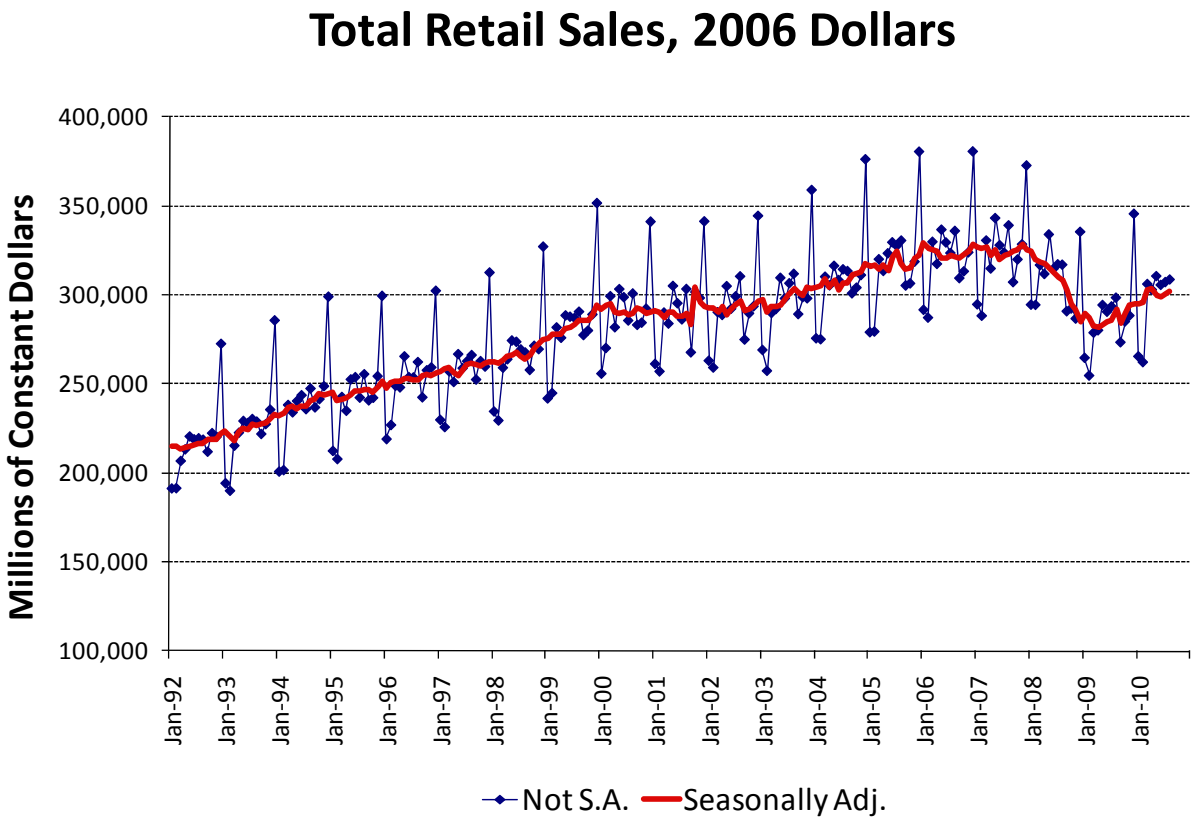

Figure 2

How are the seasonal adjustments calculated? A simple way is to regress the data against 11 dummy variables representing months – 11, not 12, since the omitted month would be captured in the intercept term. Suppose that January is the omitted month – then the February coefficient measures the average increase (or decrease) in the variable for Februaries, compared to Januaries. The March coefficient measures the average for March,

[8] Data are total retail sales, including autos but excluding food services, from the *Monthly Retail Trade and Food Services* report, http://www.census.gov/retail/ and are deflated using the CPI.

relative again to January, and so on. These coefficients can then be used to adjust the raw data for seasonal effects.

Some problems do present themselves, for example if the scale of the variable is changing over time (as is the case with sales, above), or also if seasonal patterns slowly change over time, the simple dummy variable method won't work well. In fact, the statisticians at Census and Bureau of Economic Analysis who prepare our monthly accounts use somewhat more complex algorithms given rather fanciful names like X-11, or X-12 ARIMA. We won't go into further details here, except to note these algorithms are freely available on the web or built into advanced statistical software like SAS or eViews.

There are some other data transformations that provide some kind of smoothing of the data, e.g. the use of moving averages, or presenting monthly data as changes since the same month in the previous year. We'll discuss those in class as they come up.

Often, when monthly or quarterly data are presented as seasonally adjusted, they are often (but not always!) presented as *seasonally adjusted at annual rates*. This SAAR presentation is particularly prevalent for data presented in monetary amounts (e.g. retail sales) but also for housing permits, housing starts, etc. Data on employment and often seasonally adjusted but *not* annualized. The important point is to know which way a particular series is presented.

Inflation Adjustment

Real, or nominal? When working with time series data expressed in dollars, almost always the first step economists take is to strip out the effects of background inflation. We often do the same for interest rates and other variables.

While economists often focus on "real" values of time series data, in many cases real estate professionals stick to nominal data. Often, in fact, we need to look at both. For example, consider mortgage rates. A 6 percent mortgage during 2 percent inflation is a very different deal than a 6 percent mortgage with 5 percent expected inflation. So for many analyses, we want to strip out expected inflation. But most U.S. mortgage contacts are written in nominal terms, not real; so it's very relevant to examine nominal rates as well, as we'll discuss in class.

A subtle but very important issue is that many of our key variables in real estate are forward looking. If we buy a building today, or take out a mortgage contract today, we need to think about expected inflation in the future. How the market forms these expectations, how we form our own individual expectations, and how we measure or "operationalize" expectations about future economic variables are important and sometimes slippery issues that we will discuss elsewhere in RE 720, and briefly in the next section. But it's hard to overstate the importance of thinking hard and clearly about expectations.

Don't confuse the following! Inflation measures changes in the general price level. Changes in relative prices are about what happens when the price of (housing, oil, kumquats) rises relative to other goods and services.

Which specific index should we use to measure general inflation? There are a number of possibilities. The best known is the Consumer Price Index (CPI) but there are other candidates, notably the GDP deflator, as well as the Wholesale Price Index (WPI). Each – CPI, GDP Deflator, and WPI – also has components for major categories of the economy.

As you know, price indexes like the CPI or GDP deflator are usually presented as an index number, where some base period (say, 2005) equals 100. Suppose that inflation runs 10 percent per year for the next two years. Then the index number for 2006 would be 110, and for 2007, 121. Conversely, if you didn't know the ratio in percentages, but were given the index numbers, you'd simply compute the percentage changes in the index.

If your original nominal variable was itself a percentage, and inflation was modest (under 10 percent, say) we'd simply subtract the inflation rate from the nominal rate to get the real rate. This is called the Fisher equation, after Irving Fisher, a famous economist of the 1920s.

If your raw variable was in dollars, you would rebase your prices index so that the base period was 1.0 (not 100) and then divide the nominal data by the new index to obtain real, inflation-adjusted data.

Ex ante real rates are before the fact, our forward looking expectations. *Ex post* rates are after the face, what actually happened. Remember expectations – if we subtract (say) 2009's inflation rate from 2009's Treasury bill rate, we clearly have the ex post real rate, since T-bills are short term paper. If we were looking at 30 year fixed mortgage rates we should subtract expected inflation over the expected duration of the mortgage. As already noted, measuring expected inflation is not a simple problem. This would be a good place to give a very brief discussion of several ways we can model expectations, i.e. how we can get some estimate of ex ante values of a variable.

Expectations

Myopic expectations are the simplest. As the name implies, we're "blind" to everything except that which right in front of us: we use today's value as our forecast of future values. It may seem silly, but in fact it's used from time to time, as when some analysts use today's "spot" inflation rate to forecast future inflation rates.[9] "It's 3 percent today; we'll assume it will remain at 3 percent going forward. "

[9] In this section we're discussing expectations about inflation, but we will use the same concepts to think about expectations in any forward-looking variable, e.g. real rates, net operating income, vacancy rates, cap rates, asset prices, etc.

Perfect foresight is also simple: we assume that we have a perfect ability to forecast the variable, so we can take ex post rates, which are observable after the fact, and then assume that's what the market must have forecast.

Adaptive expectations is based on the idea that we form expectations about the future by looking at recent past values. One simple way to operationalize adaptive expectations is to assume a certain moving average process for a variable.

Rational expectations is a little more complex. The basic idea behind rational expectations is that markets are "informationally efficient", i.e. that agents' predictions are not systematically wrong, i.e. that prediction errors are random. This means rational markets are efficient. There are several variations on the theme; they are often framed as different ways of thinking about market efficiency.

> *Strong-form efficiency* claims that expectations (and hence prices) in a market reflect all relevant information, more or less instantaneously; this is useful as a benchmark concept but is hardly supported in practice. (If markets are "strong-form efficient" there can be no insider information, for example.)
>
> *Semi-strong form efficient markets* are those in which expectations and prices reflect all public information. There is nothing in past data that can be used to predict future prices, and any new public information is instantaneously (or at least rapidly) incorporated. Analysis of fundamentals and/or trends ("technical analysis") will not yield risk-adjusted excess returns.
>
> Information is costly to gather and to analyze correctly. *Weak-form efficient markets* are those in which market participants optimize their use of information, i.e. they incur the costs of information collection and analysis up to the point where they can expect to earn a return equal to the information costs. Weak-form efficiency would suggest that innovations in superior data and/or analytic techniques could (emphasize could) yield excess returns, at least until the rest of the market caught up.

There's much to learn about expectations, here we offer just a few observations.

First, the different approaches to thinking about expectations are not necessarily mutually exclusive. For example, it is possible that an adaptive expectations approach is the most efficient way to forecast a series, i.e. an adaptive expectations model may (emphasize may) also be rational.

Second, expectations are *critical* to thinking about real estate, or any asset market. The value of any asset is a discounted stream of *expected* cash flows.

Third, even if a market is statistically forecastable, it may not be inefficient; it matters "how forecastable," relative to the transactions costs of engaging in arbitrage. That is, we can only realize excess returns on such a forecast if the costs of the necessary trades are small relative to the initial measured excess returns. Another subtle point is that the *existence* of high transactions costs can also be viewed as the *reason* a series is forecastable -- if real estate markets were cheap and easy to trade in, the forecastability documented by Case and Shiller and many thereafter, would disappear.

Researchers in finance still debate whether (say) the U.S. stock market is efficient; see, for example Fama (1970), Shiller (1981), De Bondt and Thaler (1985), Lo and MacKinlay (1988) Summers (1986), Fama (1998). Many studies have suggested that real estate markets are not efficient; see Case and Shiller (1989), Clayton (1998), Gatzlaff and Tirtiroglu (1995).

Which Measure of Inflation?

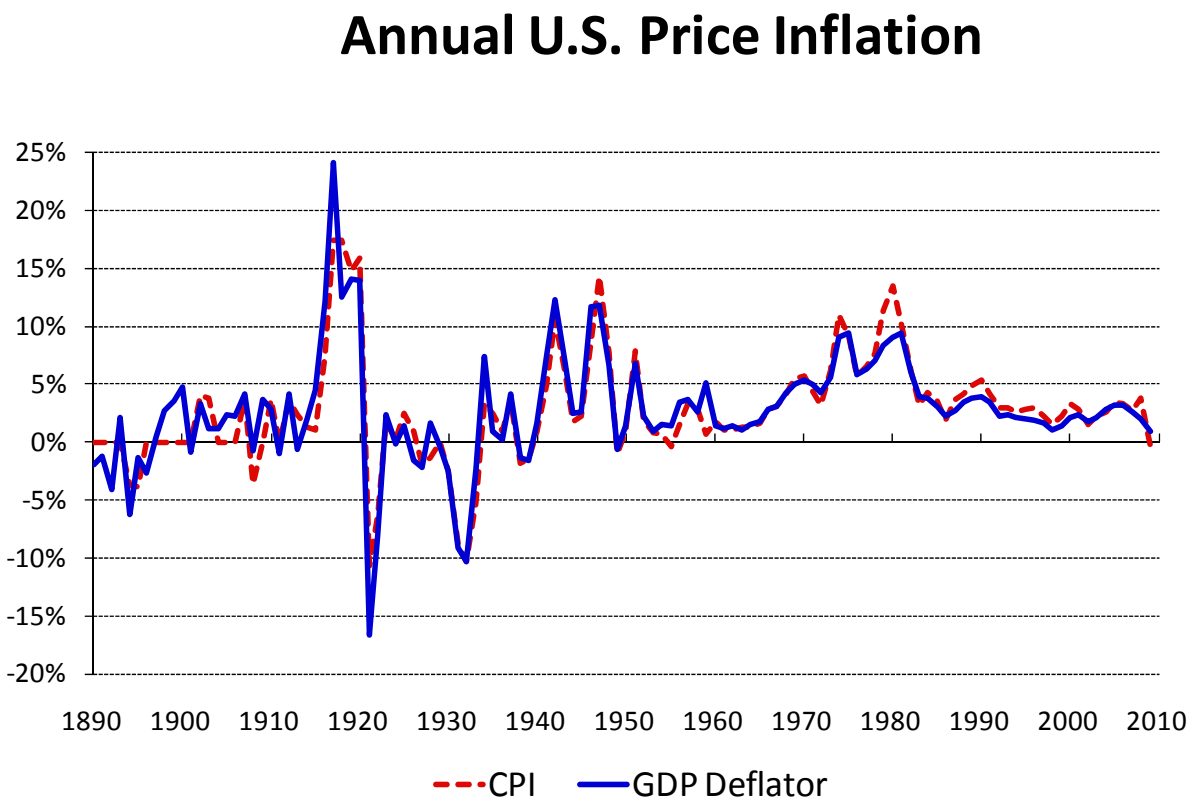

Figure 3

Which price index? GDP implicit price deflator, or CPI?[10] I'm a fan of the GDP deflator, because it's such a broad index, and often use it as my basic tool. For short time spans, it may not make too much difference. Figure 3 compares the change in the two indexes, i.e. the inflation rate, using annual data back to 1890.[11] Certainly they track each other, although in recent years the CPI has been running higher than the GDP deflator. (Note: since the GDP deflator is *quarterly*, if we want to deflate a *monthly* series we'll often us the CPI, which is available monthly; for annual data, obviously either one will work).

When we analyze a longer time span, the choice of index is more critical, since small changes (if they aren't "mean reverting" to some common underlying figure) can make a big difference cumulatively. Figure 4 presents the two indexes, the CPI and the GDP deflator, as index levels, re-based so that the 1960 starting point equals 100. Forty years later, the GDP-based index number stands at 585, while the CPI index is substantially higher, at 725.

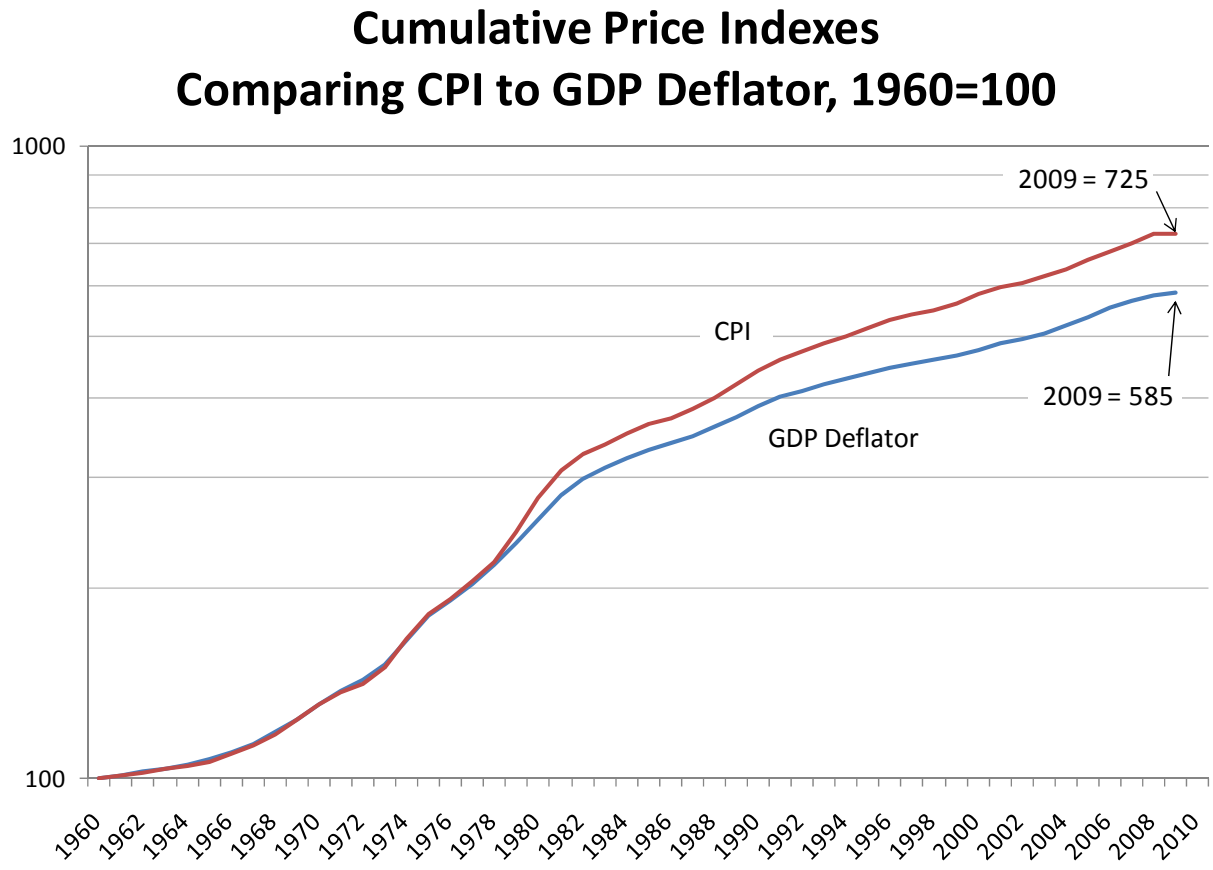

Figure 4

[10] The basic source for the quarterly GDP deflators is http://www.bea.gov ; for monthly CPI, see http://www.bls.gov .

[11] Basic sources of very long run historical data include various editions of *Historical Statistics of the United States*. See details in the references section at the end of this teaching note.

While I've been favoring the GDP deflator for some years as my bread-and-butter price index (at least for deflating quarterly or annual data), recently I've been giving consideration to another candidate, namely the (similarly named) Deflator for Gross Domestic *Purchases*. Gross domestic product, of course, includes exports and excludes imports, by definition. But if we're thinking of the goods and services we'd like to use as a proper basis for a broad domestic price index, we'd exclude exports and include imports, which is exactly what the index for Gross Domestic *Purchases* does. In a future edition, I'll have more to say about this alternative index.

Core Inflation

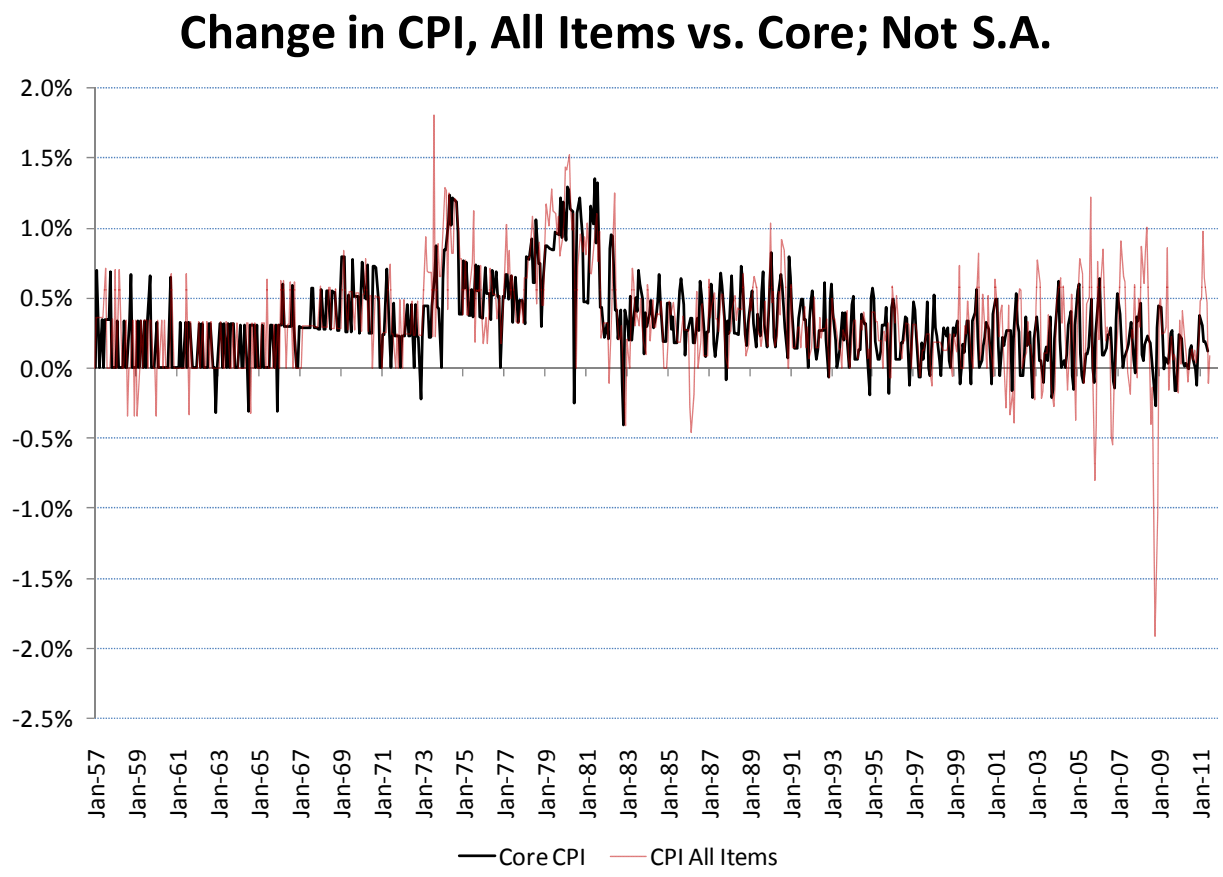

Figure 5

Another concept you need to understand is "core inflation." This is most commonly presented in the context of the CPI. Within the CPI, food and energy are often the most volatile components; but they tend to be mean reverting, specifically they tend to revert back

to the level of the rest of the CPI. So some analysts look at the CPI with food and energy stripped out. Figure 5 presents monthly changes in the all-item CPI, and the "core CPI," i.e. all items less food and energy. The pattern in the 60s is somewhat mystifying; I suspect it may be due to rounding error in the earlier, smaller numbers. But you can see that over the past three decades the data do seem broadly constant until the mean reversion hypothesis. Nevertheless, I suggest you use the core CPI data with care, if you use them at all.

A Little "Time Series" Statistical Jargon

Jargon can be annoying, but has its advantages: it is shorthand that helps us express somewhat complicated ideas in just a few words. Understanding time series jargon, and more importantly the ideas behind the jargon, helps us get more out of our data. "It's not what we don't know that hurts us, as much as the stuff we know that isn't true." There are formal tests for these properties, but in this class we'll focus on the intuition behind these tasks, thinking about how to think about our data. Sometimes in class I will report the results of formal tests, but we won't delve into that literature directly.

Random walk. Consider a series of independent coin flips. Suppose that you started out walking, took three steps, then flipped a coin. Heads, turn right, and walk three steps. Tails, turn left, and walk three steps. Repeat, over and over. Your path would follow a random walk. Many (not all!) tests suggest that U.S. stock price changes approximately follow a random walk. We can also consider a random walk that also trends up over time. We call a random walk that also includes a trend, a "random walk with drift."

Serial correlation. If data follow a random walk, a move up (or down) in one period gives no clue to the next move. What if a move up tends to be followed by another move up, and a move down tends to be followed by another move down? That's positive serial correlation. If a move up tends to be followed by a move down; and a move down tends to be followed by a move up, the data exhibit negative serial correlation. Clearly, data that are serially correlated are not random walks.

Mean reversion. If there is a tendency for data to hover around a particular value over time, we say it's "mean reverting." If present, what goes up does come down. Some would argue that, say, cap rates are mean reverting – that for a particular property type, under "normal" economic conditions, cap rates tend to some natural value (let's say for a given property type, 7 percent). Then, if mean reversion holds, and we have a hot market, with cap rates at 5, we can expect some future increase, as mean reversion takes hold. If in a real estate recession cap rates are at 10, we can expect better times ahead. Of course, one question is whether the series truly is mean reverting, but a second important question then immediately follows: when? Mean reversion over – a year? A decade?

You can think of a trend as a simple moving average. Data can also be mean reverting to a regularly shifting mean. We can call that "trend reverting."

Stationarity: a stationary series is produced by a process that isn't changing. A stationary series will be mean reverting, and exhibit constant variance. Random walks are by definition not stationary.

Cointegration: variables moving together. Mean reverting data aren't generally random walks, of course. But you can have two random walks that move together, if they have some connecting function (See "A Drunk and Her Dog," Michael Murray). We call two (or several) such series "cointegrated."

One more thing that you already know that you should always remember: correlation does not prove causality.

Pulling it All Together: Tips and Traps When Evaluating Data and Charts

Whether you are looking at someone else's chart, or evaluating your own work before turning it into a client, here's a checklist of some of the things to look for:

-- What's the basis source of the data? Is it credible? Is the source clearly labeled, can this chart be replicated?

-- Is this variable a stock or a flow?

-- Is it presented in real or nominal terms (or in some appropriate ratio)?

-- What's the periodicity? Is that appropriate to the purpose at hand? If it's (say) quarterly or monthly data, is it seasonally adjusted? Should it be?

-- Are data transformations used appropriately? For example, if it's a long run, growing, series, are we looking at percentage changes, or is it scaled logarithmically? Do the data look like they might be "stationary" or at least "trend stationary?" If not, could a simple transformation do better?

-- How many observations are presented? How does this compare to the available data? If the chart only presents recent data, or a few observations, might that obscure true patterns or relationships?

-- Is there anything special about starting and end points of the data? For example, employment data for 20 years that starts in a recession and ends in an expansion will look fairly different than data for a similar period that starts near a peak and ends in a recession. If an index number, what's the base year?

III. Demographic Basics

"Demographics is destiny," according to the old saw. Perhaps that's an overstatement, but it's still very fundamental, to understanding the economy in general and real estate markets in particular.

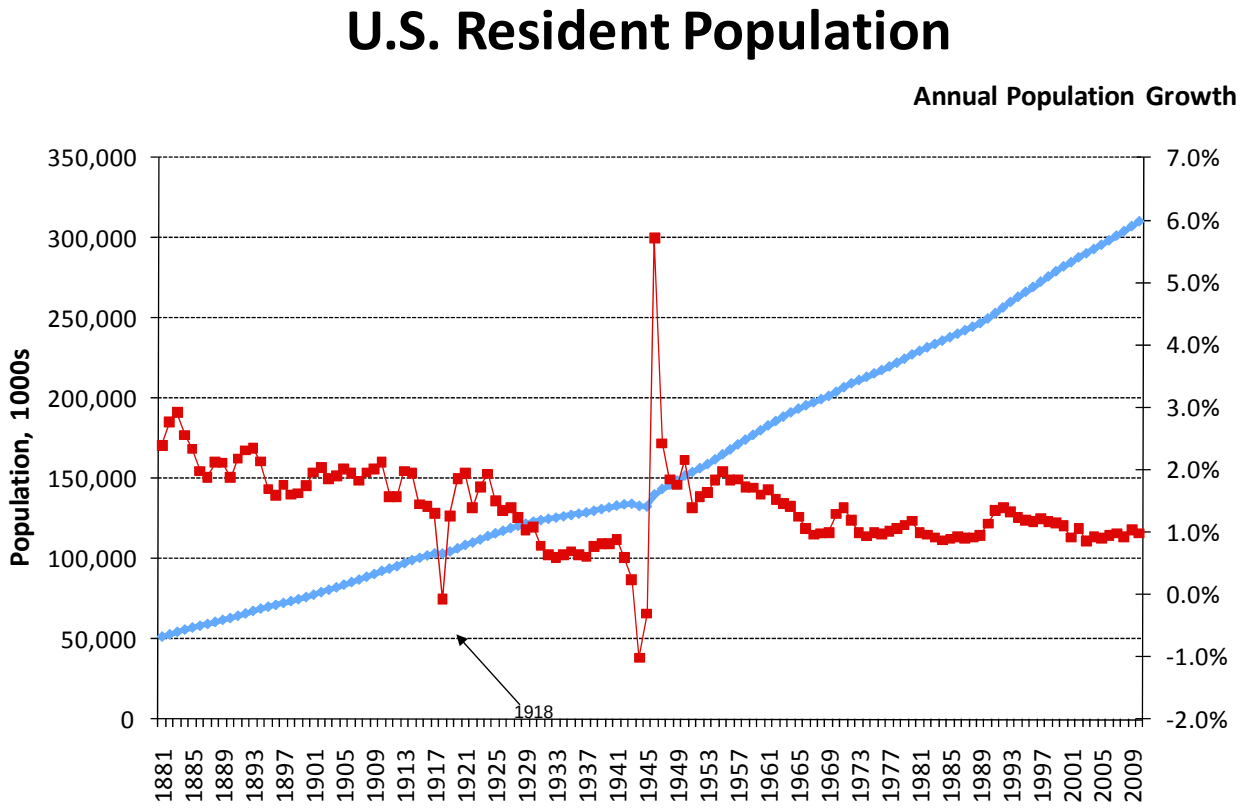

Figure 6

U.S. resident population has been growing at just about 1 percent per year for some time (Figure 6). This is in contrast to a number of other developed countries in Europe, Japan, that are growing slowly if at all. For example, Germany and Italy's growth rate is near zero, Japan's just a shade above (0.2 percent per year); France is about 0.6 percent per year (about the same as China!). The U.S. is growing at about the same rate as (wait for it!) Mexico.

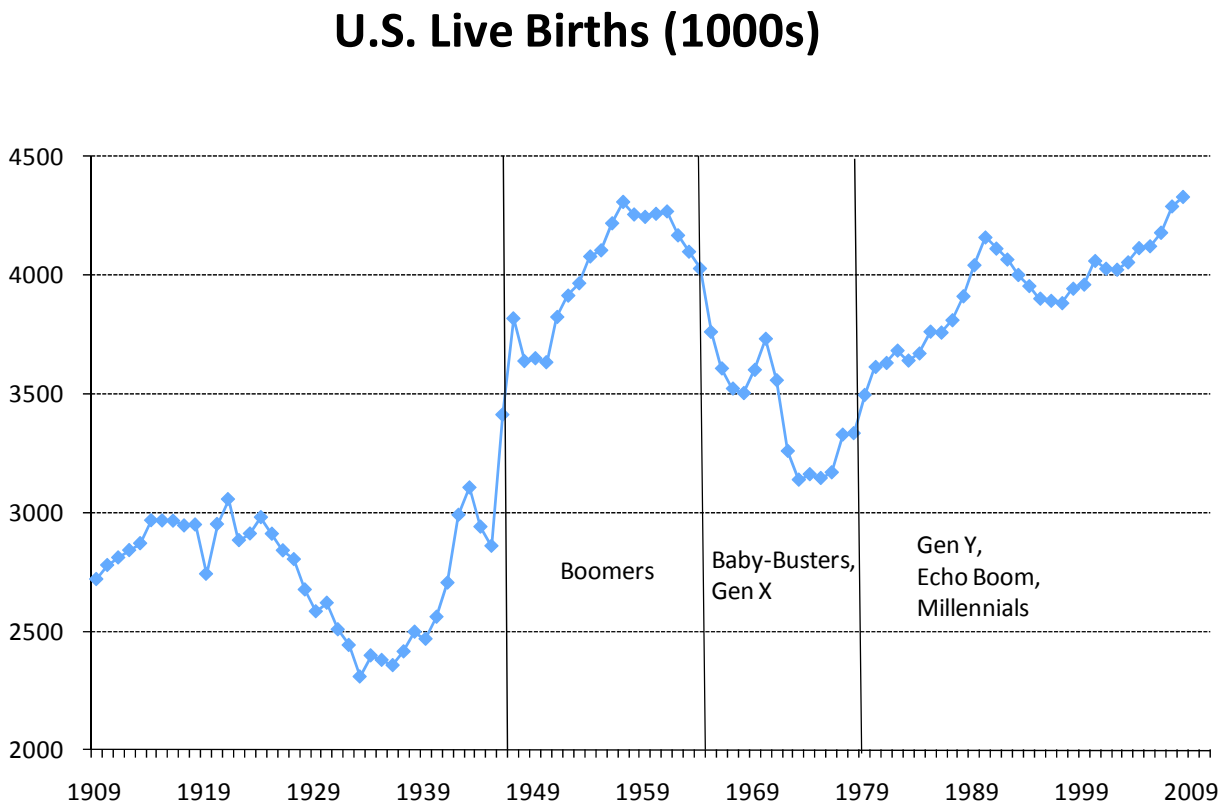

Figure 7

Figure 7 shows the generational patterns in U.S. births. Oddly enough, there is no "official" or universally accepted definition of a "baby boomer," or a "baby buster," or an "echo boomer." After reviewing several sources, for our purposes I've more or less arbitrarily set the age of the Boomers from 1946 to 1964; of Gen X from 1965 to 1978. Gen Y starts in 1979. Notice that he recent groups have several names (I've only included those printable in a family-friendly teaching note here).

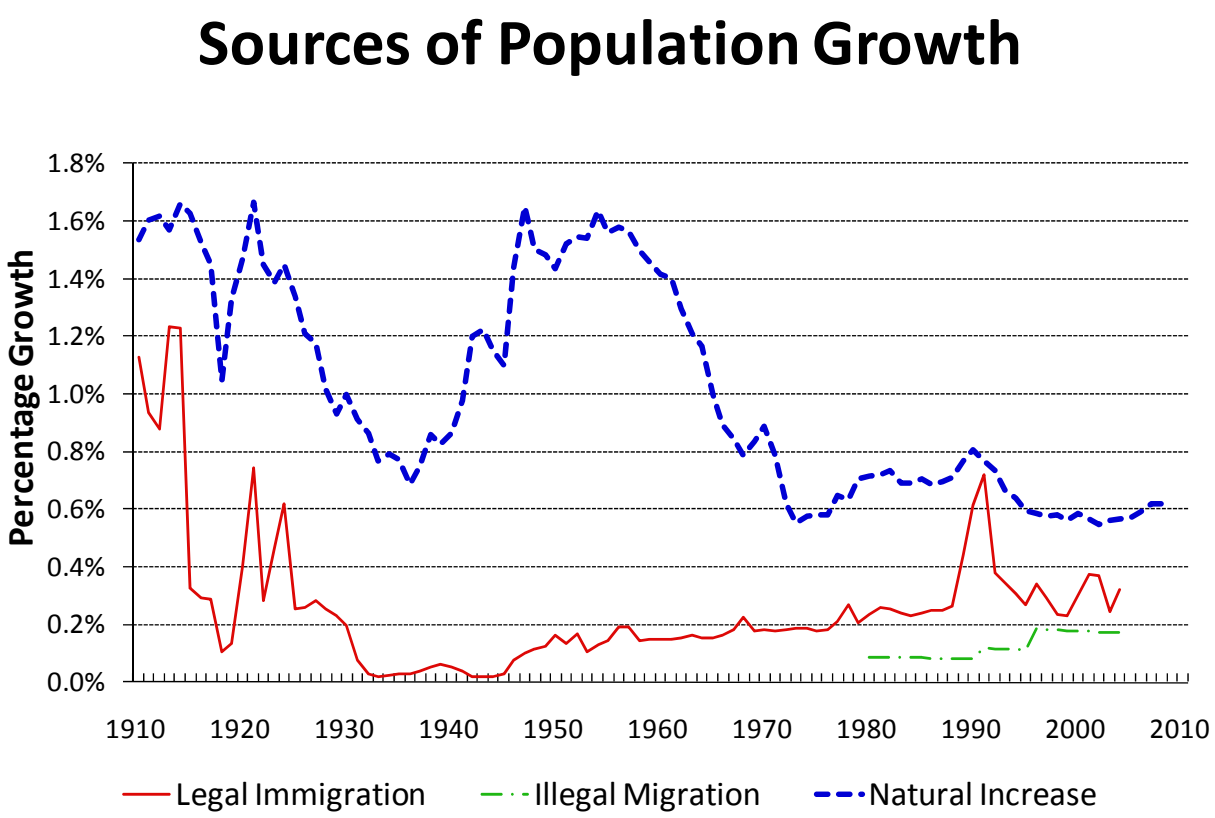

Figure 8

Recently about half of U.S. growth has been immigration (legal plus illegal), as Figure 8 shows. Notice the spike in legal immigration in 1992, when a one-time (so far!) amnesty for certain illegal immigrants was put into effect. Also, it's interesting to note – though not shown in the chart – that our recent natural increase is in no small part due to the higher fertility of residents who are first or second generation immigrants.

Among "developed" (rich) countries, the U.S. has one of the most dynamic processes of demographic growth; U.S. birth rates are among the highest, there is substantial immigration, and a number of studies find that (in contrast to popular perception), the typical U.S. immigrant is a "position NPV project " for the U.S. economy. On average, immigrants pay more in taxes than they consume in government service; immigrants, on average, have somewhat higher levels of education that the general population; and immigrants are more likely to start a new businesses. They can be modest, but it is also worth noting that of technology and engineering startups between 1995 and 2005, a quarter have at least one immigrant founder, and over half of Silicon Valley startups were started by immigrants.

We often take demographic shifts as 'exogenous', or logically prior to and uncaused by events in the housing market. But there is evidence that at least to some degree, housing prices and

availability can affect demographic processes like household formation, although it is not usually argued that housing markets are the most important causes of demographic shifts.

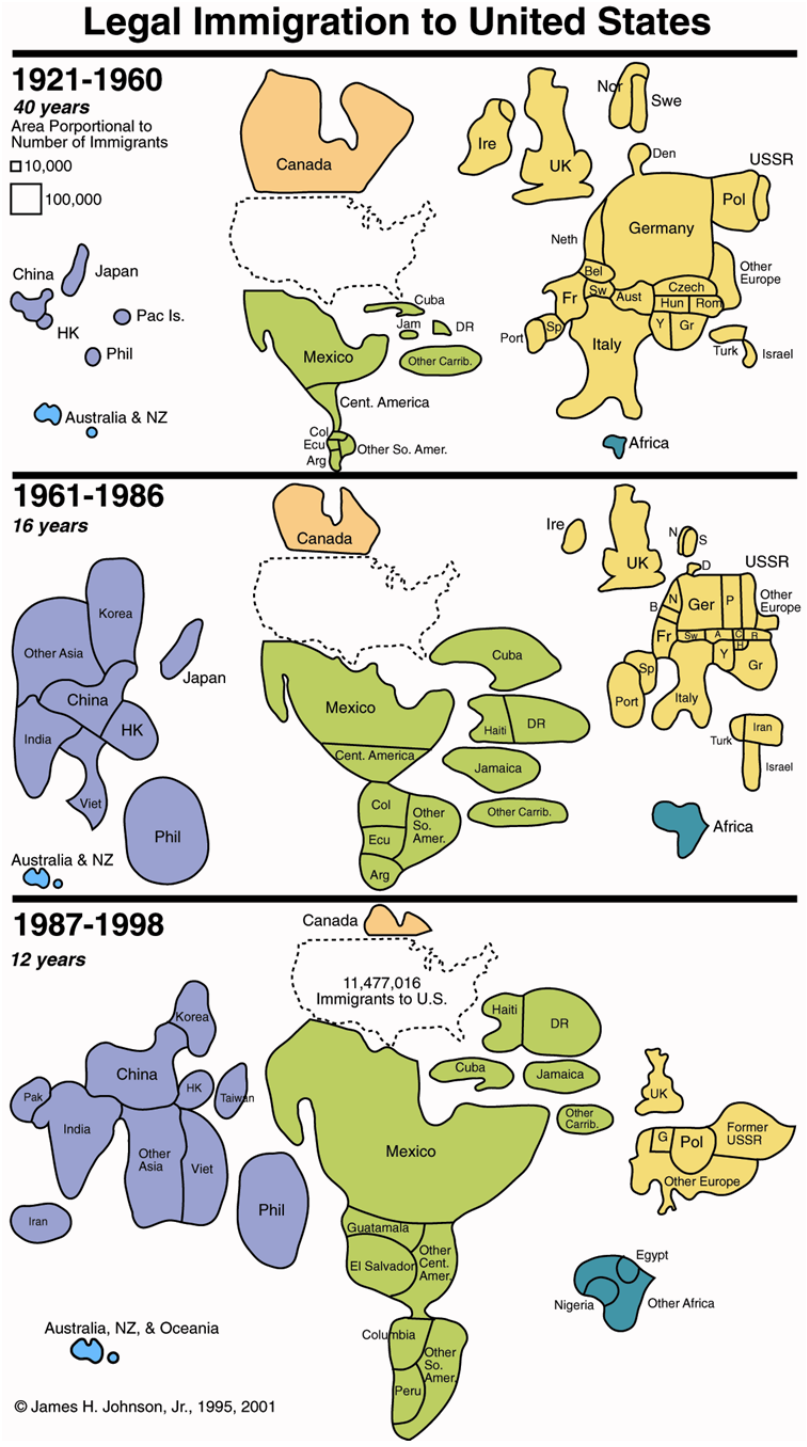

Figure 9

Figure 9, from an unpublished presentation by Professor James H. Johnson of the University of North Carolina, shows how the composition of immigration has shifted over roughly the last century, from a broad split among Europe, Canada and Mexico between the World Wars; to today's pattern, where immigration is dominated first by Mexico and other Latin American sources; and half a dozen Asian countries.

Broad Racial and Ethnic Trends

How we define race is a complicated issue that hasn't gotten any simpler in recent decades; that's largely because what used to pass for simplicity was really a set of huge misconceptions, e.g. beliefs that "race" was a hard-and-fast genetically based concept, when it's really much more slippery (Marshall1998; Collins 2004; Lorde and Wooding 2004); declining self-identification with traditional groupings (Lee and Bean 2004); and making changes in official Census definitions, that better, if still imperfectly, reflect reality, but which make data comparisons over time more difficult (Grieco and Cassidy 2001; Krieger 2000). To make an analogy that doesn't do justice to the relative importance of the two phenomena, methodologically bankrupt b-school rankings still have "real" effects on student applications, fundraising and the like; common views of what it means to be "black" or "white" don't stand up to scientific scrutiny, but that doesn't make the effects of racial segregation and discrimination any less real. [12]

U.S. Population, 1990 and Census Middle Series Projections

							Annual
	1990			**2050**			**Growth**
White	188,601	75.6%		207,901	52.8%		0.2%
Black	29,374	11.8%		53,555	13.6%		1.0%
Hispanic	22,549	9.0%		96,508	24.5%		2.5%
Indian	1,802	0.7%		3,534	0.9%		1.1%
Asian	7,076	2.8%		32,432	8.2%		2.6%
Total	249,402	100.0%		393,930	100.0%		0.8%
Hispanics can be of any race. Other categories exclude Hispanics.							

Figure 10

[12] Blank, Dabady and Citro (2004) presents an overview of racial segregation and discrimination in the U.S. For evidence on recent, perhaps more subtle, discrimination in the labor market, see Bertrand and Mullainathan (2004). Green and Malpezzi (2003) review literature on racial issues in housing and mortgage markets.

Having noted these serious difficulties, we'll nevertheless present data based on Census' parsing of race and ethnicity. The central point of Figure 10 is that, partly because of immigration, and partly because of differential fertility levels, the "white" population, as identified by Census, is growing very slowly; while the most commonly analyzed racial and ethnic minorities – black, Asian, and Hispanic – are growing faster, with Hispanics growing fastest.

Population Pyramids

Population pyramids provide a very useful look at the age distribution of population, and can be used to compare cities, states, countries, and other cross-section units, as well as over time. Figures 11 through 14 present U.S. pyramids for 1975 and 2000, as well as Census projections for 2025 and 2050.

Population pyramids are actually two horizontal bar charts, side by side, of the male and female population; each bar represents an age category (newborn to 5 years old, 5 to 9, 10 to 15, and so on).[13]

These figures are called pyramids because in early days they looked like pyramids, with lots of children at the base, and few old people. Many developing countries still look like this, more or less, though there are exceptions (China, for example has a very different pattern because of its rapid demographic shift in the past several decades, partly due to their one-child policy). "Developed" countries tend to have less "pyramid" as their age distribution of population tends towards older people.

Even a cursory glance at Figures 11-14 reveals many interesting patterns. First, since the horizontal scales are held constant, the larger total area of the bars represents the growth in total population, from about 216 million in 1975, to 282 million in 2000, to a forecast of 350 million in 2025 and 420 million in 2050. Second, you can see the "pig in the python" that is the baby boomer generation, most clearly as youths in 1975 and less clearly as middle age circa 2000.

You can also see the growth in retirees over time but in some respects the most startling change is the large increase in numbers of people over 80, which grows from less than 5 million in 1975, to 9 million in 2000, to 16 million in 2025 and 34 million in 2050.[14]

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[13] If you are creating your own population pyramids in Excel, the simple trick is to express male population (the one on the left side) as a negative number in the spreadsheet; then suppress the negative sign when formatting the legend for the horizontal axis.

[14] At one time, like you, I considered people in their 60s as "old." Currently I reserve that adjective for those about 80 and up. Check with me in 2030 and I'll let you know if my thinking has evolved further.

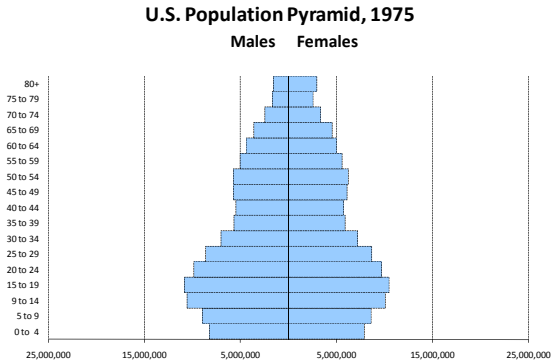


Figure 11

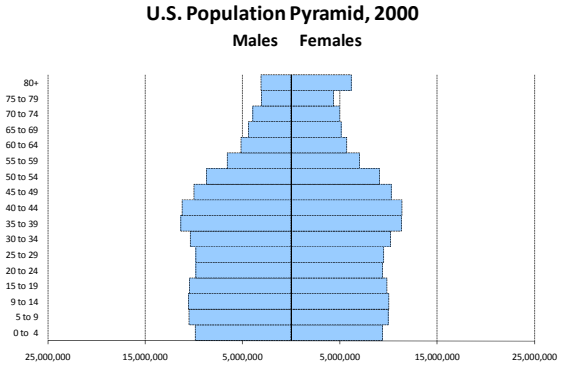


Figure 12

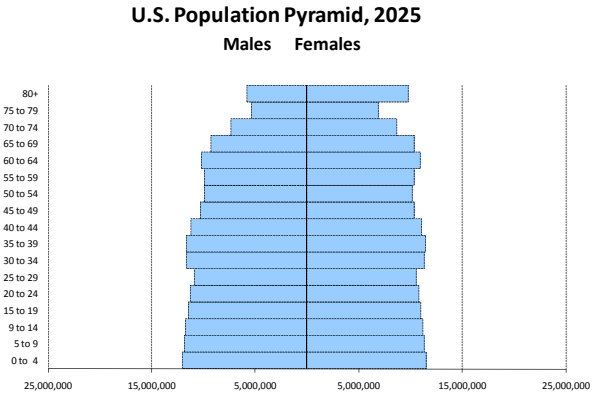


Figure 13

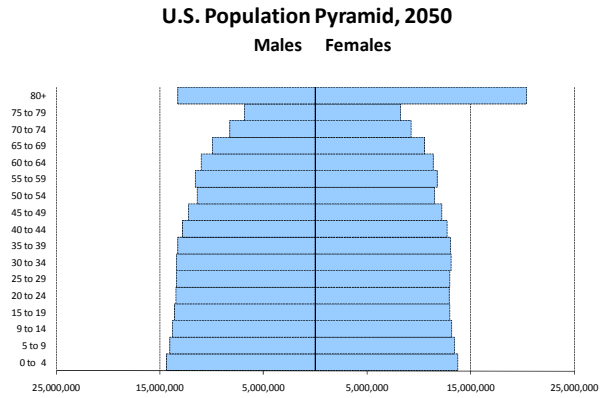


Figure 14

Another thing revealed by the pyramids are sex imbalances. In a number of countries you will see a bias towards male children (e.g. Korea, China; data show these biases have lessened recently), in some countries you'll see a "dent" in the pyramid if the country has been through a devastating war or famine.[15] The dent in China's pyramid from the "Great Leap Forward" was two-sided, but several European countries, France for example, had a big one-sided dent in historical pyramids from the large loss of young men in World Wars.

[15] You can find a convenient source of international pyramids at http://www.census.gov/ipc/www/idb/informationGateway.php

In the U.S. data we study here, the obvious sex imbalance comes in the elderly population. Men's testosterone-fueled, brat-scarfing, artery clogging lives end about 5 years earlier than modern women's, on average, and the 80 plus population is currently about 2/3 female (though the gap is shrinking, over time, proportionately though not of course in absolute numbers).

Dependency Ratios

Another way we can examine broad demographic trends is to examine the dependency ratio, or the number of "dependents" (children, and those of retirement age) divided by the number for those of working age. Figure 15 shows how this ratio fell through the 80s, as the baby boom entered the workforce, but is now rising again, as they reach retirement age. (Obviously some under 18 and over 65 work; some 18 – 64 do not). Nevertheless, the ratio is a reasonable rough indicators of at least potential "depending").

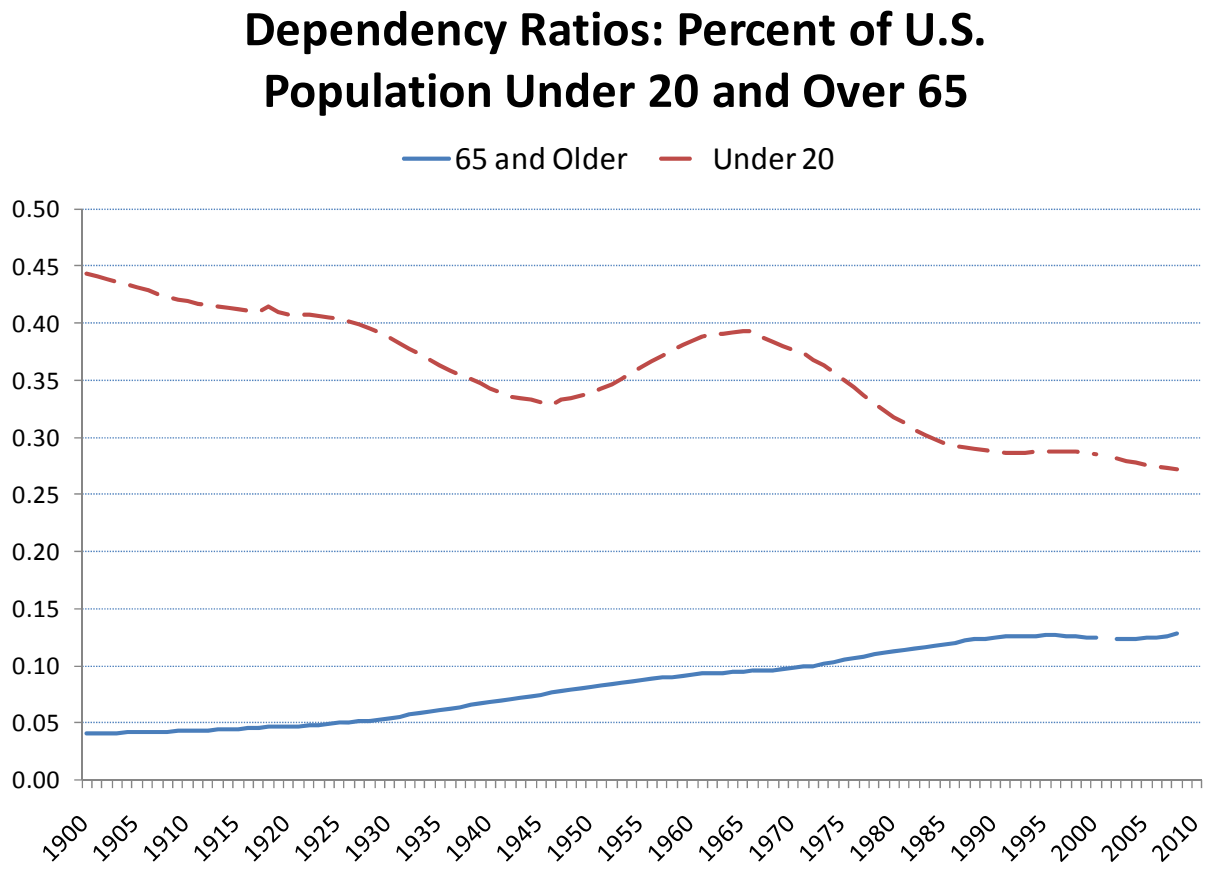


Figure 15

Households and Families

So far our discussion of demographics has revolved around counting people. But for many purposes, e.g. studying housing demand, we need to aggregate people up to some other units. The two most common are households and families.

Until you took this course, you may not have thought about the difference between households and families. Families are two or more related people living together. Households include families, but also include unrelated people living together, and singles. All families are households, but not all households are families. Figure 16 shows growth in households over the past 40 years; notice the growth is somewhat volatile, and depends in part on the business cycle.

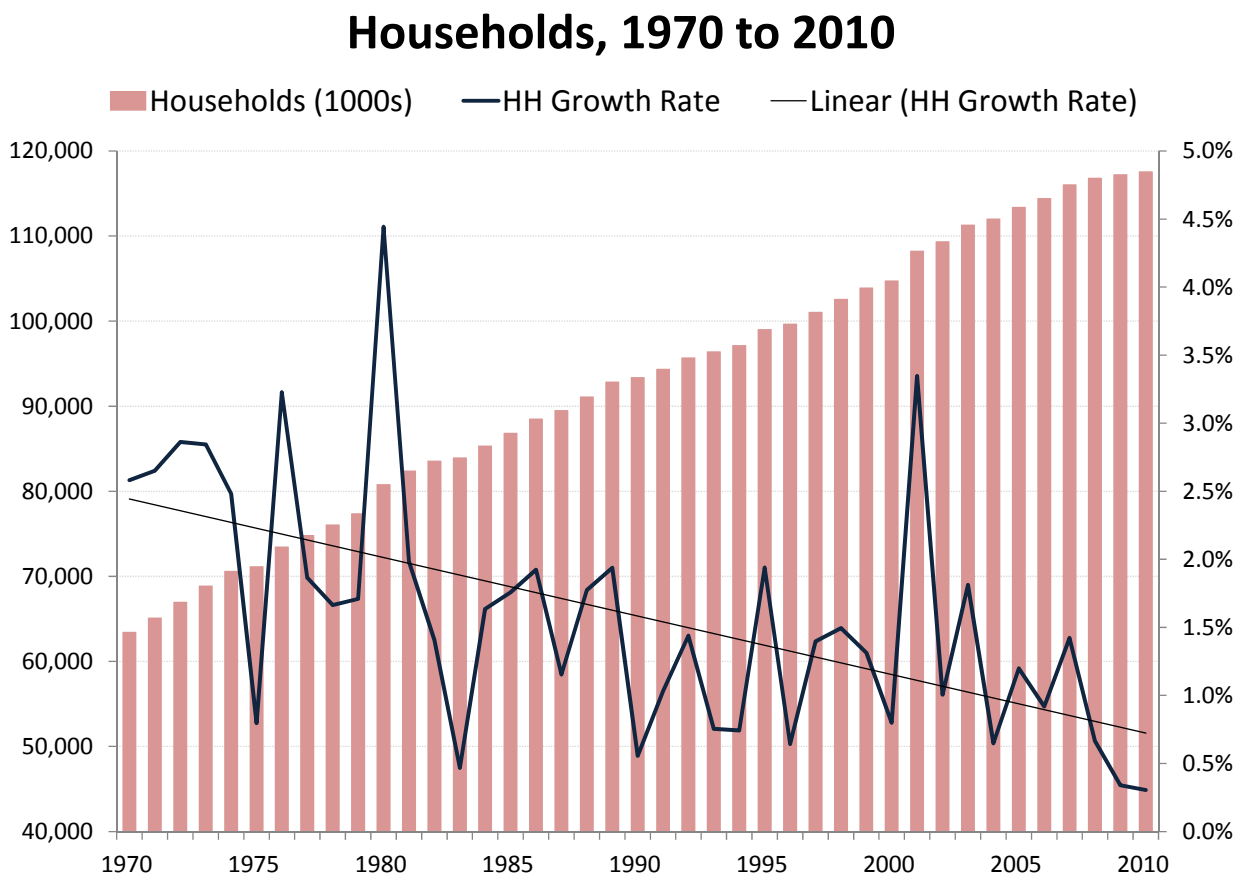
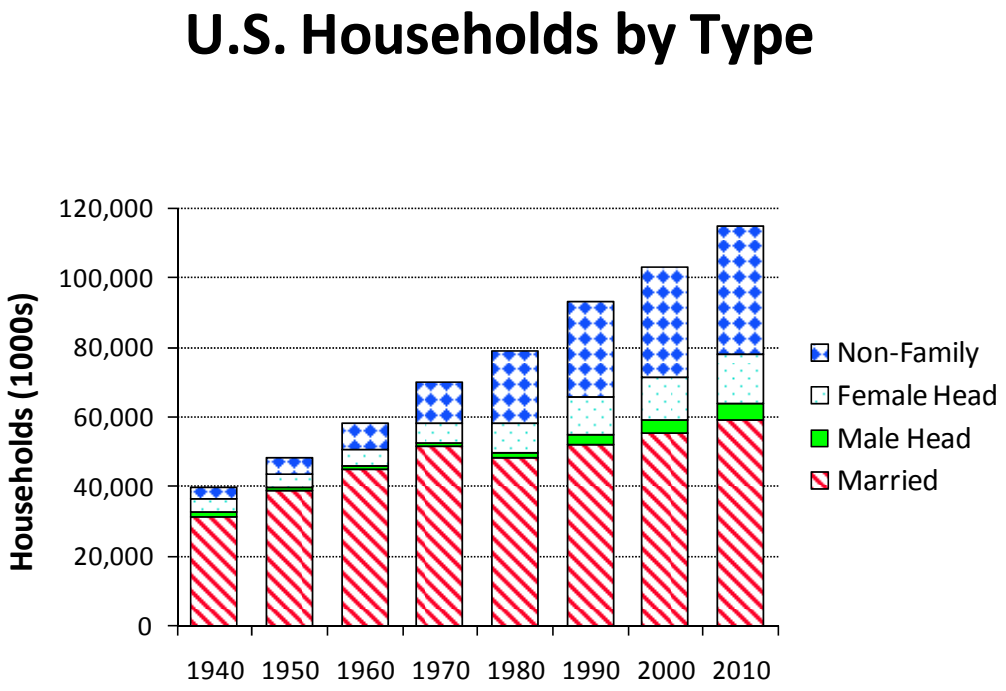


Figure 16

Figure 17 presents a simple breakdown of the main types of households. In 2010, according to Census, of about 115 million households, there are about 78million families (59 million couples, with or without children; 5 million families comprising a male and one or more

children; and 14 million families comprising a female and one or more children). The 37 million non-family households are mostly single people living alone, but also include non-related people living together (e.g. students in group houses).



Source: Census Bureau

Figure 17

IV. Basic Economic Flows: GDP and its Components

The National Income Accounts are due in no small part to the efforts of the great economist Simon Kuznetz, who developed the first comprehensive NIA circa 1934 for the U.S. Commerce Department. Kuznets and associates labored to produce a set of accounts back to 1869, and the Department of Commerce institutionalized the NIA in 1947.

Kuznets was also a pioneer in international comparisons of income and product. Over time, the United Nations system helped promulgate standards for the construction of NIAs that allow us to make today's relative comparisons of the U.S. economic performance and potential to others. Studying GDP data while preparing for MIPIM or Expo Real or the 2nd year field trip? Thank Simon Kuznets. In 1971, Kuznets received a richly-deserved Nobel

Prize for this work. There have been many other conceptual and practical advances in NIA, notably the development of purchasing power parity (PPP) based accounts by University of Pennsylvania economists. Irving Kravis, Alan Heston and Robert Summers (father of Larry; Larry's mother Anita is also a top economist at Wharton, and one of the driving forces behind the survey of land use and real estate development regulations we'll use later in this semester).

The Basic National Income Accounting Identity

We begin by breaking national output into its major components. Recall the basic national income identity from principles of macroeconomics:

$$Y = C + I + G + (X-M)$$

where Y is national output (GDP),[16] C is private consumption, I is private investment, G is government spending (investment and consumption), and X-M is net international trade (exports minus imports). Figure 18 shows the relative size of these components over time1

These data are quarterly, from Q1 1947 to Q2 2010, and in constant prices (year 2005 dollars). All quarterly data are seasonally adjusted at annual rates. They can be found in various issues of the *Survey of Current Business*, or at: http://www.bea.gov.

Obviously, consumption is by far the largest component of NIA at this level of aggregation. Investment and government expenditure are smaller than consumption, but more volatile. Net trade is the smallest major category.[17]

[16] Gross Domestic Product is the value of output produced by the factors of production located within a country. Sometimes we loosely call Y "national income." But strictly speaking, GDP is national income plus depreciation, plus net indirect taxes, plus net factor payments abroad. In the U.S., national income is typically a little over 80 percent of GDP. Most of the difference is due to depreciation and net indirect taxes.

[17] Net trade doesn't show up well in the graph. It's at the very bottom, specifically for most years it's the area between the 0 line and the bottom. A trade surplus is a positive addition to GDP, and a deficit a subtraction. That is, if we import more than we export, we consume more than we produce; and GDP is, roughly, what the economy produces. For most of this period the U.S. has run a deficit, and hence net trade is represented by the little negative area (below zero on the y-axis).

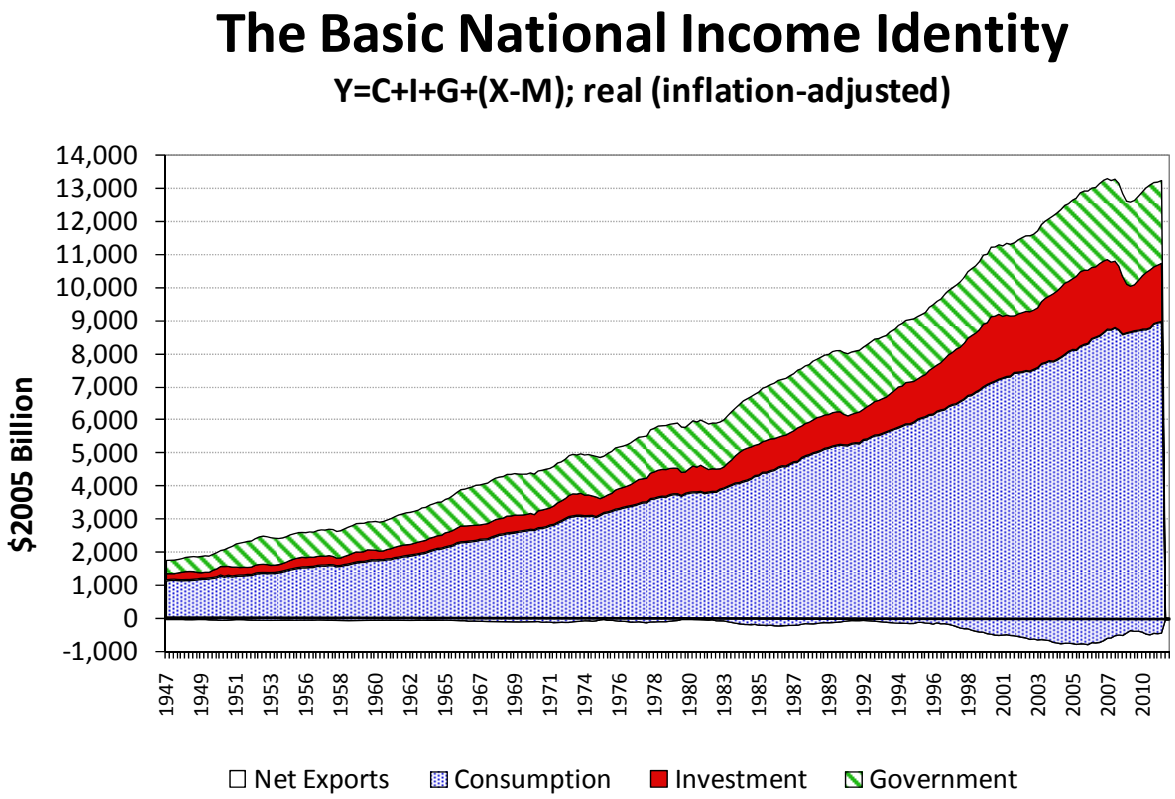
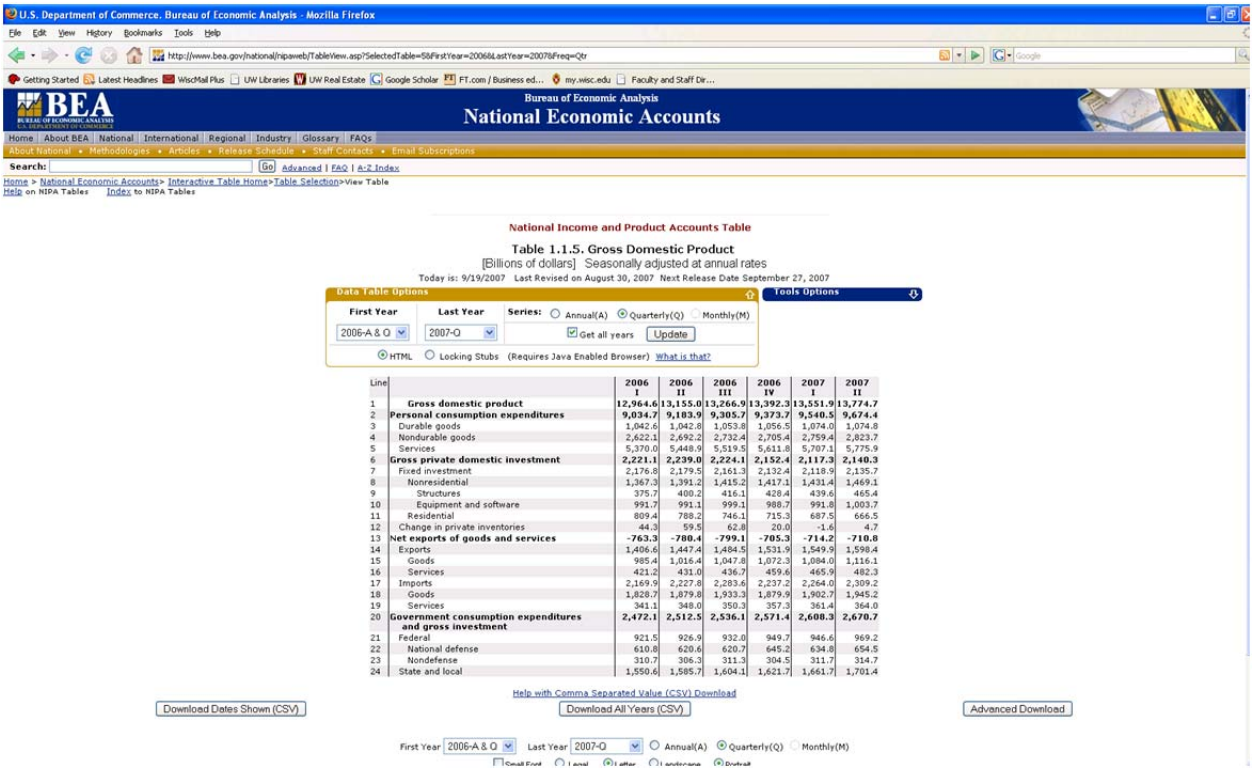


Figure 18

New data come out every quarter, and revisions to recent quarters are common and often non-trivial. So by the time you read this, the data will be in need of updating. Figure 19 shows a screenshot of the relevant download screen at www.bea.gov. In Real Estate 720, we'll spend some time on a spreadsheet exercise that will provide you practice in this updating exercise, and some of the basic data are also made available to RE 420 students on the course website.



Line		2006 I	2006 II	2006 III	2006 IV	2007 I	2007 II
1	**Gross domestic product**	**12,964.6**	**13,155.0**	**13,266.9**	**13,392.3**	**13,551.9**	**13,774.7**
2	**Personal consumption expenditures**	**9,034.7**	**9,183.9**	**9,305.7**	**9,373.7**	**9,540.5**	**9,674.4**
3	Durable goods	1,042.6	1,042.8	1,053.8	1,056.5	1,074.0	1,074.8
4	Nondurable goods	2,622.1	2,692.2	2,732.4	2,705.4	2,759.4	2,823.7
5	Services	5,370.0	5,448.9	5,519.5	5,611.8	5,707.1	5,775.9
6	**Gross private domestic investment**	**2,221.1**	**2,239.0**	**2,224.1**	**2,152.4**	**2,117.3**	**2,140.3**
7	Fixed investment	2,176.8	2,179.5	2,161.3	2,132.4	2,118.9	2,135.7
8	Nonresidential	1,367.3	1,391.2	1,415.2	1,417.1	1,431.4	1,469.1
9	Structures	375.7	400.2	416.1	428.4	439.6	465.4
10	Equipment and software	991.7	991.1	999.1	988.7	991.8	1,003.7
11	Residential	809.4	788.2	746.1	715.3	687.5	666.5
12	Change in private inventories	44.3	59.5	62.8	20.0	-1.6	4.7
13	**Net exports of goods and services**	**-763.3**	**-780.4**	**-799.1**	**-705.3**	**-714.2**	**-710.8**
14	Exports	1,406.6	1,447.4	1,484.5	1,531.9	1,549.9	1,598.4
15	Goods	985.4	1,016.4	1,047.8	1,072.3	1,084.0	1,116.1
16	Services	421.2	431.0	436.7	459.6	465.9	482.3
17	Imports	2,169.9	2,227.8	2,283.6	2,237.2	2,264.0	2,309.2
18	Goods	1,828.7	1,879.8	1,933.3	1,879.9	1,902.7	1,945.2
19	Services	341.1	348.0	350.3	357.3	361.4	364.0
20	**Government consumption expenditures and gross investment**	**2,472.1**	**2,512.5**	**2,536.1**	**2,571.4**	**2,608.3**	**2,670.7**
21	Federal	921.5	926.9	932.0	949.7	946.6	969.2
22	National defense	610.8	620.6	620.7	645.2	634.8	654.5
23	Nondefence	310.7	306.3	311.3	304.5	311.7	314.7
24	State and local	1,550.6	1,585.7	1,604.1	1,621.7	1,661.7	1,701.4

Figure 19

Each quarter's GDP and other basic NIA data actually come out three (or more) times. About one month after each new quarter ends the "advance" report appears. About one month after that, the "preliminary" report comes out, with an initial set of revisions. One month after that, we receive the "final" report, although final is itself a misnomer. On a less regular basis (measured in years rather than months), BEA releases occasional "benchmark" revisions to all or part of a series as new information, techniques and definitions are applied. National income accounting is a complex and resource intensive enterprise. There is a trade-off between timely release of data and precision. Figure 20 presents the typical release dates.

	Approximate Release Schedule for BEA GDP Data						
	Previous Year, Q4		**Current Year, Q1**		**Current Year, Q2**		**Current Year, Q3**
Advance Report	January		April		July		October
Preliminary Report (1st	February		May		August		November
Final Report (2nd Revision)	March		June		September		December
Releases are usually a few days before the end of the month.							
Exact dates for a particular year can be found at www.bea.gov.							

Figure 20

Despite this system, and BEA's best efforts we should view past GDP as an estimate rather than a fixed point. The official NIA are often criticized, and rightly so, for several serious conceptual shortcomings. Among those are, in no particular order,

(1) GDP accounts generally do not include home production. When Michael Keaton takes on such a role in "Mr. Mom," the value of domestic services he produces (or tries to) are not included in GDP.

(2) GDP misses some important changes in the national balance sheet. For example, when we pump oil out of Texas or Alaska, GDP increases by the value of the oil produced. But conceptually there is an adjustment that should be made, but isn't, because when we exploit a nonrenewable resource there is both a credit (a measured increase in GDP, counted) and a debit (a decline in the value of our national balance sheet, not counted)

(3) There are many other "goods" enjoyed and "bads" suffered which escape the NIA framework, including the value of leisure time, or (part of) the reduction in welfare from air pollution, to give but two examples.

In the end, despite the shortcomings as detailed in Fleurbaey (2009), GDP and its components are still useful indicators of the state of the economy, and we will abstract from these issues for the rest of this note.

Table 3. Gross Domestic Product and Related Measures: Level and Change From Preceding Period

	Billions of current dollars						Billions of chained (2005) dollars								
	2009 r	Seasonally adjusted at annual rates					2009 r	Seasonally adjusted at annual rates					Change from preceding period		
		2008	2009					2008	2009				2009 r	2009	
		IV	I	II	III	IV r		IV	I	II	III	IV r		III	IV r
Gross domestic product	14,2582	14,347.3	14,178.0	14,151.2	14,242.1	14,4617	12,990.3	13,1419	12,925.4	12,901.5	12,973.0	13,161.1	-3219	71.5	188.1
Personal consumption expenditures	10,0885	10,009.8	9,987.7	9,999.3	10,132.9	10,2343	9,235.6	9,1953	9,209.2	9,189.0	9,252.6	9,291.7	-553	63.6	39.1
Goods	3,2552	3,227.5	3,197.7	3,193.8	3,292.3	3,3370	3,144.1	3,1104	3,129.8	3,105.4	3,159.6	3,181.8	-619	54.2	22.2
Durable goods	1,0349	1,019.9	1,025.2	1011.5	1,051.3	1,0517	1,101.3	1,076.8	1,087.2	1,071.7	1,122.7	1,123.4	-4.50	51.0	0.7
Motor vehicles and parts	3128	298.4	3008	299.5	331.7	31.96	317.2	30.62	311.2	306.2	335.2	316.3	-80.3	29.0	-18.9
Furnishings and durable household equipment	2533	259.1	255.7	251.3	251.6	2547	259.2	2642	259.4	254.2	258.4	265.0	-16.3	4.2	6.6
Recreational goods and vehicles	328.0	327.3	3296	321.3	326.8	3341	411.8	3943	403.1	398.4	414.8	431.0	88	16.4	16.2
Other durable goods	1408	137.1	1393	139.4	141.3	14.33	124.2	1214	123.5	122.9	124.9	125.3	-3.8	2.0	0.4
Nondurable goods	2,2202	2,207.6	2,172.4	2182.2	2,241.0	2,2853	2,037.0	2,026.1	2,035.5	2,025.7	2,033.3	2,053.7	-2.03	7.6	20.4
Food and beverages purchased for off-premises consumption	7903	787.5	7885	786.3	789.4	7989	697.4	6864	687.4	693.5	700.1	708.6	-3.3	6.6	8.5
Clothing and footwear	3258	326.5	327.9	321.6	324.8	3288	330.0	3354	334.0	326.9	326.7	332.6	-15.0	-0.2	5.9
Gasoline and other energy goods	3046	321.2	271.0	279.4	324.4	3430	292.5	2872	293.2	294.0	292.7	290.1	51	-1.3	-2.6
Other nondurable goods	7997	772.5	7870	795.0	802.3	8146	720.3	7208	724.7	714.5	716.7	725.6	-84	2.2	8.9
Services	6,8334	6,782.3	6,790.0	6,805.6	6,840.6	6,8973	6,088.4	6,0804	6,076.0	6,078.8	6,090.6	6,108.2	53	11.8	17.6
Household consumption expenditures (for services)	6,5683	6,494.1	6,522.0	6545.9	6,575.7	6,6294	5,832.0	5,8068	5,817.2	5,826.7	5,834.3	5,849.7	144	7.6	15.4
Housing and utilities	1,8771	1,872.1	1,878.8	1871.1	1,872.5	1,8860	1,656.8	1,6563	1,656.9	1,651.8	1,654.0	1,664.0	94	2.2	10.0
Health care	1,6282	1,574.9	1,598.0	1622.6	1,633.0	1,6513	1,446.8	1,4224	1,434.3	1,448.2	1,448.6	1,455.3	3.02	0.4	6.7
Transportation services	304.6	305.7	3016	301.1	306.3	3094	263.7	2667	261.9	260.5	265.0	265.3	-10.1	2.5	0.3
Recreation services	382.4	380.9	3834	381.5	382.5	3822	345.2	3461	347.7	348.3	343.6	343.1	-4.6	-2.7	-0.5
Food services and accommodations	605.7	607.3	6073	606.0	603.7	6066	529.8	5359	533.7	530.5	527.9	526.9	-1.96	-2.6	-1.0
Financial services and insurance	828.7	823.5	8167	824.9	832.4	8408	757.9	7506	751.4	756.1	761.8	762.3	-19	5.7	0.5
Other services	9435	929.8	936.0	938.7	945.3	9540	833.3	8292	832.2	832.4	834.6	833.9	7.6	2.2	-0.7
Final consumption expenditures of nonprofit institutions serving households	285.1	288.2	2880	259.7	264.9	2679	256.7	2754	259.4	252.0	256.5	258.8	-99	4.5	2.3
Gross output of nonprofit institutions	1,0695	1,066.1	1,060.8	1,065.8	1,070.7	1,0807	958.3	9651	957.8	958.2	957.0	960.0	1.8	-1.2	3.0
Less: Receipts from sales of goods and services by nonprofit institutions	804.4	778.0	7927	806.1	805.8	8128	701.6	6910	698.7	705.7	700.5	701.4	1.06	-5.2	0.9
Gross private domestic investment	1,6309	2,022.1	1,689.9	1,561.5	1,556.1	1,7161	1,529.6	1,8577	1,558.5	1,456.7	1,474.4	1,628.7	-4598	17.7	154.3
Fixed investment	1,7510	2,066.6	1,817.2	1,737.7	1,712.6	1,7365	1,649.3	1,9093	1,687.5	1,631.9	1,626.7	1,651.2	-3691	-5.2	24.5
Nonresidential	1,3897	1,539.7	1,442.6	1391.8	1,353.9	1,3706	1,291.9	1,4961	1,321.2	1,288.4	1,269.0	1,289.1	-2778	-19.4	20.1
Structures	4813	620.7	533.1	494.8	457.9	4393	391.4	4840	419.4	400.0	380.2	366.2	-954	-19.8	-14.0
Equipment and software	9084	1,018.0	9095	897.0	895.9	9313	890.3	9937	887.5	876.5	879.8	917.4	-1783	3.3	37.6
Information processing equipment and software	522.6	540.2	5083	512.2	519.0	5507	556.5	5676	537.5	544.8	554.9	589.0	-323	10.1	34.1
Computers and peripheral equipment	749	75.8	71.1	7.20	72.5	83.9									
Software	244.2	258.7	2405	240.2	241.4	2545	240.6	2522	235.5	236.2	239.2	251.4	-16.4	3.0	12.2
Other	203.5	205.6	1967	200.1	205.1	2123	202.4	2043	195.8	199.1	203.9	210.8	-8.7	4.8	6.9
Industrial equipment	1502	167.9	1578	151.4	146.5	1449	133.6	1672	140.8	135.2	130.4	128.3	-51.1	-4.8	-2.1
Transportation equipment	72.2	95.3	854	70.6	73.2	796	65.9	909	89.8	82.7	88.0	74.9	-8.30	3.3	8.9
Other equipment	1635	194.7	1780	162.7	157.2	1560	145.1	1726	157.3	144.0	140.1	139.1	-35.2	-3.9	-1.0
Residential	361.3	427.8	3746	345.9	358.8	3660	359.0	4150	367.9	344.4	359.6	364.0	-9.21	15.2	4.4
Change in private inventories	-120.1	-44.5	-127.4	-176.2	-156.5	-20.4	-107.6	-37.4	-113.9	-160.2	-139.2	-16.9	-817	21.0	122.3
Farm	-2.4	-3.7	-13	0.6	0.0	-8.7	-0.3	-19	0.3	2.2	1.9	-5.7	5.0	-0.3	-7.6
Nonfarm	-117.8	-40.8	-126.1	-176.8	-156.5	-11.7	-107.7	-35.7	-114.9	-163.1	-141.4	-11.2	-873	21.7	130.2
Net exports of goods and services	-392.3	-590.5	-378.5	-339.1	-402.2	-449.2	-355.4	-470.9	-386.5	-330.4	-357.4	-347.1	1389	-27.0	10.3
Exports	1,5937	1,706.2	1,509.3	1,493.7	1,573.8	1,6781	1,472.1	1,5680	1,434.5	1,419.5	1,478.8	1,555.5	-1572	59.3	76.7
Goods	1,0384	1,155.7	989.5	978.1	1,045.2	1,1407	990.1	1,0729	956.1	940.7	993.9	1,069.7	-1374	53.2	75.8
Services	5254	550.5	519.8	515.6	528.5	5374	481.0	4940	477.2	477.4	483.9	485.6	-207	6.5	1.7
Imports	1,9560	2,296.7	1,887.9	1,832.8	1,976.0	2,1273	1,827.4	2,0389	1,821.0	1,749.8	1,836.2	1,902.7	-2961	86.4	66.5
Goods	1,5753	1,892.5	1,508.2	1461.1	1,592.8	1,7391	1,483.8	1,6826	1,474.4	1,409.4	1,490.6	1,560.9	-2835	81.2	70.3
Services	3807	404.2	379.6	371.7	383.1	3881	343.2	3569	346.2	339.5	345.3	341.8	-133	5.8	-3.5
Government consumption expenditures and gross investment	2,9310	2,905.9	2,879.0	2,929.4	2,955.4	2,9604	2,564.8	2,5440	2,527.2	2,568.6	2,585.5	2,577.9	467	16.9	-7.6
Federal	1,1449	1,114.3	1,106.7	1,138.3	1,164.3	1,1704	1,026.7	1,0073	996.3	1,023.5	1,043.3	1,043.7	508	19.8	0.4
National defense	779.1	758.9	7507	776.2	795.8	7938	695.1	6817	672.8	695.2	709.3	703.1	357	14.1	-6.2
Consumption expenditures	666.6	648.8	6429	662.7	679.3	6816	589.3	5787	571.5	588.2	599.6	597.7	277	11.4	-1.9
Gross investment	112.5	110.1	1078	113.5	116.5	1121	108.7	1039	102.0	107.8	110.7	108.1	8.3	2.9	-4.6
Nondefense	365.8	355.3	3560	362.1	368.5	3767	331.5	3254	323.4	328.2	333.8	340.5	151	5.6	6.7
Consumption expenditures	319.7	306.6	3113	316.4	321.9	3292	286.6	2784	280.1	284.0	288.3	294.2	131	4.3	5.9
Gross investment	46.1	48.8	447	45.7	46.6	475	44.9	472	43.3	44.3	45.5	46.4	1.9	1.2	0.9
State and local	1,7861	1,791.7	1,772.3	1,791.2	1,791.1	1,7900	1,541.1	1,5393	1,533.3	1,548.0	1,545.5	1,537.8	-26	-2.5	-7.7
Consumption expenditures	1,4305	1,441.7	1,424.4	1,429.9	1,429.6	1,4380	1,249.4	1,2936	1,252.0	1,252.7	1,246.6	1,245.9	-21	-6.1	-0.7
Gross investment	3556	350.0	3479	361.3	361.3	3520	291.6	2859	281.5	294.9	298.4	291.5	-0.7	3.5	-6.9
Residual							-11.7	84	-1.1	-2.9	-13.7	-29.4			
Addenda:															
Final sales of domestic product	14,3784	14,391.8	14,3053	14,327.4	14,398.7	14,4821	13,112.8	13,1935	13,055.8	13,077.8	13,127.2	13,190.5	-2284	49.4	63.3
Gross domestic purchases	14,6505	14,937.8	14,5585	14,490.3	14,644.3	14,9108	13,3389	13,6040	13,303.1	13,225.9	13,323.8	13,502.8	-4823	97.9	179.0
Final sales to domestic purchasers	14,7706	14,982.3	14,6839	14,686.5	14,800.9	14,9312	13,4608	13,6549	13,432.7	13,401.4	13,477.2	13,531.8	-3690	75.8	54.6
Gross domestic product	14,2582	14,347.3	14,178.0	14,151.2	14,242.1	14,4617	12,990.3	13,1419	12,925.4	12,901.5	12,973.0	13,161.1	-3219	71.5	188.1
Plus: Income receipts from the rest of the world		714.4	579.6	571.3	590.5			652.7	530.9	522.5	539.2			15.7	
Less: Income payments to the rest of the world		807.4	479.1	478.6	489.1			554.2	438.5	437.5	427.5			-10.0	
Equals: Gross national product		14,454.3	14,277.9	14,243.8	14,343.7			13,2405	13,018.1	12,986.8	13,084.0			97.2	
Net domestic product	12,3947	12,466.4	12,2944	12,287.2	12,391.4	12,605.9	11,252.7	11,4160	11,193.2	11,167.0	11,235.2	11,415.7	-3444	68.2	180.5

Figure 21

Each GDP release is chock full of tables, but Figure 21 reproduces the single most important table. It breaks down our familiar Y=C+I+G+(X-M) into its major components (the rows), for

recent years and quarters, in current (nominal) dollars on the left side and real (inflation-adjusted) dollars on the right side.

When I update my basic GDP numbers, I download three files from:

http://www.bea.gov/national/nipaweb/SelectTable.asp?Selected=Y

Table 1.1.5, Gross Domestic Product
Table 1.1.6, Real Gross Domestic Product, Chained Dollars
Table 1.1.9 Implicit Price Deflators for GDP

These provide the main categories of nominal (current) GDP data; real (inflation-adjusted) GDP and major components; and the price indexes that translate real into nominal data.

Note that the quarterly data mostly go back to 1947; but sometimes separate GDP deflators are not available for some categories. When this happens, I use the overall GDP deflator to deflate the series.

In my personal quarterly database, rows are dates (quarters) and columns are variables, so the first thing I do when I open up each spreadsheet is to copy and paste-transpose to put the data in this format. Then I just copy and paste the new data into my pre-existing database, and adjust charts and derived variables as required.

Recessions

A commonly cited definition of a "recession" is when GDP declines for two or more successive quarters. But that's not how we officially date business cycles. Actually, the official arbiter of whether we are in "recession" or "expansion" is the National Bureau of Economic Research (NBER), which also applies some other criteria and judgment.[18] Figure 22, available at www.nber.org, presents the official NBER dates of recessions back to pre-Civil war days. While the overall correlation between NBER's recession quarters and the "two-quarter" rule of folk wisdom, the current case of the "Great Recession" is a good example of divergence. As Figure 23 shows, we didn't see two quarters of GDP decline until 2008Q3; but NBER called the recession in December 2007 (2007Q4).

Note the date the NBER actually *made* the call – December 2008, about a year after the recession, in retrospect, began. Talk about a "slow whistle!" NBER is an academic group, and they make no attempt to make "real time" calls.

[18] The NBER's panel of economists examines a range of (mostly monthly) data, checking for declines that are "broad, deep and consistent." Among the variables they examine are employment, industrial production, and retail and wholesale sales.

BUSINESS CYCLE REFERENCE DATES		DURATION IN MONTHS			
Peak	Trough	Contraction	Expansion	Cycle	
Quarterly dates		*Peak*	*Previous trough*	*Trough from*	*Peak from*
are in parentheses		*to*	*to*	*Previous*	*Previous*
		Trough	*this peak*	*Trough*	*Peak*
	December 1854 (IV)	--	--	--	--
June 1857(II)	December 1858 (IV)	18	30	48	--
October 1860(III)	June 1861 (III)	8	22	30	40
April 1865(I)	December 1867 (I)	32	46	78	54
June 1869(II)	December 1870 (IV)	18	18	36	50
October 1873(III)	March 1879 (I)	65	34	99	52
March 1882(I)	May 1885 (II)	38	36	74	101
March 1887(II)	April 1888 (I)	13	22	35	60
July 1890(III)	May 1891 (II)	10	27	37	40
January 1893(I)	June 1894 (II)	17	20	37	30
December 1895(IV)	June 1897 (II)	18	18	36	35
June 1899(III)	December 1900 (IV)	18	24	42	42
September 1902(IV)	August 1904 (III)	23	21	44	39
May 1907(II)	June 1908 (II)	13	33	46	56
January 1910(I)	January 1912 (IV)	24	19	43	32
January 1913(I)	December 1914 (IV)	23	12	35	36
August 1918(III)	March 1919 (I)	7	44	51	67
January 1920(I)	July 1921 (III)	18	10	28	17
May 1923(II)	July 1924 (III)	14	22	36	40
October 1926(III)	November 1927 (IV)	13	27	40	41
August 1929(III)	March 1933 (I)	43	21	64	34
May 1937(II)	June 1938 (II)	13	50	63	93
February 1945(I)	October 1945 (IV)	8	80	88	93
November 1948(IV)	October 1949 (IV)	11	37	48	45
July 1953(II)	May 1954 (II)	10	45	55	56
August 1957(III)	April 1958 (II)	8	39	47	49
April 1960(II)	February 1961 (I)	10	24	34	32
December 1969(IV)	November 1970 (IV)	11	106	117	116
November 1973(IV)	March 1975 (I)	16	36	52	47
January 1980(I)	July 1980 (III)	6	58	64	74
July 1981(III)	November 1982 (IV)	16	12	28	18
July 1990(III)	March 1991(I)	8	92	100	108
March 2001(I)	November 2001 (IV)	8	120	128	128
December 2007 (IV)	June 2009 (II)	18	73	91	81
Average, all cycles:					
1854-2009 (33 cycles)		16	42	56	55*
1854-1919 (16 cycles)		22	27	48	49**
1919-1945 (6 cycles)		18	35	53	53
1945-2009 (11 cycles)		11	59	73	66
* 32 cycles					
** 15 cycles					

Figure 22

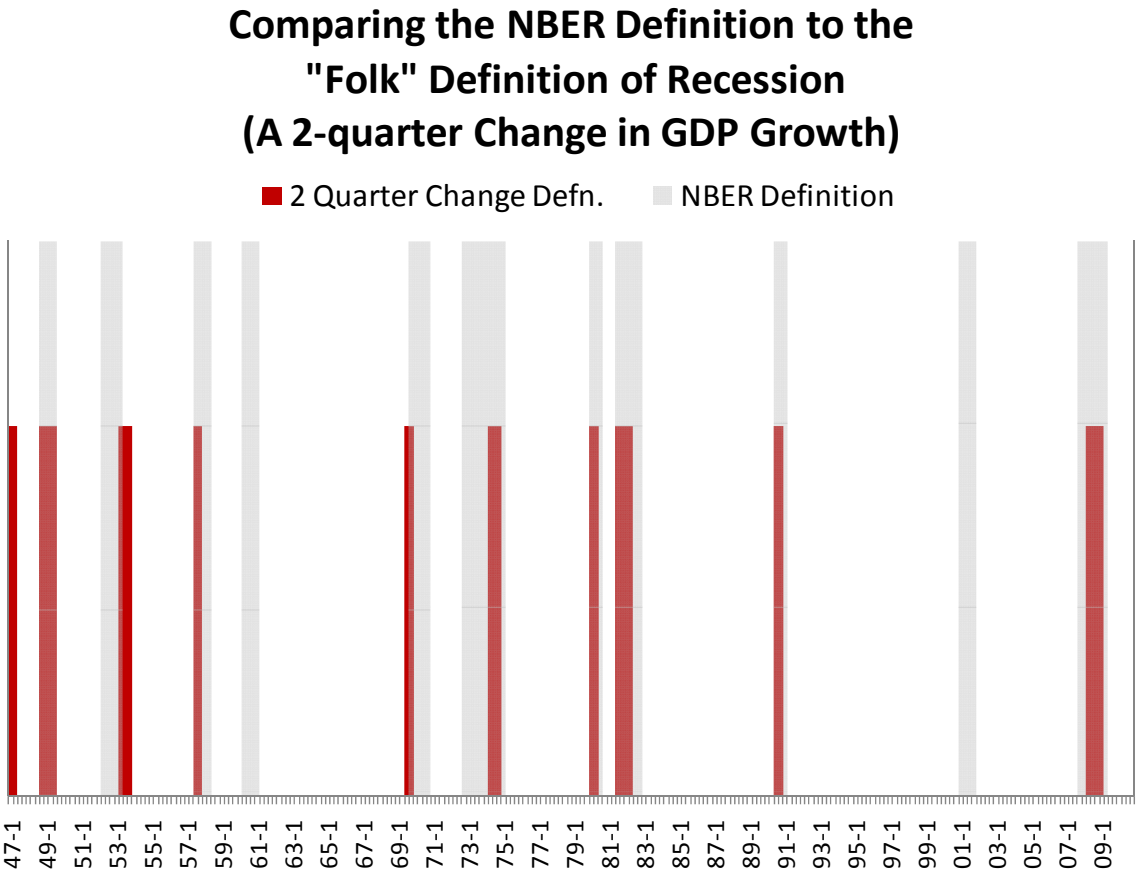


Figure 23

Naturally, once we've defined recessions, we've also defined expansions – the periods when the economy is growing. Recessions are half the business cycle conceptually, but fortunately we have larger and longer expansions. Since 1945, the duration of all recessions totals about 11 months, while expansions average about 59 months.

Know the approximate dates of major recessions in this data: 1960 (that's why Kennedy beat Nixon), 1970 (very mild), 1973 (the first "oil shock"), 1981 (second "oil shock), and 1990 (mild). Then we had a 10 year expansion, the longest on record, until the "tech wreck", i.e. the recession that followed the burst of the NASDAQ bubble in 2001. That recession was fairly mild, unless you were a software engineer or a web designer. Then we had another long six year expansion, until the housing-MBS fueled "Great Recession. Of course, the *length* of these expansions and contractions are only one way to measure them.

The Logarithm is Our Friend

Now for a "trick of the trade." Whenever you look at more that a few years of data, linear graphs like Figure 18, above, will overstate apparent growth in later years. Why? Because

the y-axis is linear. As (for example) a series grows by a constant percentage, as we move to the right the *absolute* change (in $ or whatever units) increases, over an *ever-larger base*. Because the absolute change is growing, a series with a constant growth rate *appears* to be growing faster; a series that is slowing down may not be apparent.

A good way around this is to use logarithmically scaled plots. Natural logs have the appealing property that they represent (approximate) percentage changes. The next figure expresses GDP in log form. For good measure we've also thrown in GDP *per capita*.

Each dotted horizontal line in Figure 24 represents an equal dollar change. For example, on the right axis, read up $10,000, $20,000, $30,000, and so on to $100,000. Because the axis is measured logarithmically, equal $10,000 increments are spaced closer together as we move up the axis.

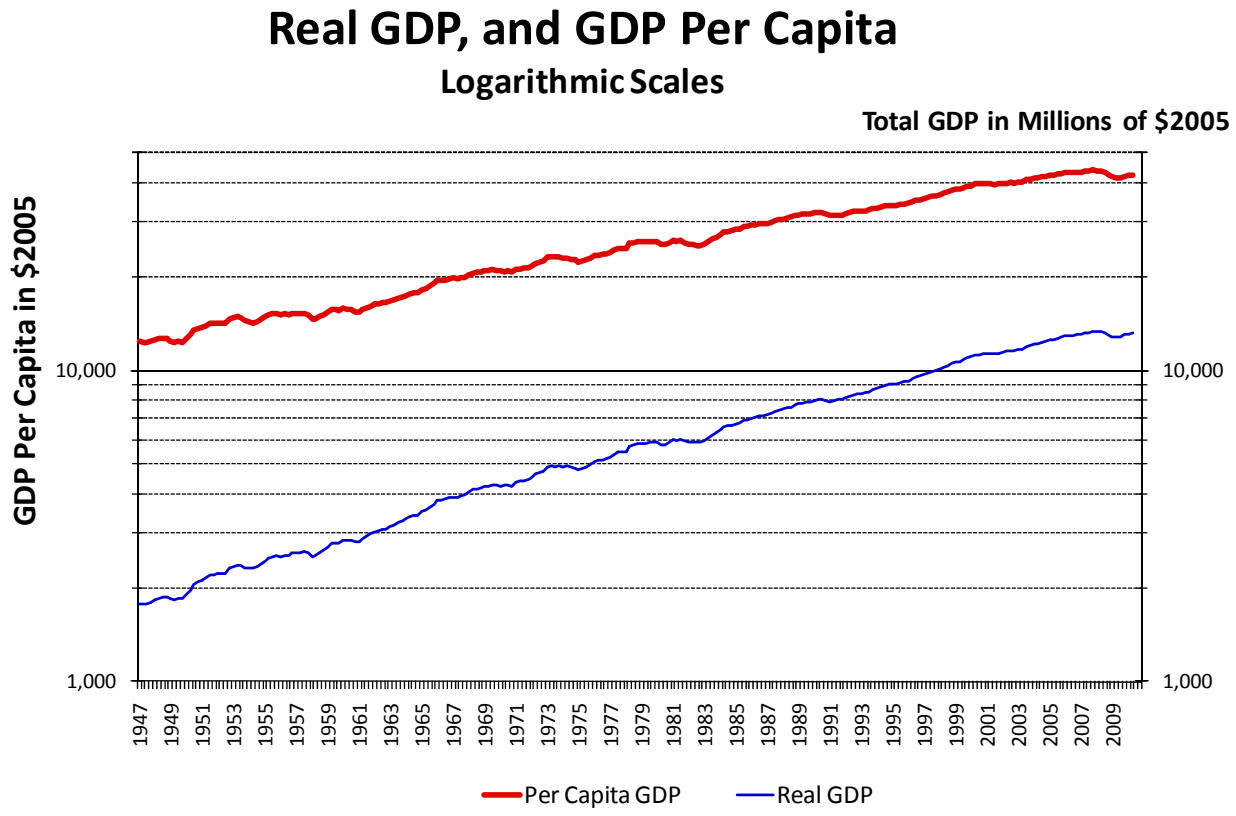


Figure 24

The thick line on top is GDP per capita, measured on the left axis; it ranges from $11,000 in 1947 (but in year 2000 dollars!), to about $38,000 in 2004 (but again in $2005). A middle aged person in their fifties has seen inflation-adjusted incomes *per capita* almost triple within their lifetime, which is quite remarkable.

Of course, total GDP has increased even more, since the U.S. population has grown from about 140 million at the end of WWII to over 300 million today. The thin line below is total GDP, measured on the right axis. (Notice that the numbers on both left and right axes happen to coincide, but the left axis measures dollars, while the right axis measures *millions* of dollars). Over the past 6 decades, total GDP grew from about a trillion and a half dollars (in constant $2005), to about $14 trillion.

Notice, if you look carefully, that the slope of GDP per capita is just a little flatter than that of GDP. That will be true as long as we have a growing population. Actually, in the early 1960s population was growing around 1.5 percent or so per annum, and now it's growing about 1 percent per annum.

Ch-ch-ch-changes[19]

Whether we look at linear plots or log, notice how "smooth" overall GDP is. Check out the dips that represent recessions in 1960, 1970, 1973, 1981, 1990, 2001 and 2008. That little dip in 1990 cost George H.W. Bush the election! (See Fair 2002). Another, often better, way to look at trends in GDP is to examine changes rather than levels (Figure 25).

Notice that the trend in these changes is down slightly, from about 1 percent per quarter in the 50s to about .8 percent per quarter today. More importantly, notice that the volatility of GDP changes seems to be lower in the past few years, until the Great Recession. In previous versions of this note, I did not give too much credence to "new age" forecasting that predicted the end of the business cycle, but I noted that there are some plausible reasons why the cycle might be moderating. For example, improved inventory control methods have probably reduced volatility somewhat. Actually, the *real* story about declining volatility in GDP changes is when we compare this whole period to pre-World War II. That's not shown here, but we'll discuss briefly in class.

[19] Is anyone in this class old enough to remember David Bowie?

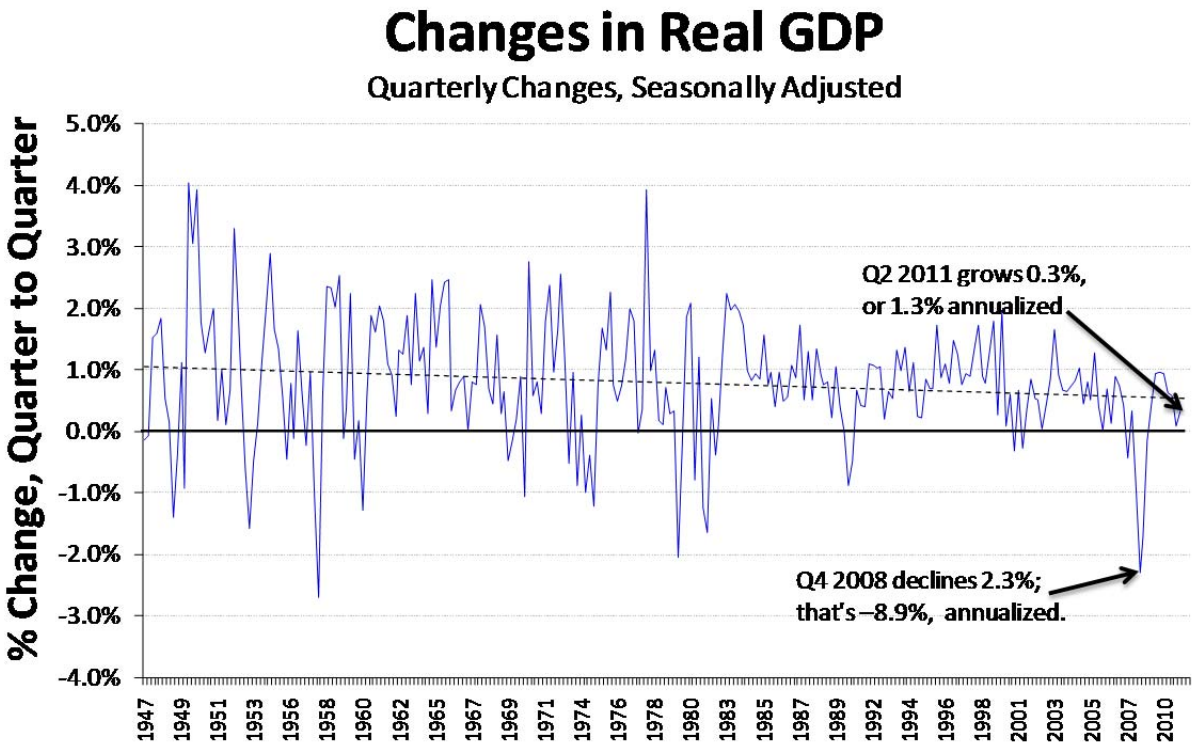


Figure 25

Until 2008, economists were writing a slew of papers explaining the "Great Moderation," or that apparent reduction in volatility circa 1982. Since the onset of the Great Recession the topic has become less popular, thought it's still important – it's not at all clear we really have returned to pre-1982 volatility; perhaps the past three years are an anomaly. Time will tell.

Returning to Figure 2, notice that consumption is not only the largest of our major categories, it appears to be the "smoothest." We can confirm this by calculating the annual growth rates of GDP, and of the major categories of GDP; then calculating the means and standard deviations of these growth rates, as we've done in Figure 26.

Summary Statistics on Components of GDP, Quarterly BEA Data				
	Average Share of GDP 1947-2009	Average Quarterly Real Growth Rate Seasonally Adjusted	Standard Deviation, Quarterly Real Growth Rate Seasonally Adjusted	Coefficient of Variation, Quarterly Real Growth Rate Seasonally Adjusted
Private Consumption	64.7%	0.85%	0.85%	1.0
Private Investment	16.0%	0.98%	5.51%	5.6
Nonresidential Real Estate	*3.6%*	*0.57%*	*2.96%*	*5.2*
Residential Real Estate	*4.8%*	*0.60%*	*5.15%*	*8.6*
Equipment and Software	*7.1%*	*1.26%*	*3.46%*	*2.8*
Changes in Inventories	*2.3%*			
Government C+I	25.0%	0.76%	1.74%	2.3
Federal C+I	*11.9%*	*0.66%*	*3.16%*	*4.8*
State and Local C+I	*13.2%*	*0.87%*	*1.08%*	*1.2*
Net Exports	-1.5%	4.01%	98.12%	24.5
Exports	*7.7%*	*1.24%*	*4.42%*	*3.6*
Imports	*8.7%*	*1.52%*	*4.11%*	*2.7*
GDP	100.0%	0.81%	1.00%	1.3
GDP Per Capita		0.47%	1.11%	2.4
Government C+I, + Transfer Payments, + Interest	32.0%			
(From *Budget of the U.S.* ; all levels of government, annual data)				
Note: Data from 1947Q1 through 2009Q3				

Figure 26

The first column highlights the fact that consumption is almost two thirds of GDP in a typical quarter. Net trade is a pretty small fraction, but this masks the fact that its two components (exports and imports) are significant, and growing. Investment is about a seventh of GDP in a typical quarter. ***Real estate investment (residential and nonresidential together) accounts for about 9 percent of GDP, on average, and over half of private net investment. Know that.***

The second column shows that GDP grows an average of about .8 percent per quarter, or about 3.2 percent per year over the last 40 years. Roughly, population has been growing a little over 1 percent *per annum* over this period, and GDP per capita has thus been growing a little under 2 percent *per annum*.

The third and fourth columns are our measures of volatility in GDP and its components. The standard deviation is quite familiar, but the less commonly used coefficient of variation is

actually a better measure of volatility.[20] Whether we look at column 3 or 4, the following key results hold. Consumption is pretty smooth (low standard deviation of changes, and low coefficient of variation of same). Government expenditure is a little more volatile that private consumption, but still pretty smooth. Investment is pretty volatile; and residential real estate investment is more volatile that nonresidential, or than total investment. Net trade is *extremely* volatile.

Figure 27 looks at this volatility graphically. It presents the major components of GDP in changes rather than levels. The conclusions above are confirmed. Note in particular the lower volatility of investment since around 1990. Will this lower volatility hold indefinitely?

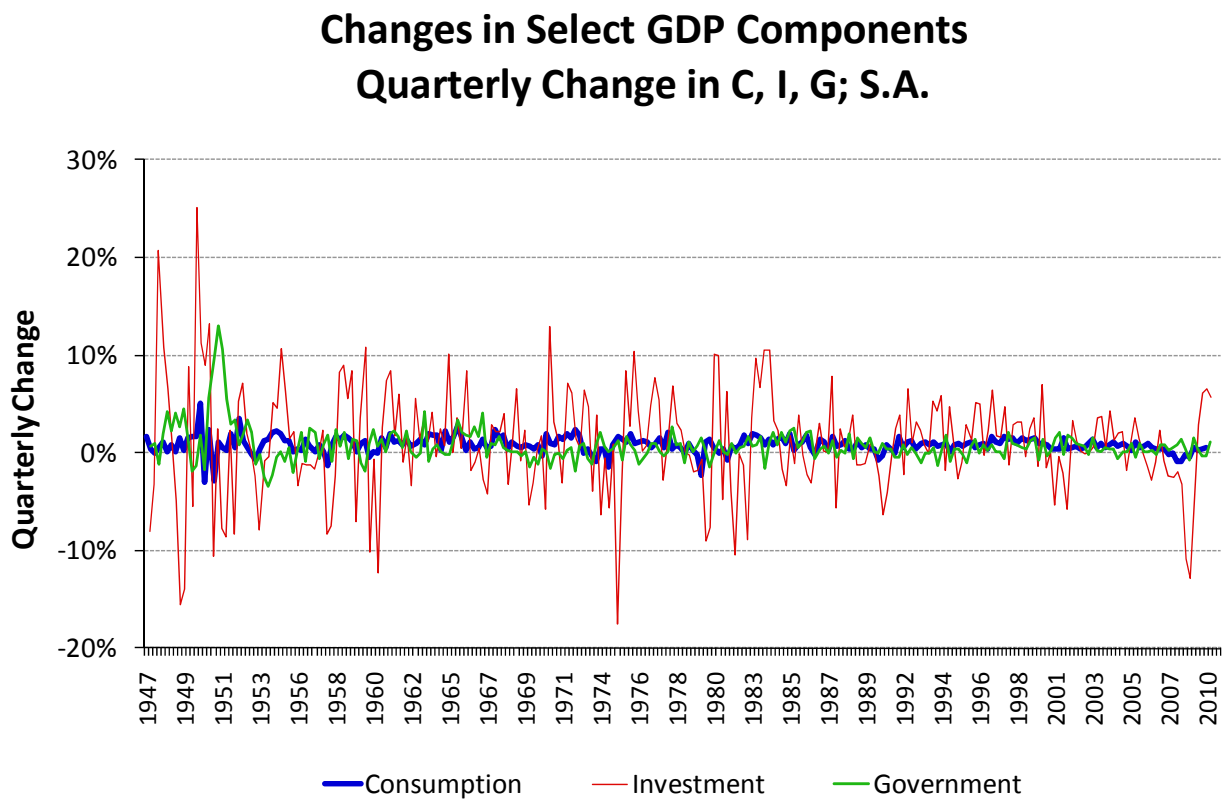


Figure 27

[20] The coefficient of variation is the standard deviation of the series divided by the mean of the series. It's a better measure of volatility because it controls roughly for differences in scale between two series. In this case, since our original series are growth rates, these two measures give similar qualitative results.

Another Look at GDP in the Business Cycle

Figures 28 and 29 give us another look at real GDP, across five recent business cycles. We simply construct an index number for GDP separately for each of the five cycles, set so the NBER turning point (peak or trough) equals 100. (See Figure 22, above, for the dates of the peak, and associated discussion).

Figure 28 presents the five sets of index numbers centered at the NBER peak, running 12 quarters before the peak to 12 quarters after the peak. Figure 29 is the analogous figure centered on the trough; this signals the recovery for each of the five cycles. The second oil price shock in the early 1980s was the double dip recession of 1981 and 1982. I combined the two here -- the expansion between the two dips was short and weak. Thus in Figure 28 I center Oil Shock 2's peak at Q1 1981, the peak of the first cycle; in Figure 29, the trough is the trough of the second recession associated with the second oil shock, Q4 1982.

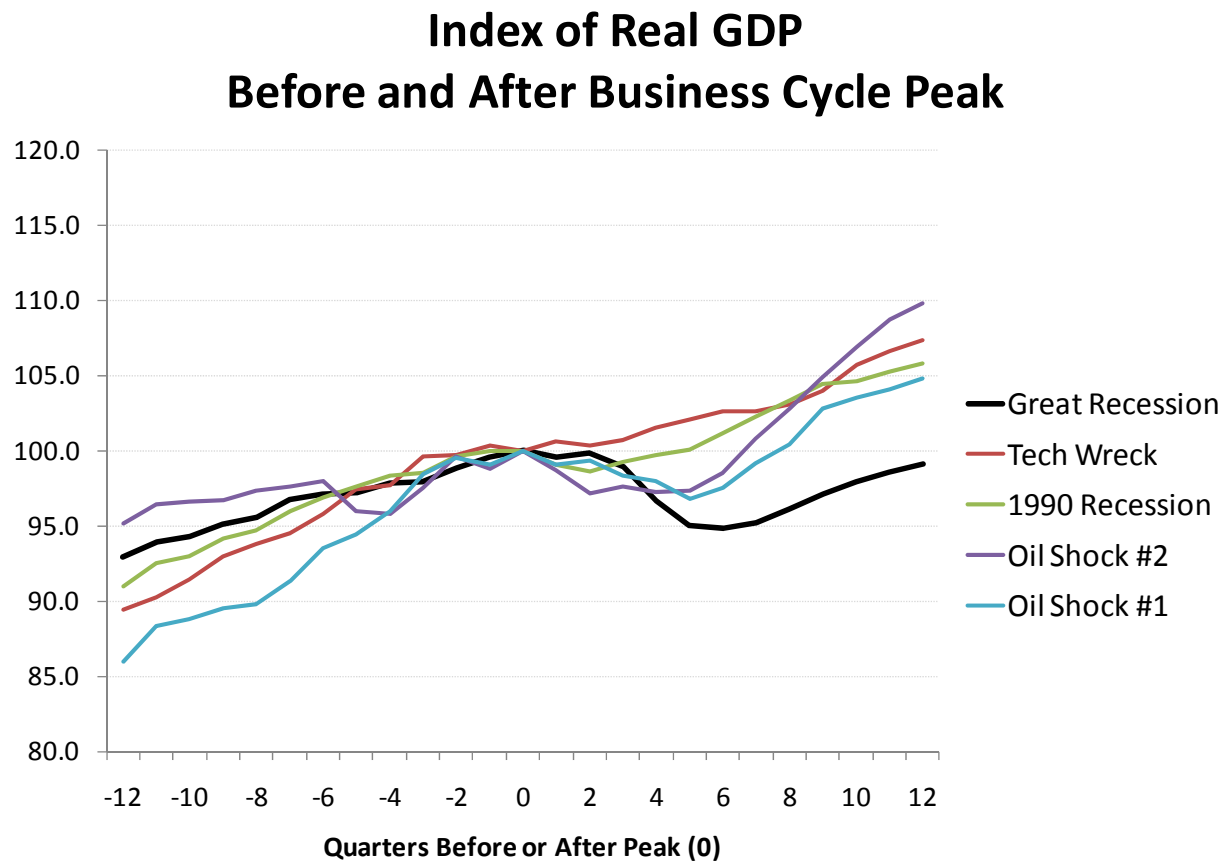


Figure 28

Figure 28 provides an interesting perspective on the recent "Great Recession." Examining the 12 quarters before the peak, we see that pre-peak real GDP actually grew relatively slowly before the peak, though growth before the second oil price shock was a little slower still. Pre-peak growth was fastest before the first oil price shock. After the peak, the great recession clearly exhibits the largest drop, and a slow rise. Generally the figure does not support the old saw that the faster the bone, the bigger the subsequent bust.

Figure 29 provides a slightly different perspective around the troughs. This figure highlights the anemic recovery, so far, from the great recession; but also shows that the other two recent recessions, after the tech wreck and the 1990 recession, were also very slow. Some observers have wondered whether structural changes in the economy (for example the declining share of manufacturing in the economy) might lead to generally declining rates of expansion. But as yet we have little solid evidence about this conjecture.

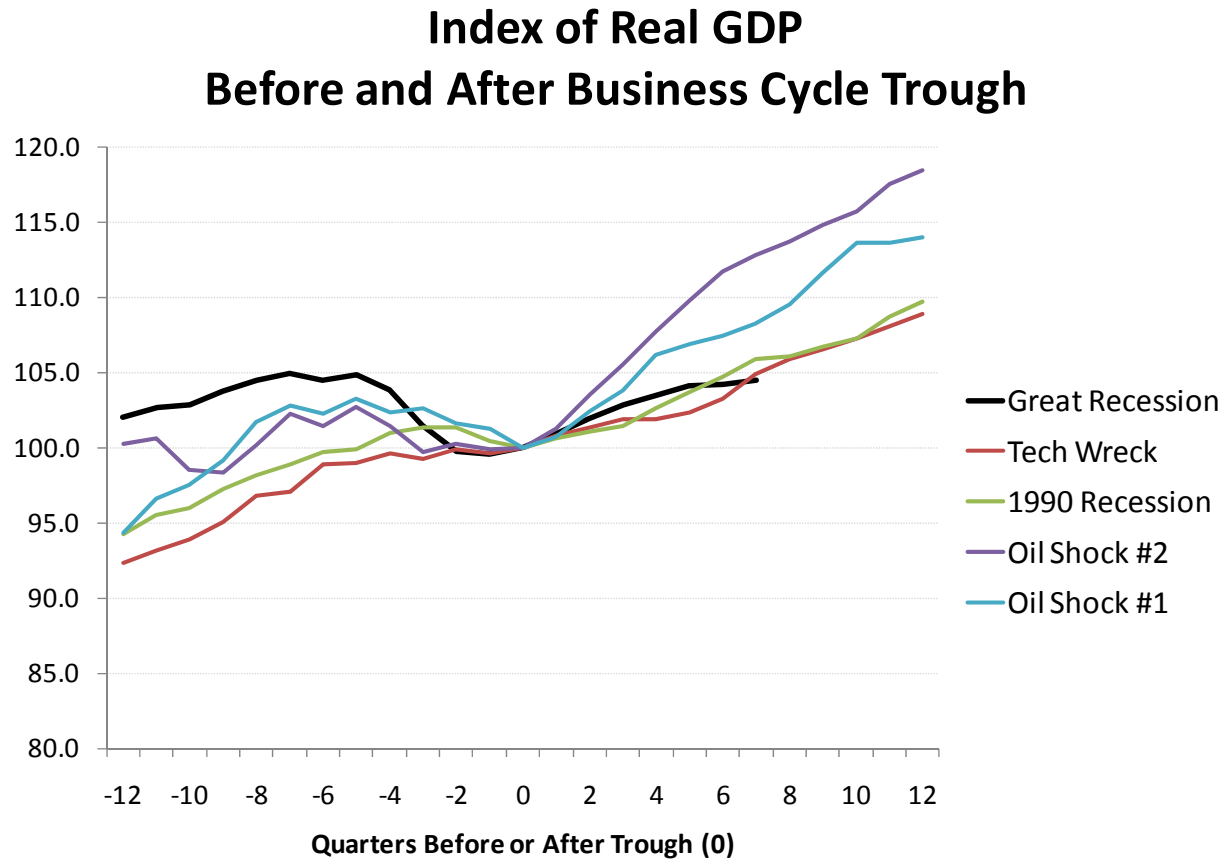


Figure 29

Consumption

Consumption is "the Big Lebowski," about 70 percent of GDP, and is the smoothest component. But not all consumption is growing at the same rate, nor are all components equally smooth. Figure 30 shows the three main classes of consumption. Over the past six decades, since WWII, inflation-adjusted long run consumption has grown an average of 3.4 percent. Breaking down by types of consumption, nondurable goods consumption has grown by 2.5 percent, durable goods by 5.1 percent, and services at a rate of 3.5 percent. At the end of WWII, services were only about 39 percent of total consumption; while by 2010 services are about 2/3 of the consumption bundle.[21]

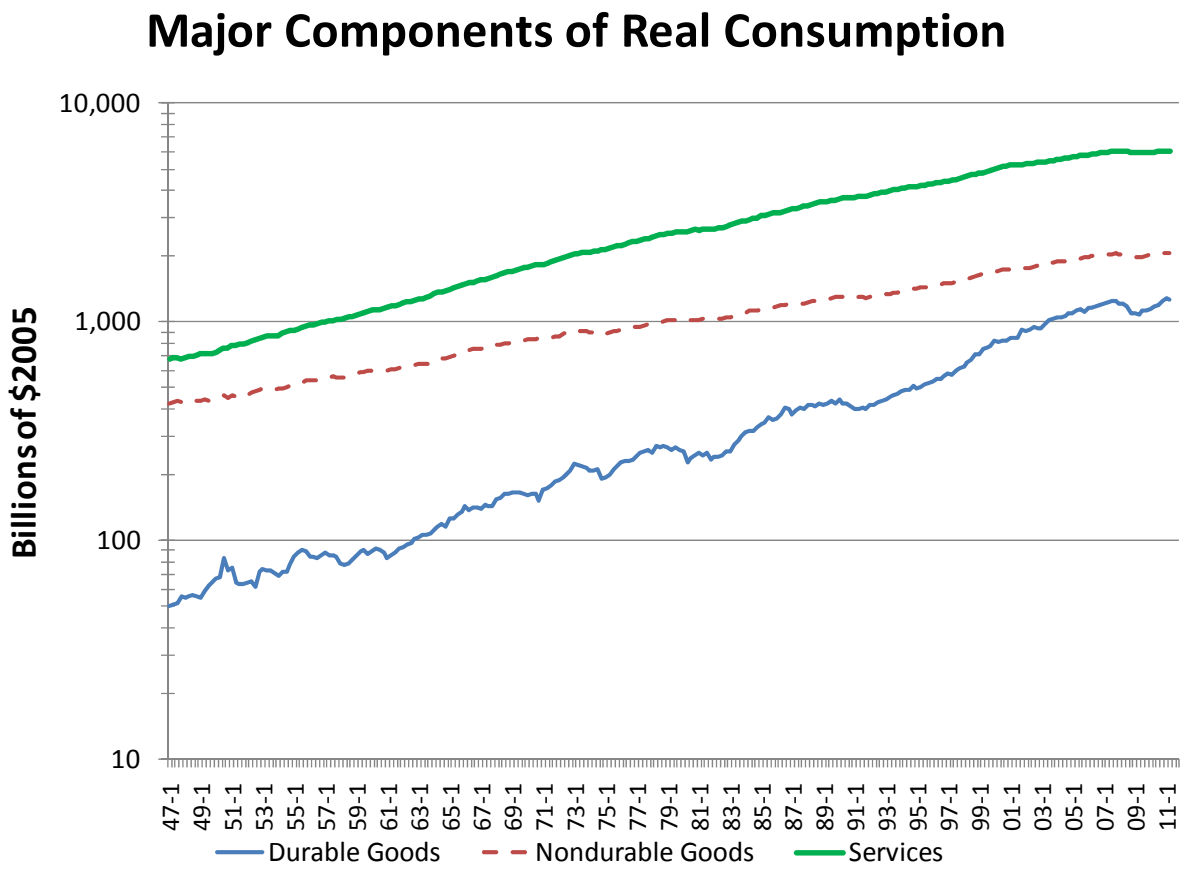


Figure 30

[21] The growth of services in consumption is hardly surprising; as incomes rise, how much more "stuff" can I consume, once I have a La-Z-Boy recliner, a plentiful supply of coffee and snacks, and the largest TV my wall can hold? But I can always take another run to EVP to be served a delicious cup of Tanzanian Peaberry, or hop a flight to DC to spend a day browsing the National Gallery. When I'm flush, I'm always looking to hire more students to do tedious data entry and help me run more regressions and draw more charts – all *services*.

Housing is both consumption, and investment. (We discuss housing as investment in the next section). It's part of services, and is roughly 18 percent of consumption. Housing consumption (including fuels/utilities) has recently popped up to over 13 percent of total GDP, as Figure 31 shows.

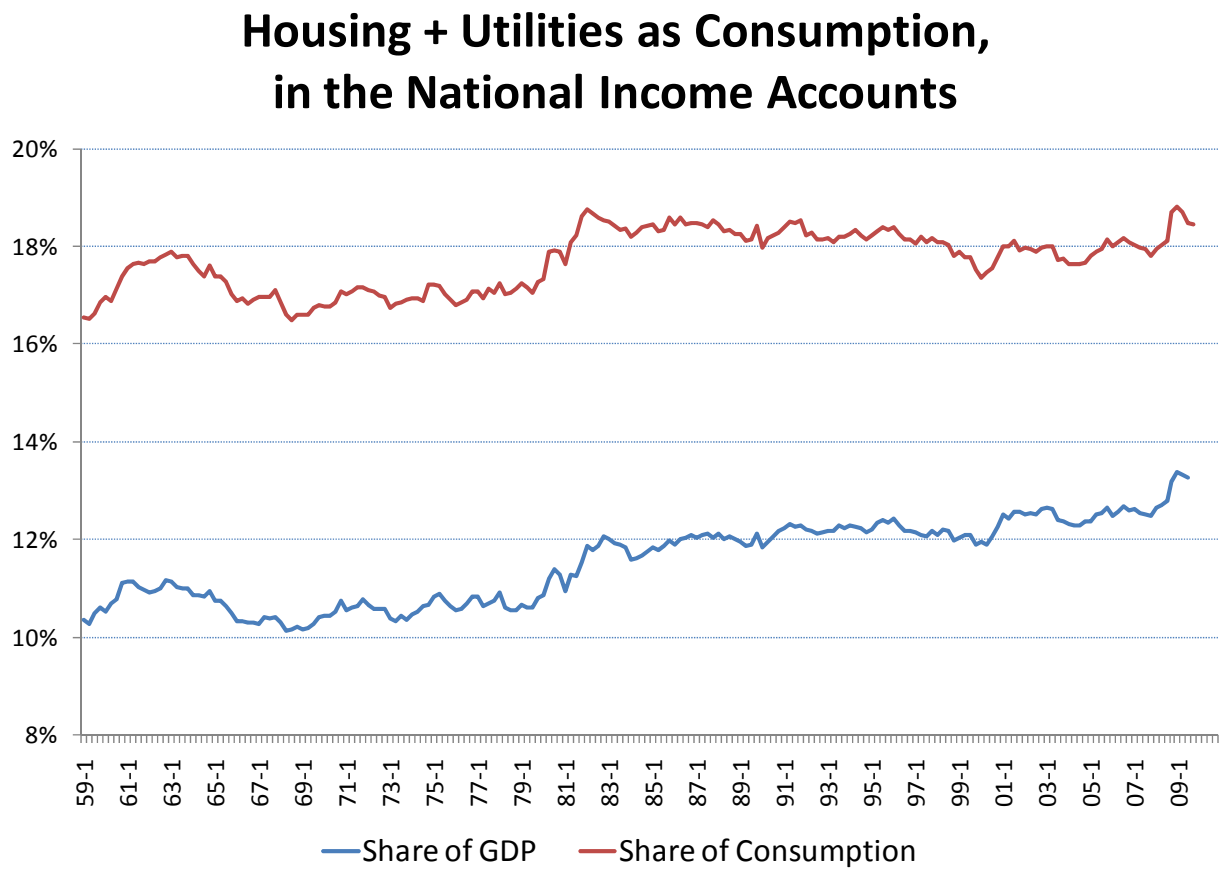


Figure 31

It's important to understand that the BEA does not measure housing consumption by direct expenditure. The big problem is homeowners – some have mortgages, some don't, mortgage terms vary – but that's about the mortgage, not the house. We want the consumption of housing, not what's spent on a mortgage.

Roughly, housing consumption for renters is rent plus utilities; but for owners, BEA uses regression methods to impute the rental equivalence for their units, i.e. BEA's estimate of what the unit would rent for, plus relevant utilities.

Investment

Now let us examine a few of the components further subdivided. We further split I into real estate investment, residential and nonresidential, and other (equipment and changes in inventories). We split government into federal, and state and local. We rewrite our NIA identity as:

Y = Consumption (Private!)
+ (Residential RE + Nonresidential RE + Equipment & Software + Changes in Inventories)
+ (State & Local Government + Federal Government Consumption & Investment)
+ (X-M)

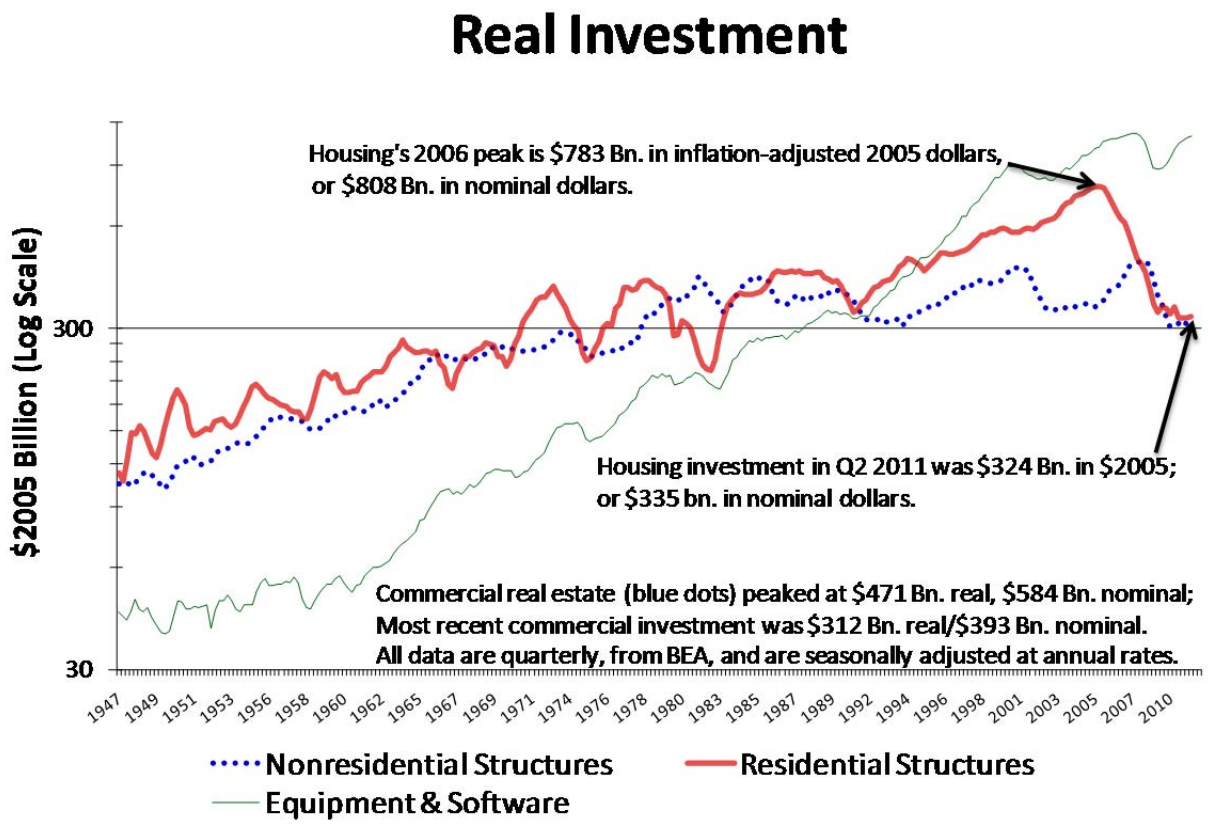


Figure 32

Figure 32 is in log scale, so we can compare slopes across categories and over time and interpret them as rates of change. Note the following. First, over most (but not all) years, residential investment exceeds nonresidential real estate investment; and total real estate investment often (not always) exceeds equipment investment and changes in inventories until 1996, when investment in equipment and software topped each of the real estate series for the first time, and has not ceded first place ever since, even during the "tech wreck" of 2001. The graph also shows quite clearly that in the long run, investment in equipment and inventories is growing much faster than real estate investment is growing.

Figure 32 also shows the large hit residential investment took in the Great Recession; and that it fell before other types of investment. Separately we'll examine the timing of residential investment and commercial real estate investment in the business cycle, but it's not too soon to note that in a typical business cycle, housing leads the recession; consumption then follows; employment and commercial real estate bring up the rear.

Government

The consumption and investment data we've just discussed comprise private consumption and investment. What about the consumption and investment of our governments? Figure 33 shows government direct spending (consumption and investment) for the federal and for state/local governments respectively.

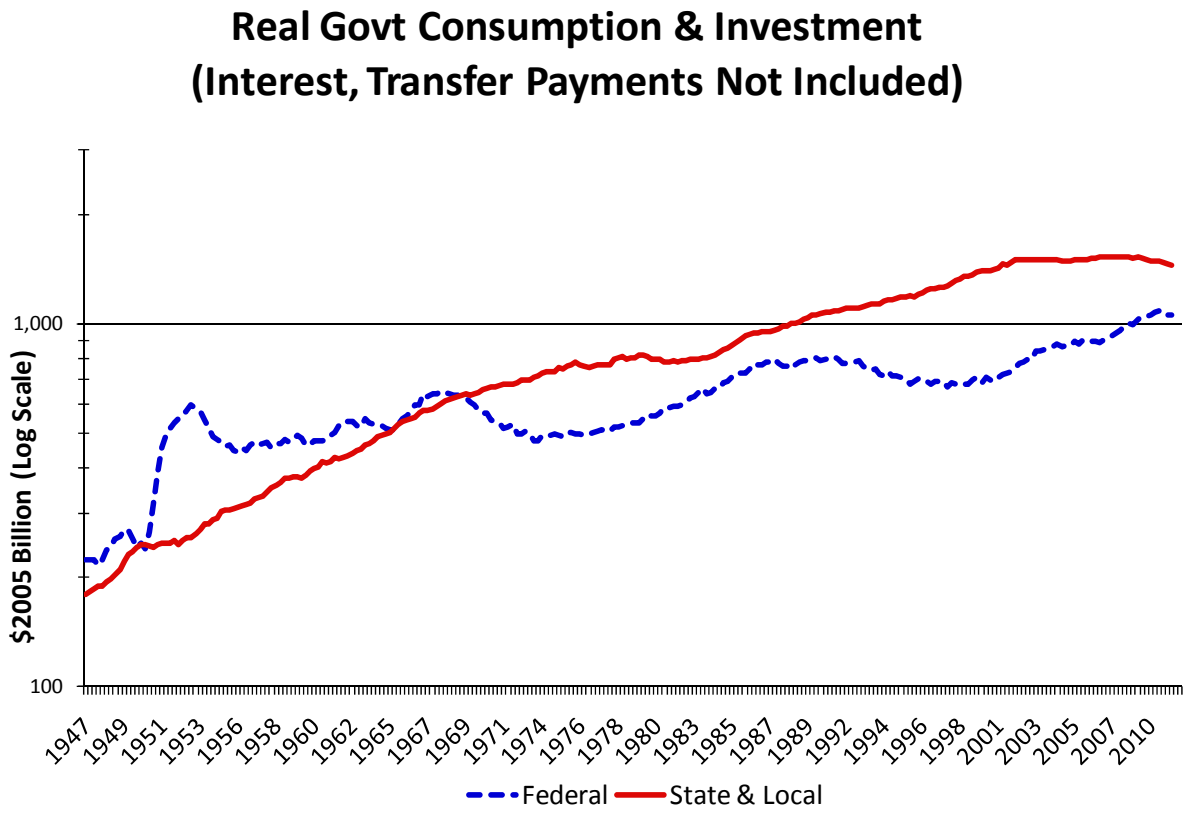


Figure 33

Figure 33 is really pretty surprising to most people. To begin with, real direct spending by the federal government has not been rising all that fast, if we look over the period since the Korean War. We see clearly the run-up in spending corresponding to the Vietnam War; and the 1980s defense buildup, and the "peace dividend" that led to large declines in military spending after the collapse of the Soviet Union. Through it all, state and local government spending rose inexorably.

Now, it's important to understand that these data are direct spending: what the government consumes or invests itself, e.g. when a road is built, or the government buys an F-18, for example. But a lot of government outlay in a given year is actually spent by someone else. For example, when the government sends my father his social security check, he turns around and spends it on food, clothing, etc. The same is true of welfare payments, or any so-called "transfer payment," as well as interest paid.

This seems a little arcane, but it's important to keep track of these kinds of things when calculating GDP, to avoid double counting. Since the government counts my father's consumption (financed with social security) in GDP, if we also counted cutting the check as part of GDP, we'd count each dollar twice!

The upshot is, when we are measuring GDP, we count transfer payments and net interest elsewhere (when the money is spent or invested), so we deliberately omit these categories from government spending in the NIA. But of course, for other purposes we are intensely interested in transfer payments and net interest.

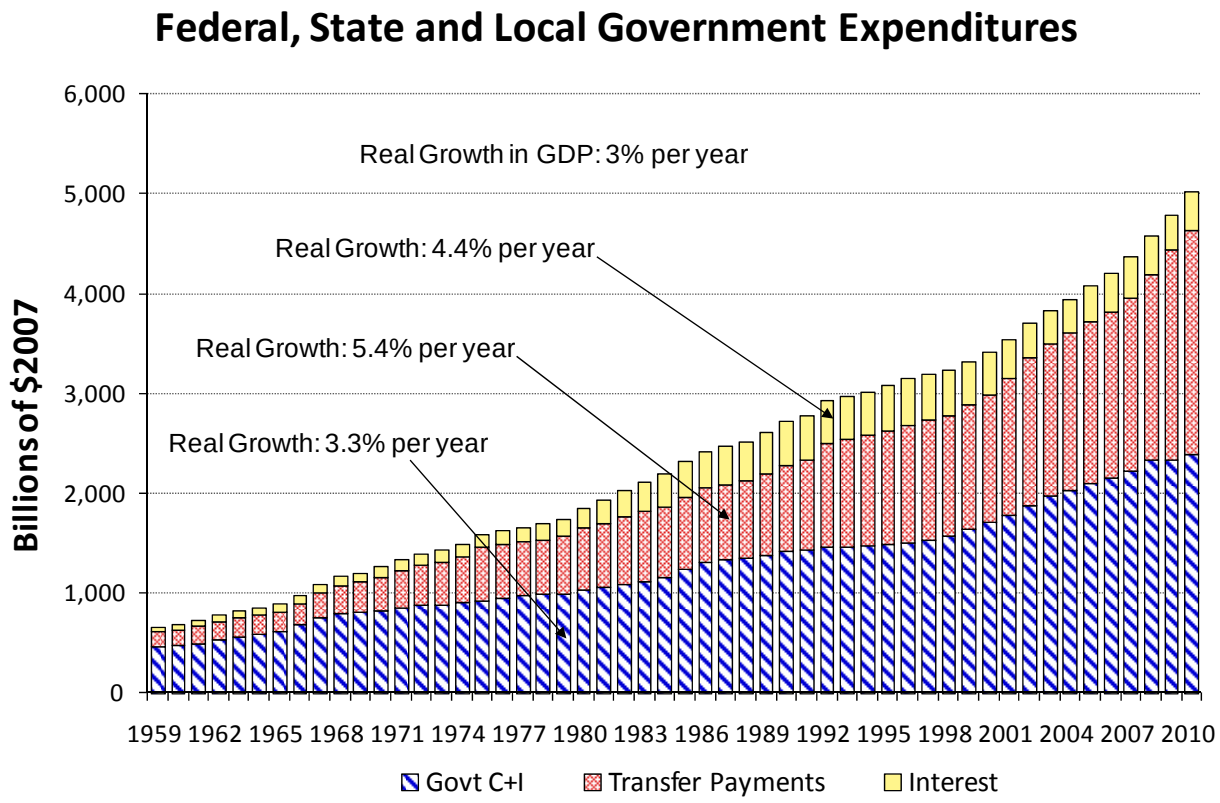


Figure 34

So let's add those transfer payments and net interest back in, and think about government at all 3 levels. Figure 34 presents this data from the *Economic Report of the President.* Federal, state and local government accounts are consolidated. The relatively modest growth in government consumption and investment is driven by state and local governments, as we have already seen. But the explosion in transfer payments is mostly federal. In fact, federal transfer payments rival federal direct spending now. And net interest has also grown very rapidly, though it's fallen a bit in very recent years; government debt has been increasing, but for the moment that's been offset by very low interest rates on said debt.

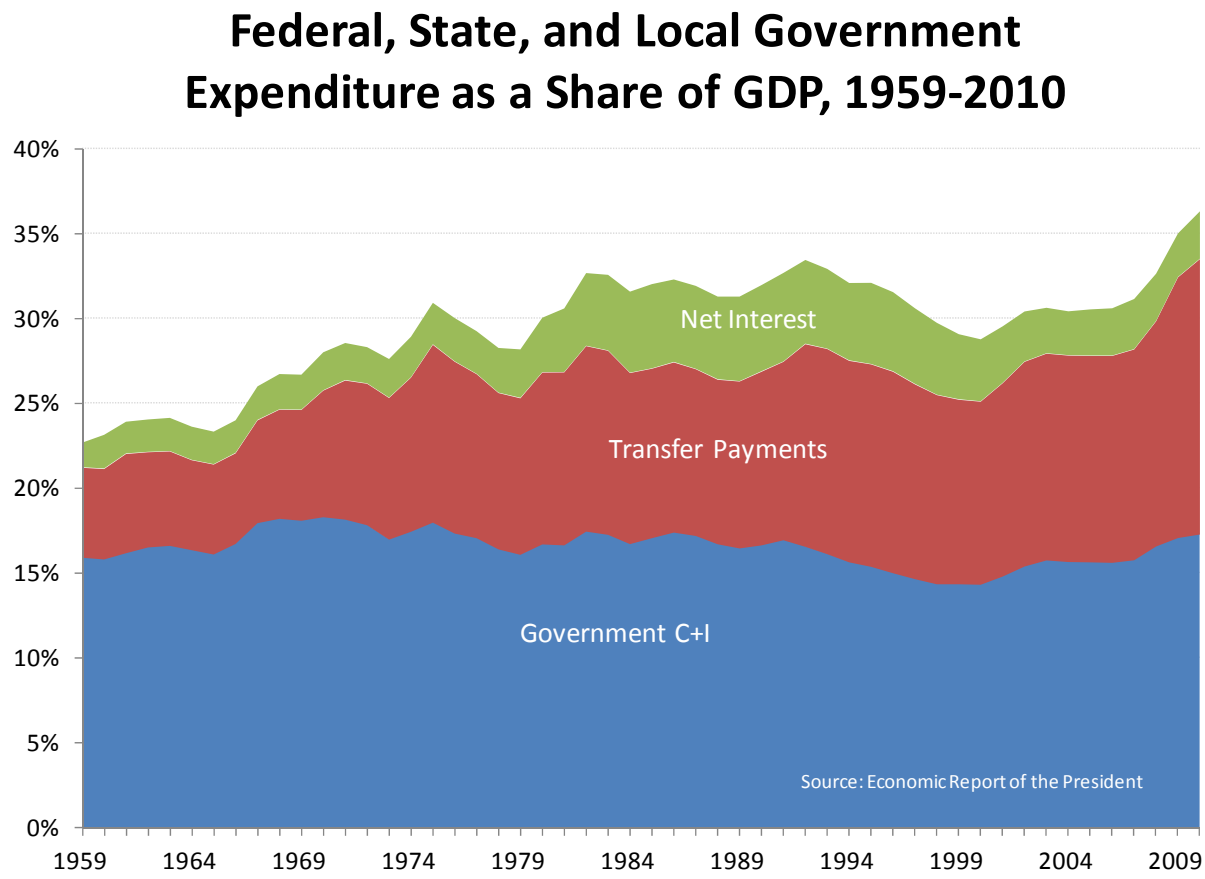


Figure 35

Figure 35 presents the same data as figure 34, except this time government expenditures are presented as a ratio to gross domestic product. Forty years ago total government – consumption, investment, transfer payments and interest – was about 23 percent of gross domestic product; recently it has exceeded one third of GDP. Figure 35 also highlights that the growth of government spending over the past five decades is due entirely to increases in transfer payments.

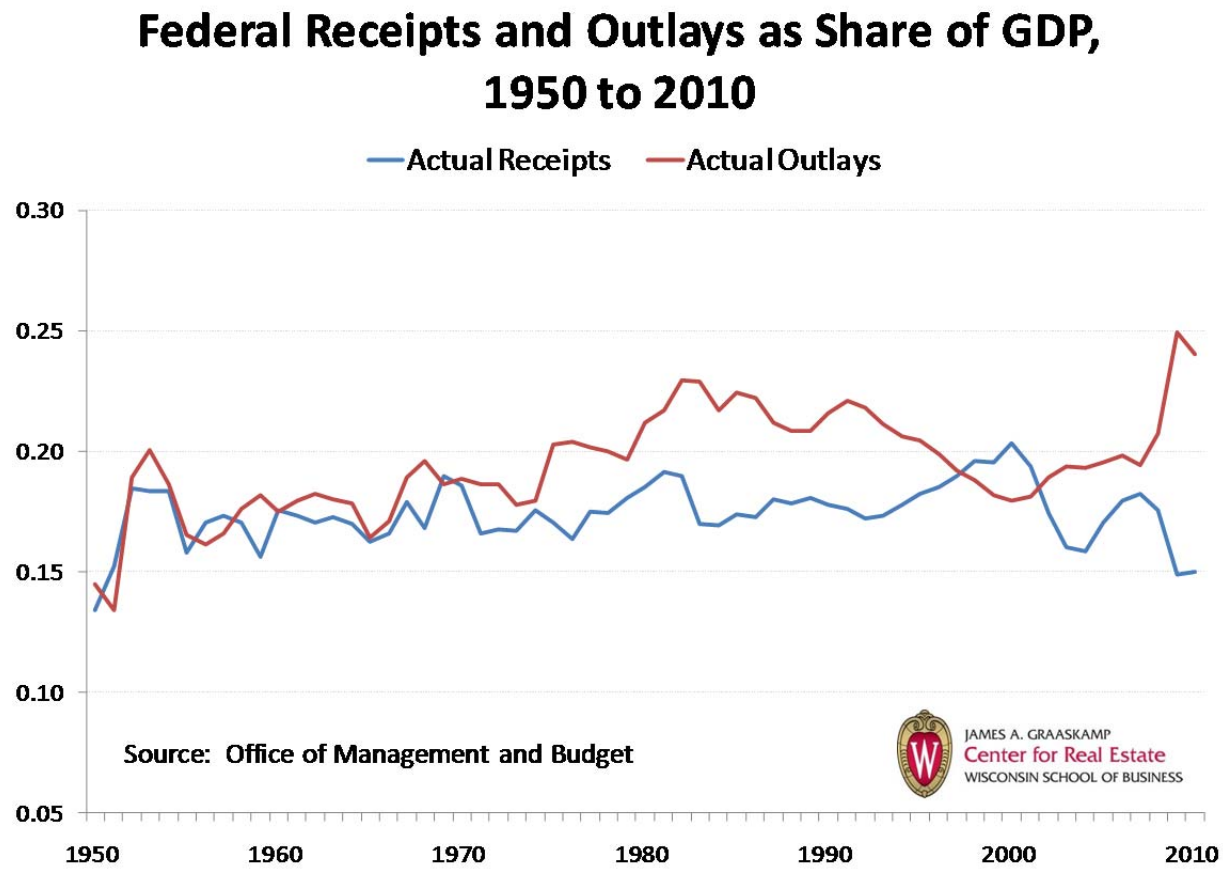


Figure 36

So far in this section we've focused on what government spends; how do we pay for it? In Figure 36 we drop the state and local data and return to federal expenditures and receipts, but continue with the broader budgetary definition of "G," i.e. interest and transfer payments.

Figure 36 presents actual outlays and receipts as a share of GDP, annually, from 1950 to 2010. Obviously, when the red line is on top, we're running a deficit; when the blue line is above the red line, it's surplus city. So Figure 36 shows that we are currently running the largest deficits, as a share of the economy, since WWII. We've managed to combine the highest spending since WWII (Medicare, Medicaid, two wars, "stimulus,"...) with the lowest revenues, as a share of GDP, thanks to the deepest recession, large tax cuts, and a complex set of tax expenditures that beggar belief.

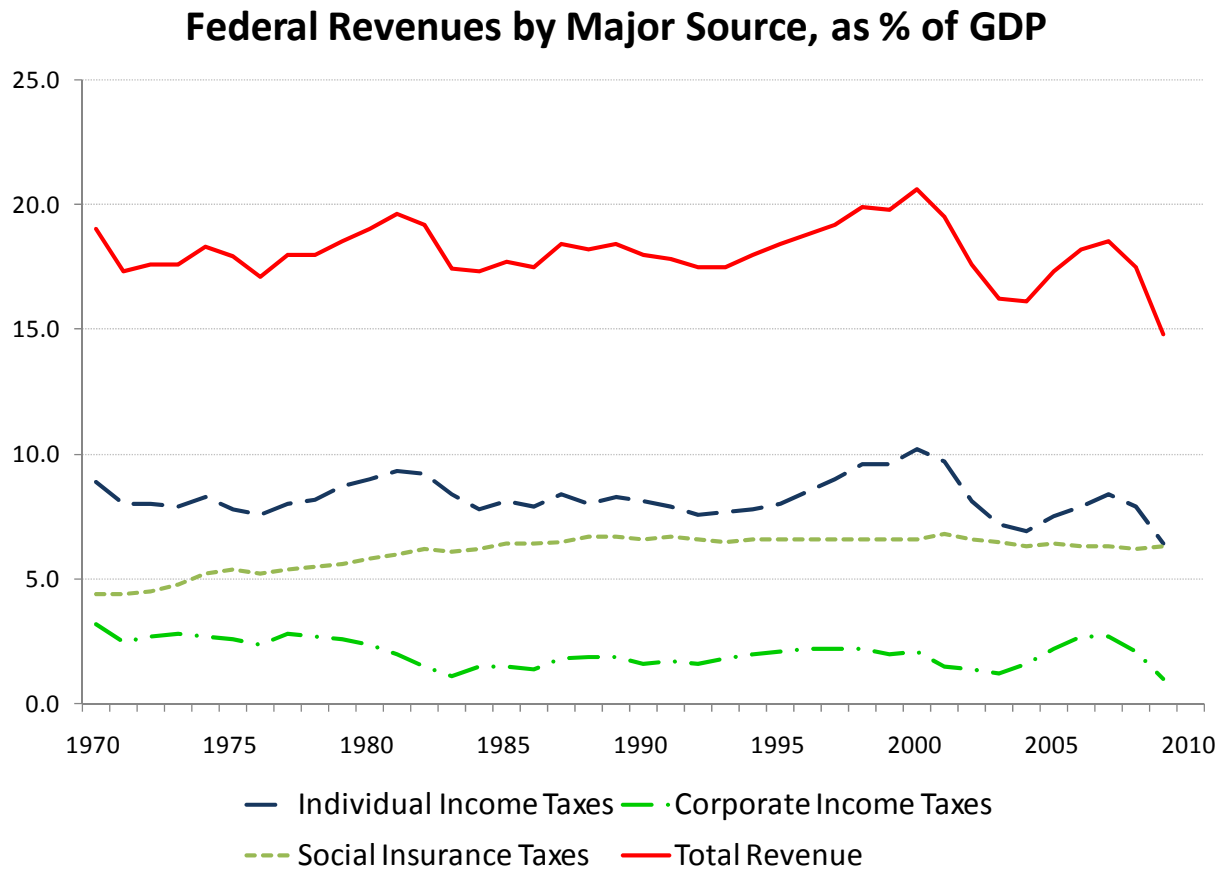


Figure 37

Figure 37 breaks down the federal revenue side by major category. It is often noted that about half the US population pays no federal income tax. Most of these non-tax-payers are poor, though a few who pay no tax are the so-called “superrich" who have arranged their affairs to legally escape most income taxation through trusts and other tax vehicles. See Johnston (2003). All this is true, but incomplete. Obviously rich and poor pay many other taxes at the state and local level. But at the federal level, social insurance taxes, known as Federal Insurance Contributions Act taxes (aka FICA) have slowly grown as a share of GDP. At the same time, individual income taxes have fallen to where they are now about equal to FICA in terms of revenue collected. Recently a worker’s FICA contribution has been set at 7.65 percent of income, up to $106,800 of taxable income. Employers also pay FICA, ordinarily at the same rate as employees. In a competitive labor market, such taxes, while legally paid by the employer, total compensation (not simply wages) are equated to productivity, on the margin, resulting in an equivalent pre-tax reduction in market wages (Mieczkowski 1969). Thus economists claim that in a competitive labor market, such employer-paid taxes are shifted to the worker; the economic incidence of the tax is such that the worker pays.

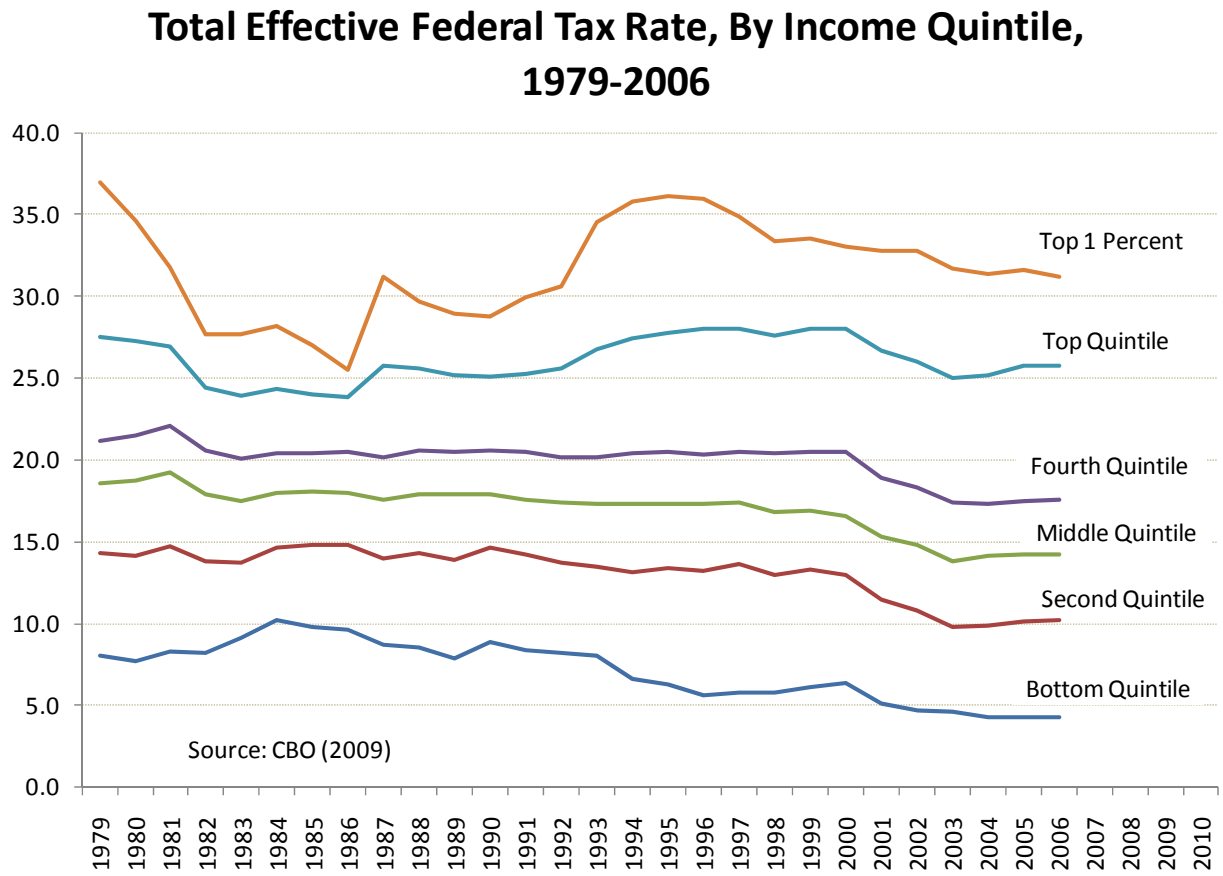


Figure 38

Figure 38 shows individual federal taxes including income tax, FICA, excise taxes and so on as a share of household income by income quintile as well as for the top 1%. The figure shows that federal taxes all land are broadly work on average progressive state taxes however especially sales taxes are regressive. We will add it on state taxes and teacher edition.

There are some interesting patterns and figure 40. You can see the effects of Reagan tax cuts circa 1981 taxes fell on the rich but increased on the bottom of the income distribution then later in his term he increased taxes on the top of the income distribution and the drops dropped taxes on the poor but not just as slow is still a previous level. Clinton's strategy reversed a pattern of attacks on the top quintile one up and fell on the bottom quintile while the taxes on the middle of the income distribution were essentially unchanged. George W. Bush's tax cuts lowered taxes on everybody.

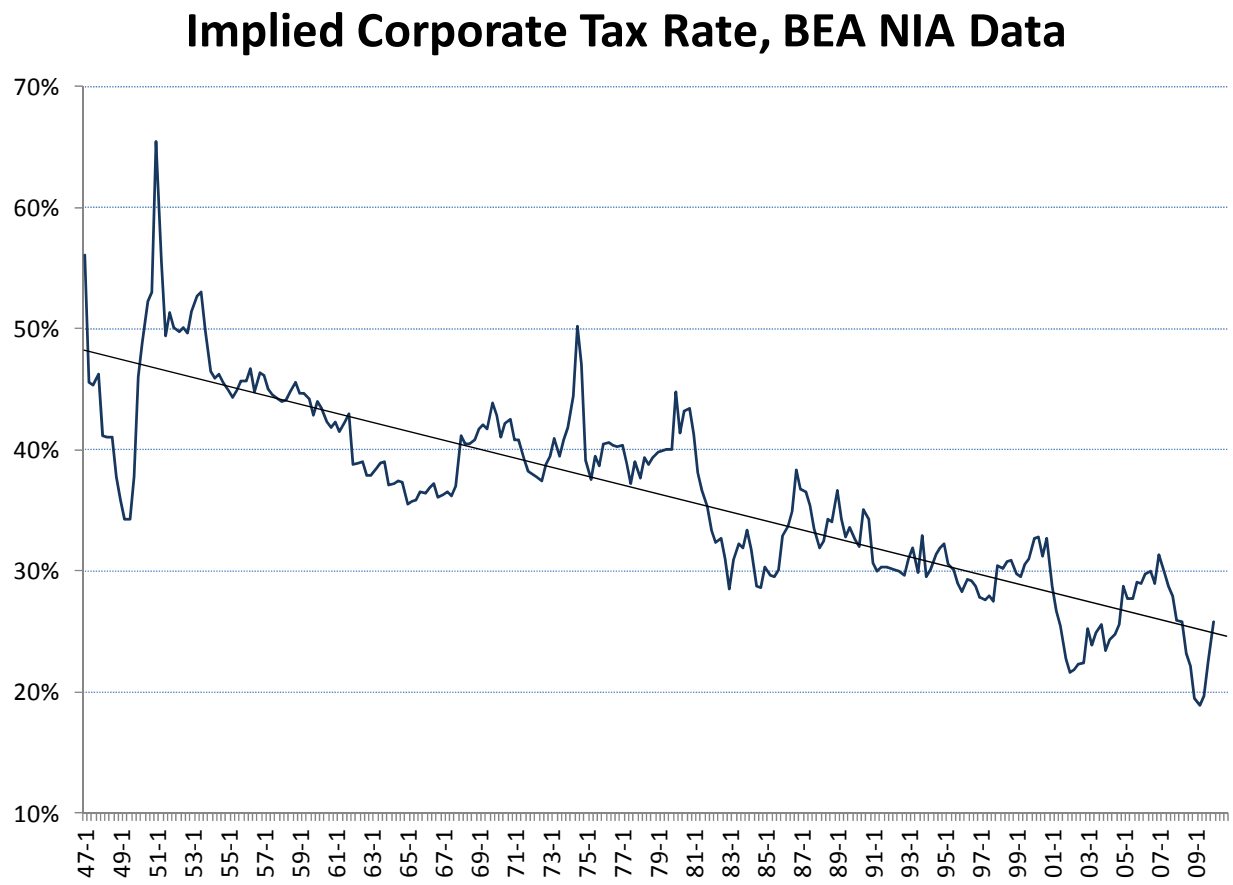


Figure 39

Many economists raise concerns about double taxation of corporate income -- once at the corporate level, and once when paid out as dividends. In a very simple version of the world, tax neutrality would suggest taxing at the corporate level or the individual level but not both. In practice, either practice would probably be readily "gamed," e.g. by failing to pay dividends and retaining earnings, perhaps nearly indefinitely; or by finding ways to create tax shelters that transformed ordinary income into untaxed "dividends."

Another complication is that the statutory corporate tax rate has little to do with the effective tax rate, at least in the United States. According to Prof. Aswath Damodaran, some industries average effective tax rates close to the statuatory level (utilities, 34 percent; auto sales 33 percent; trucking 31 percent) while others are much lower (computer software 10 percent, Internet services 6 percent, drug companies 6 percent, biotech countries 5 percent). A 2008 Government Accountability Office study found that 55 percent of U.S. corporations paid no federal income taxes during at least one year in the 7 year study period.[22]

[22] See http://economix.blogs.nytimes.com/2011/01/27/winners-and-losers-under-the-u-s-corporate-tax-code/ http://www.nytimes.com/2011/01/28/us/politics/28tax.html and http://www.nytimes.com/2011/05/03/business/economy/03rates.html

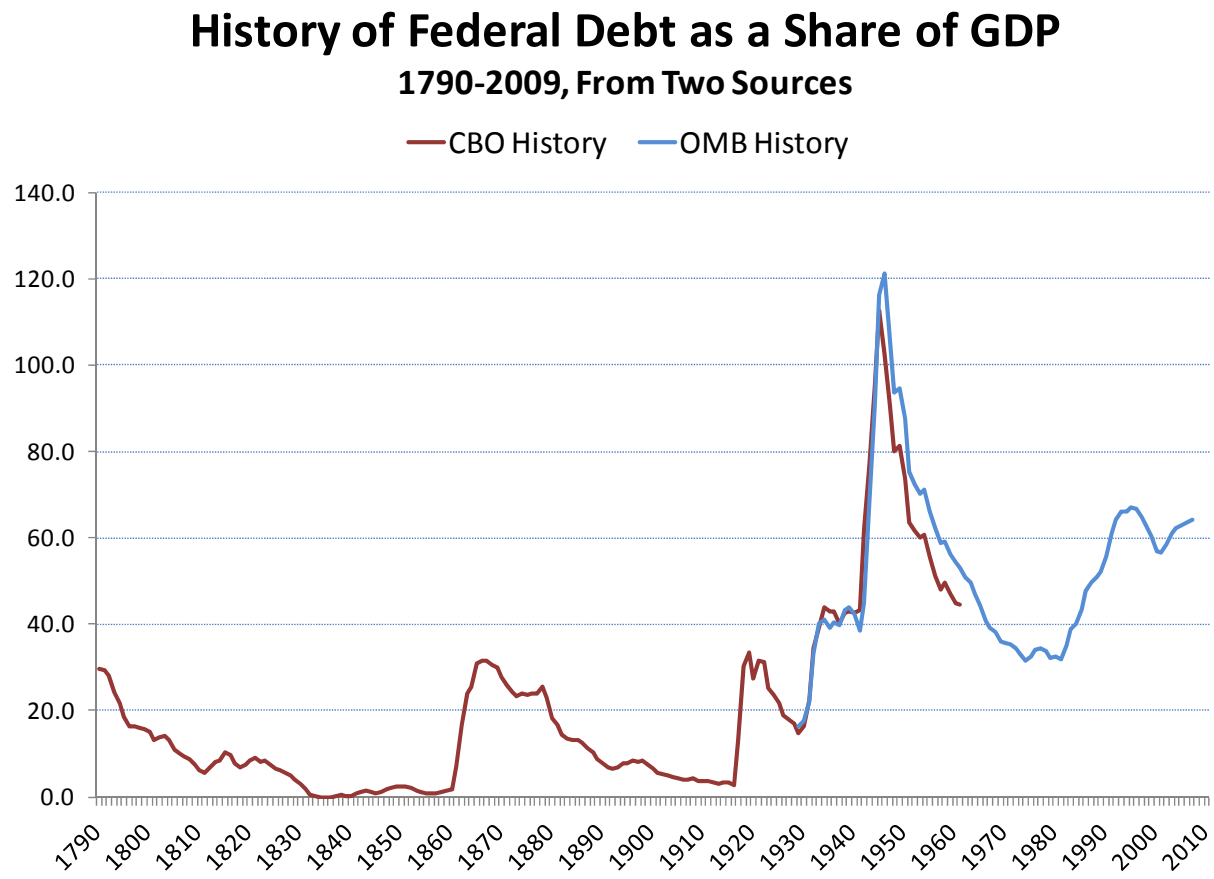


Figure 40

Government spending and revenue give rise to surpluses and deficits; these are flows. The stock of accumulated deficits (net of surpluses) is the federal debt. As of this writing in the federal debt is, of course, one of the hot button issues in American economics and politics.

Figure 40 provides a very long run perspective on the federal debt, from two different sources.[23] The main points from the figure are obvious. One of the big issues in the 1789 United States Constitution that replaced the 1781 Articles of Confederation was in fact the commitment of the new federal governments to assume and pay the debts incurred for during the Revolutionary war. Since that time, at least until the 70s, was for sharp increases in the federal debt to GDP ratio during wartime(especially the Revolution, the Civil War and World Wars I and II). After each war, a combination of modest surpluses economic growth and inflation ran down the high wartime levels of debt to GDP.

[23] I am somewhat mystified at the differences between the Office of Management and Budget and Congressional Budget Office data during the 40s, but qualitatively the data are quite similar during the years of overlap.

This pattern was broken in the late 70s; the Vietnam War was I no small part paid for through the implicit tax of inflation; and the debt-to-GDP ratio rose during the peacetime period of the 80s, as inflation subsided, taxes were cut, and government spending rose.

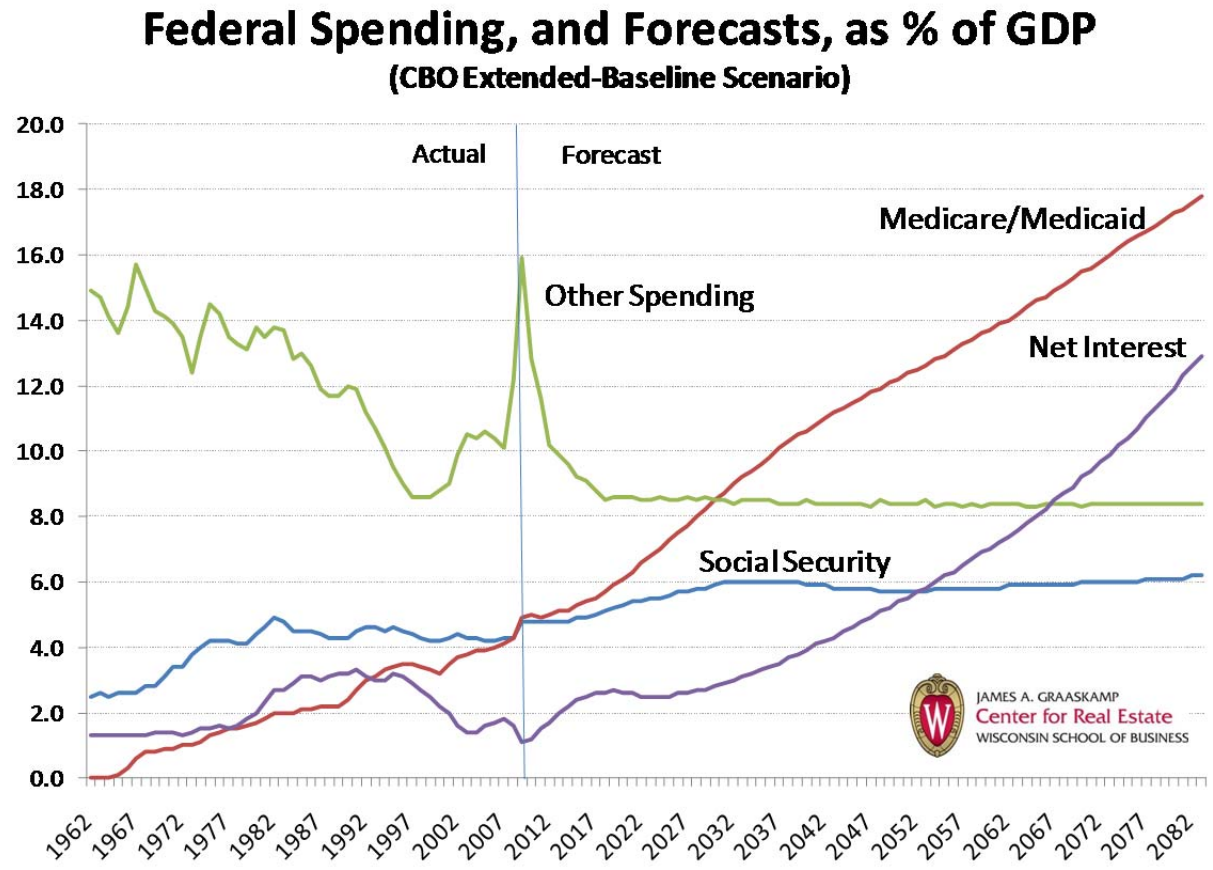


Figure 41

As readers are no doubt aware as of this writing we face serious federal debt challenges going forward that are not related to wars. Figure 41 presents the only *forecast* in this teaching note, namely CBO's forecast of several broad categories of federal spending. Assumptions built-in include reasonably precise forecasts of our aging population, that partly drive the Social Security, Medicare and Medicaid projections. The other large drivers of the forecasts are increases in medical costs similar to our recent history; and increasing interest payments on the resulting debt.

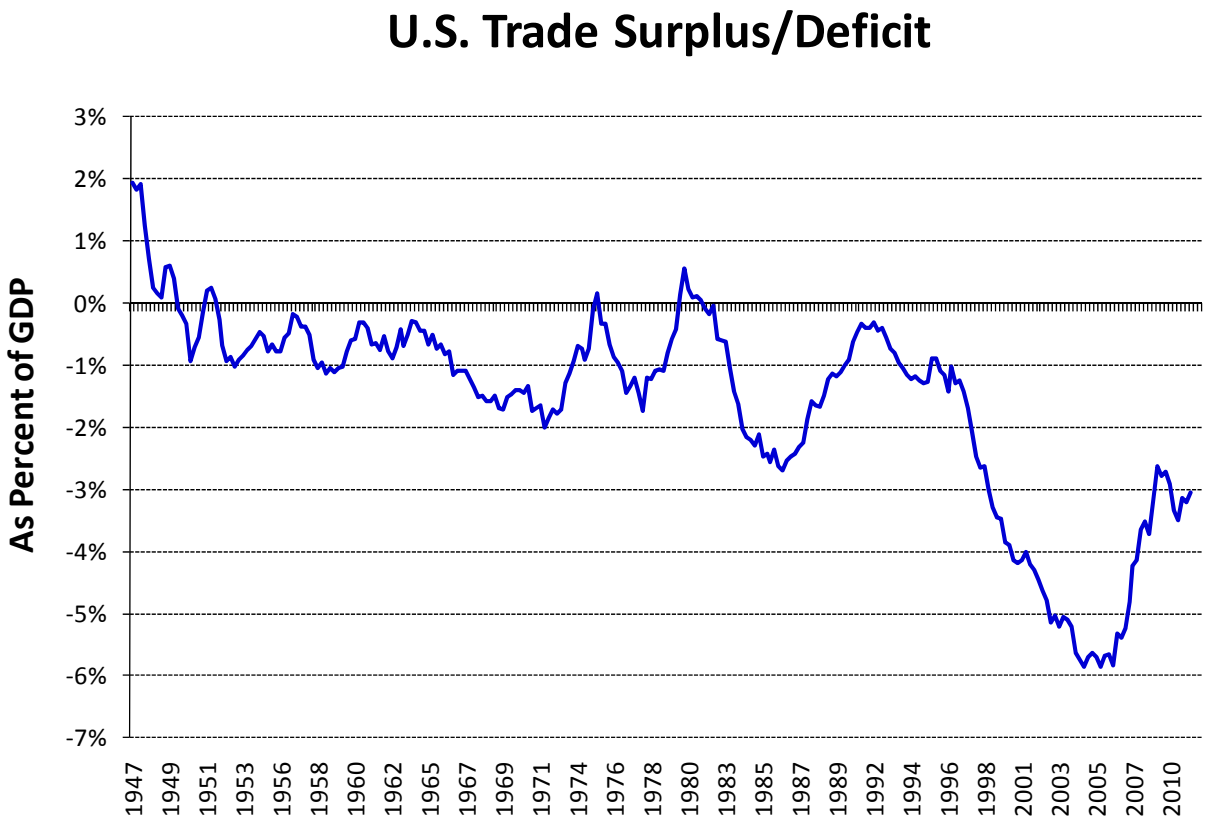


Figure 42

Figure 42 shows what's happening to X-M, net international trade. From the point of view of national income accounting, when we calculate GDP we add in the *net* balance of trade. We've already seen that's pretty small in absolute terms. When trade is in balance (not often lately), the contribution of exports to GDP is offset by imports.[24]

What Figure 42 omits, is how fast exports and imports have grown, i.e. how much bigger the "traded goods" sector is compared to the 50s. Figure 43 shows the two components, X and M, separately. In the 50s, exports were around $50 billion in $2005, or less than 5 percent of GDP; and now they're around $1.7 trillion, or 13-14 percent of GDP. The qualitative pattern for imports is similar, though obviously somewhat higher than exports in recent years.

[24] Discussion question: does this imply that imports are a "bad thing?" Colbert thought so. (Not Stephen, the other one). What's fallacious about such reasoning? Who the heck was "the other" Colbert?

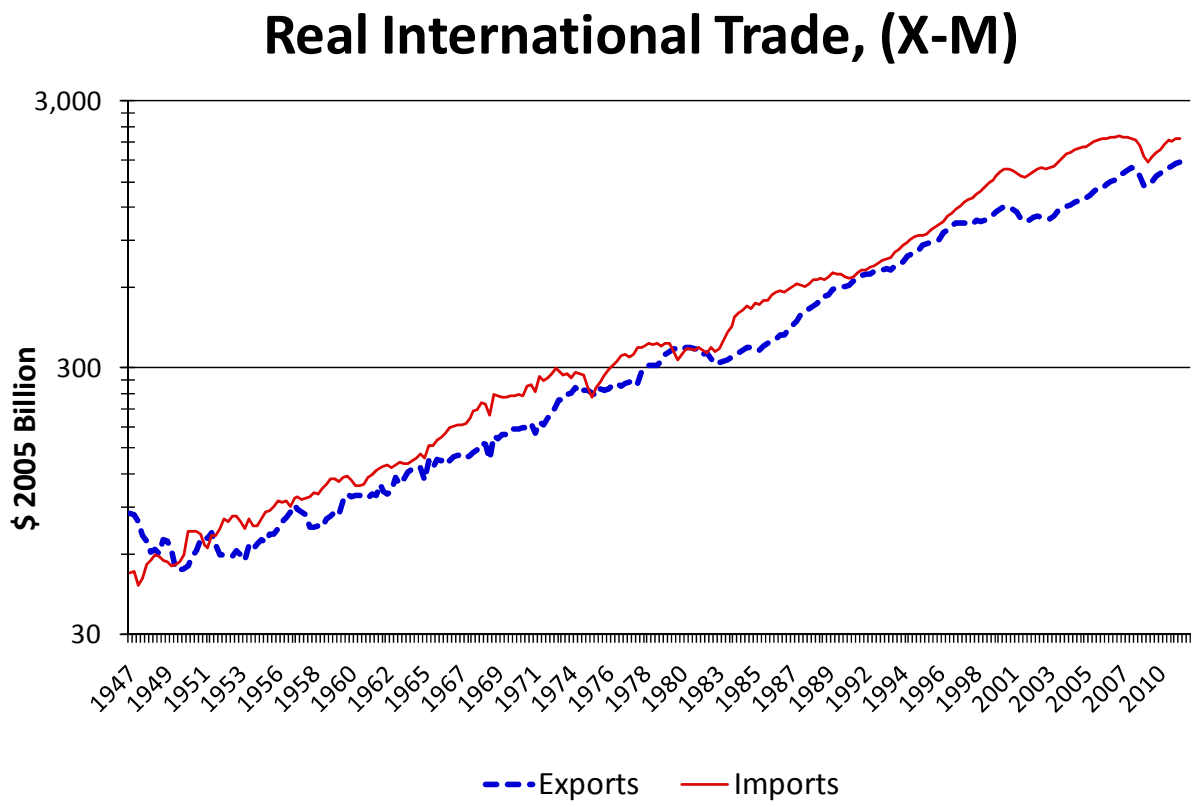


Figure 43

Where do trade deficits come from? This in one of the important issues in everyday economics that most non-economists fundamentally misunderstand. In the media it's often portrayed as if our trade deficit is something "done to us" by nefarious Chinese commercial policies; or Japan's, or Germany's, or Mexico's. Perhaps we shouldn't be surprised that our political leaders don't put much effort into righting this misunderstanding. In fact, as we'll discuss later in class, the main reason for our persistent trade deficits lie within our own choices. It turns out we have a trade deficit largely because we have persistent government budget deficits, and we don't save as much as we need to invest.

Exchange Rates

The simple version of trade written out above abstracts from exchange rates – so far we've held them constant. But another way markets adjust across countries, of course, is through exchange rates.

Why would *real estate* professionals concern themselves with exchange rates? Obviously they are of interest if you are investing overseas, or working to attract global capital. But there are many important, but indirect issues. For example, why do you think despite all the horrific economic events of 2008-2010, mortgage rates are still around 5 percent? (Remember, the Fed usually only directly controls short term rates.) No small part of the answer is: foreign investors in U.S. long term paper. *If* the dollar were to take a long and substantial slide, would these investors remain? Food for thought.

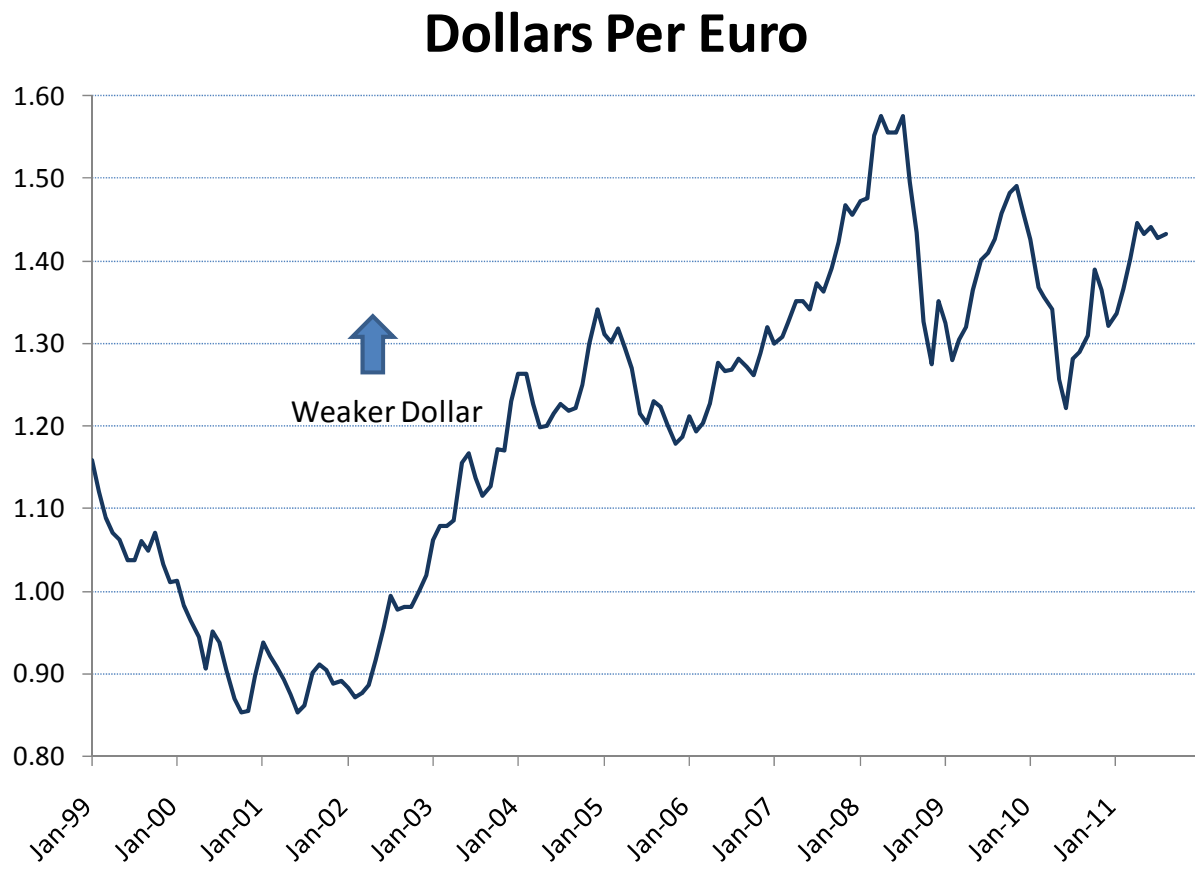


Figure 44

Figure 44 is a good place to start, since Europe is a major trading and financial partner, and many students will participate in field trips to MIPIM or ExpoReal. In January 1999, the Deutschmark, franc and numerous other currencies went away, and were replaced with the Euro, initially set at €1.00 = $1.15. Initially the dollar strengthened against the Euro for a few years, but since then the dollar has broadly slid; despite some strengthening in early 2008, it now takes about $1.45 to buy a Euro.[25] The big question today is, what will happen over the next several years, and what does the market expect will happen?

We could present dozens of charts with the dollar compared to pounds, pesos, renminbi, Canadian dollars won, rupees, reals and so on. The Federal Reserve is one source of a weighted average of many currencies, weighted by each country's share of U.S. trade. Figure 45 presents this index.

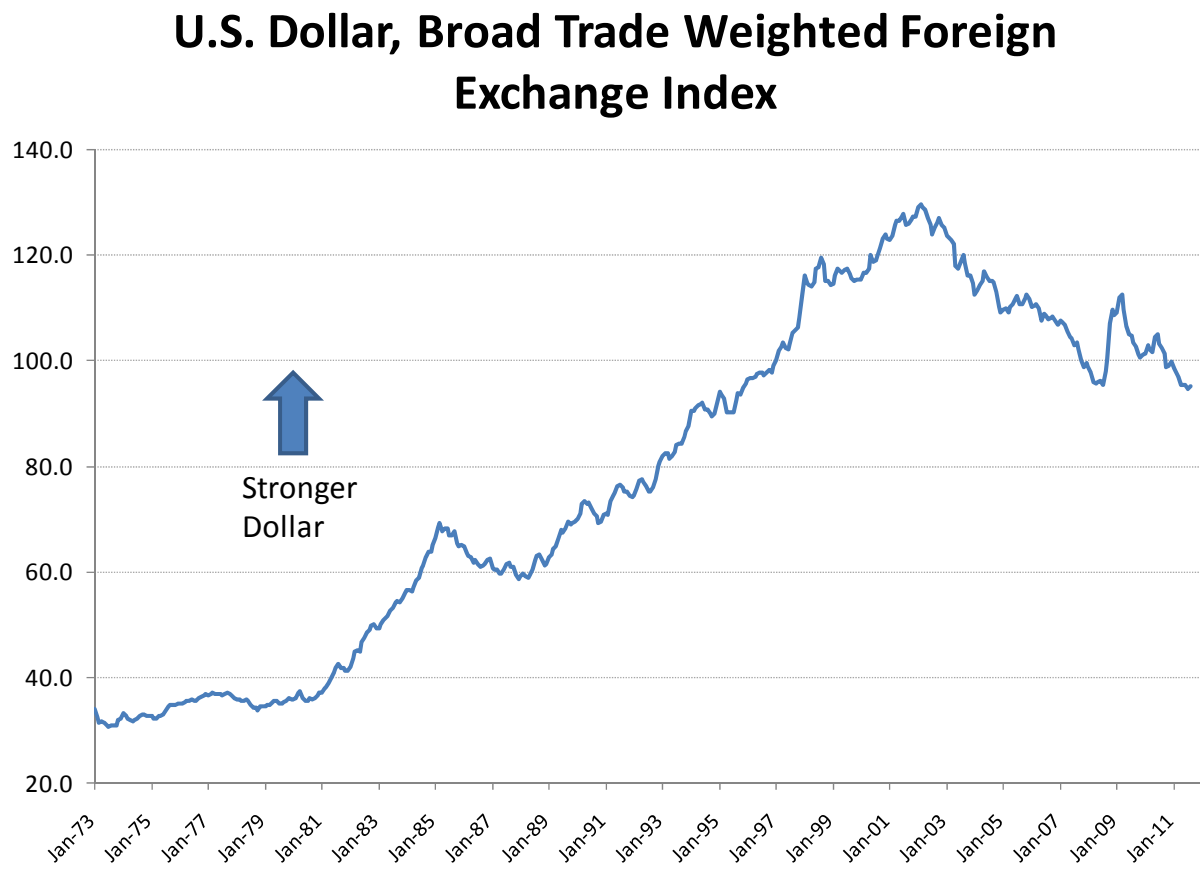


Figure 45

[25] There are many sources of exchange rate data, including the International Monetary Fund website. Many of the major (and some minor) currencies can be found at the St Louis Federal Reserve's website. They have a very convenient data compendium, called "FRED" (Federal Reserve Economic Data), at http://research.stlouisfed.org/fred2/ .

All these Figures report market exchange rates. In some contexts we'd use so-called purchasing power parity (PPP) exchange rates. PPP rates are used when comparing living standards across countries. These adjust market rates for differences across countries in the price of non-traded goods (primarily – wait for it – real estate!) But you can't buy and sell currencies at PPP rates; while they have their uses, it's good old-fashioned market exchange rates that drive trade and capital flows across countries.

Figure 44 and 45 are those that are directly observable in the foreign exchange markets. In a future edition I will also discuss the so-called real effective exchange rate, which adjusts for differences in inflation between the two countries in question.

V. Employment

Employment is a critical economic variable that can be measured and approached in several ways, as we'll see. It's often viewed as a fundamental driver for many real estate markets; in a later exercise in RE 720 we'll examine how to estimate the time path of specific employment related to given property types, e.g. the employment (industries and job types) most relevant to office, or industrial real estate, say.

Monthly employment is probably the most carefully watched economic report in the U.S. (except for the day's stock market prices – and unlike daily stock market prices, monthly employment contains some real information on the state of the economy. The stock market does too, if you discipline yourself to look at, say, monthly averages over a period of years. The daily news on the stock market is mostly noise.)

There are actually two widely followed sources of U.S. aggregate employment data – a household survey of about 60,000 (carried out mainly by phone and mail); and an establishment or payroll survey, of about 400,000 plants and other places of business. Both are reported on the Bureau of Labor Statistics website http://www.bls.gov. (There are other sources, notably weekly data on unemployment claims, data on temporary workers from ManPower, and another BLS survey effort on "gross flows" or "business dynamics," about which more later).

Generally, the household-based data comes out faster, but the establishment data are considered more reliable. There are other differences. For example, consider a worker with two part-time jobs. In the household survey she will be counted as one worker, whereas in the establishment survey she will be counted as two workers. (At least conceptually. Given the sampling design this one person might or might not actually be sampled twice in the establishment survey (probably not!) but she'd be twice as likely to be counted as an equivalent worker with only one job; which leads to the same over counting result.)

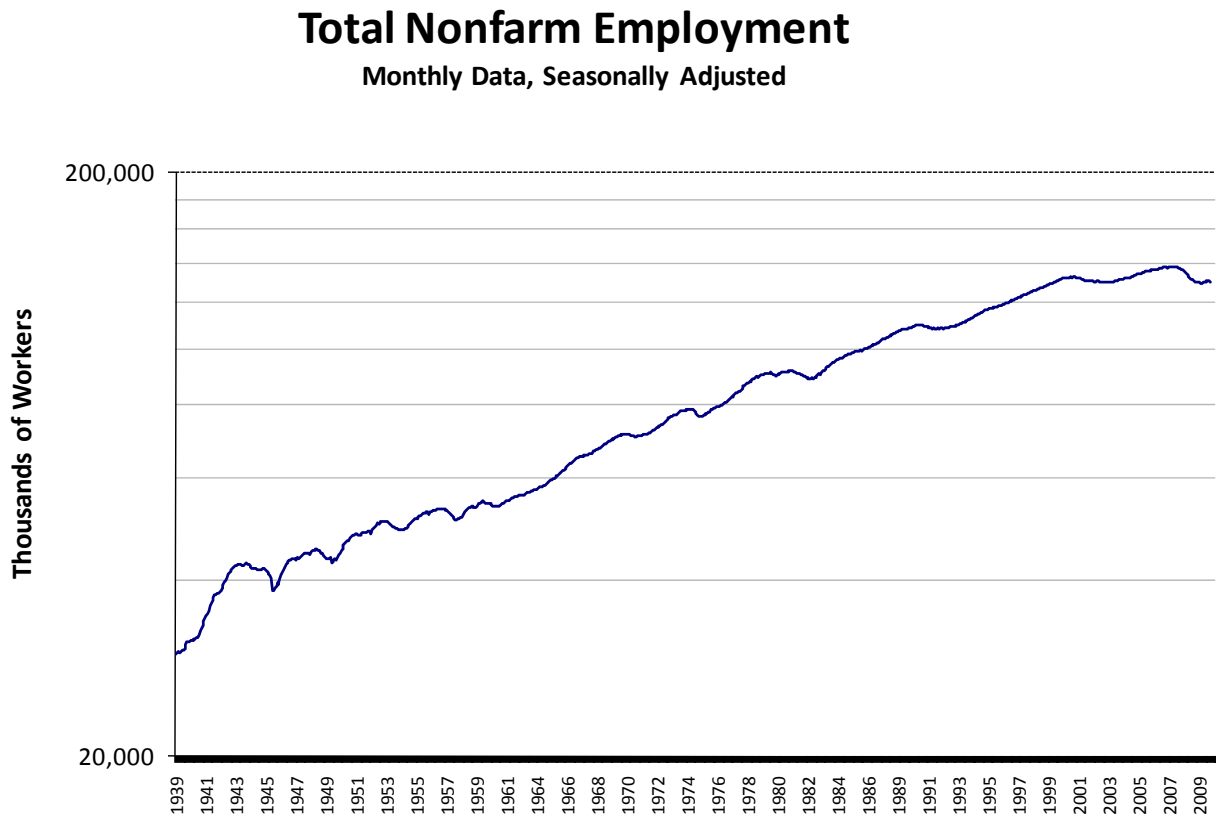


Figure 46

Monthly data on employment go back to 1939. Figure 46 presents this bellwether data, seasonally adjusted at annual rates. Figure 47 is a closer look at recent data.

Employment has fallen since the Great Recession began in 2008; the red line in Figure 47 presents a simple extrapolation of employment if trend growth had continued during the past two years. The gap today is roughly 14 million.

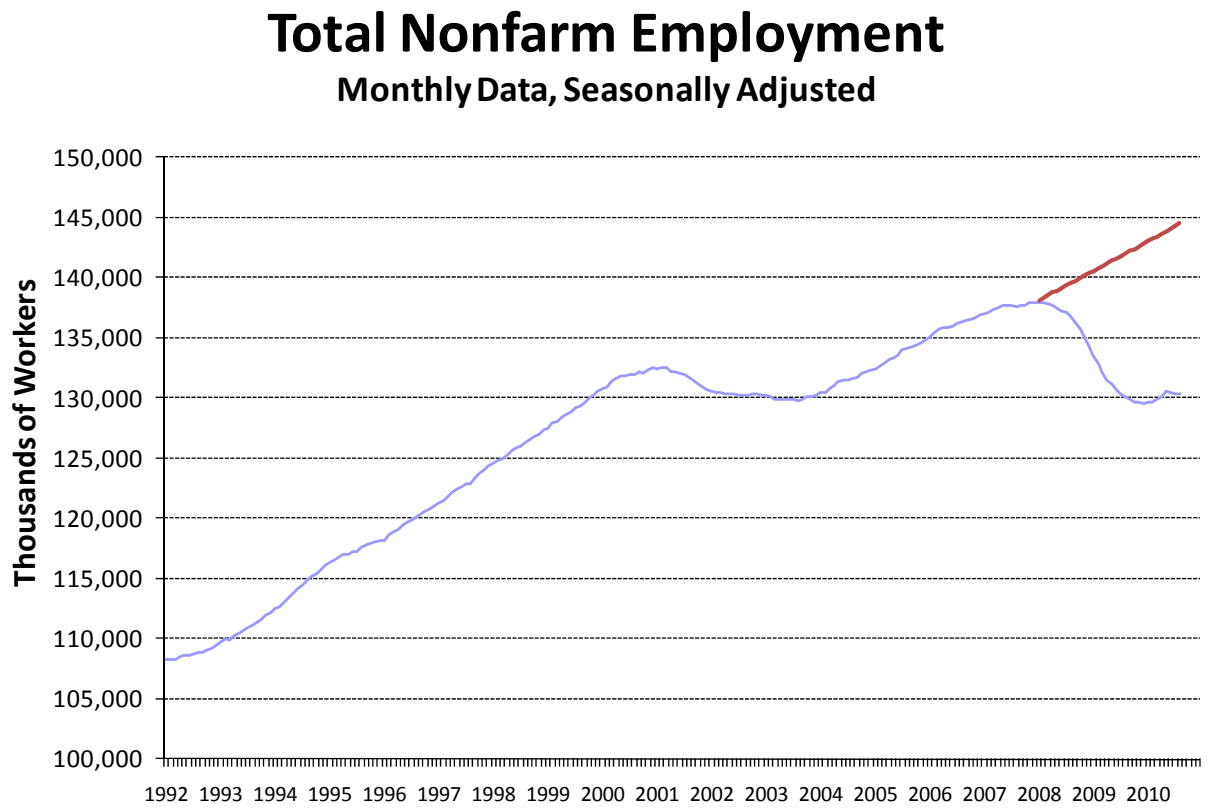


Figure 47

Employment can be viewed as the interaction among several phenomena:

-- The size of the *potential labor force*. In the U.S. this is most often measured as the non-institutional civilian population over age 16.

-- *Labor force participation*. Of those who might work, how many actually currently participate in the labor force, or try to? In the U.S. we usually define participation as either working, or trying actively to find a job. The labor force participation rate is the size of this labor force, divided by the potential labor force.

-- Those who succeed in obtaining employment, part time or full time; by definition, the employed are a subset of those who participate.

-- The unemployed, at least by the usual "headline" definition most widely reported, are those who are actively seeking, i.e. participating, but have not yet found work.

We'll examine each of these in turn. Then we'll take a brief look at some simple but important labor force dynamics, namely the difference between gross and net changes in employment.

The Potential Labor Force

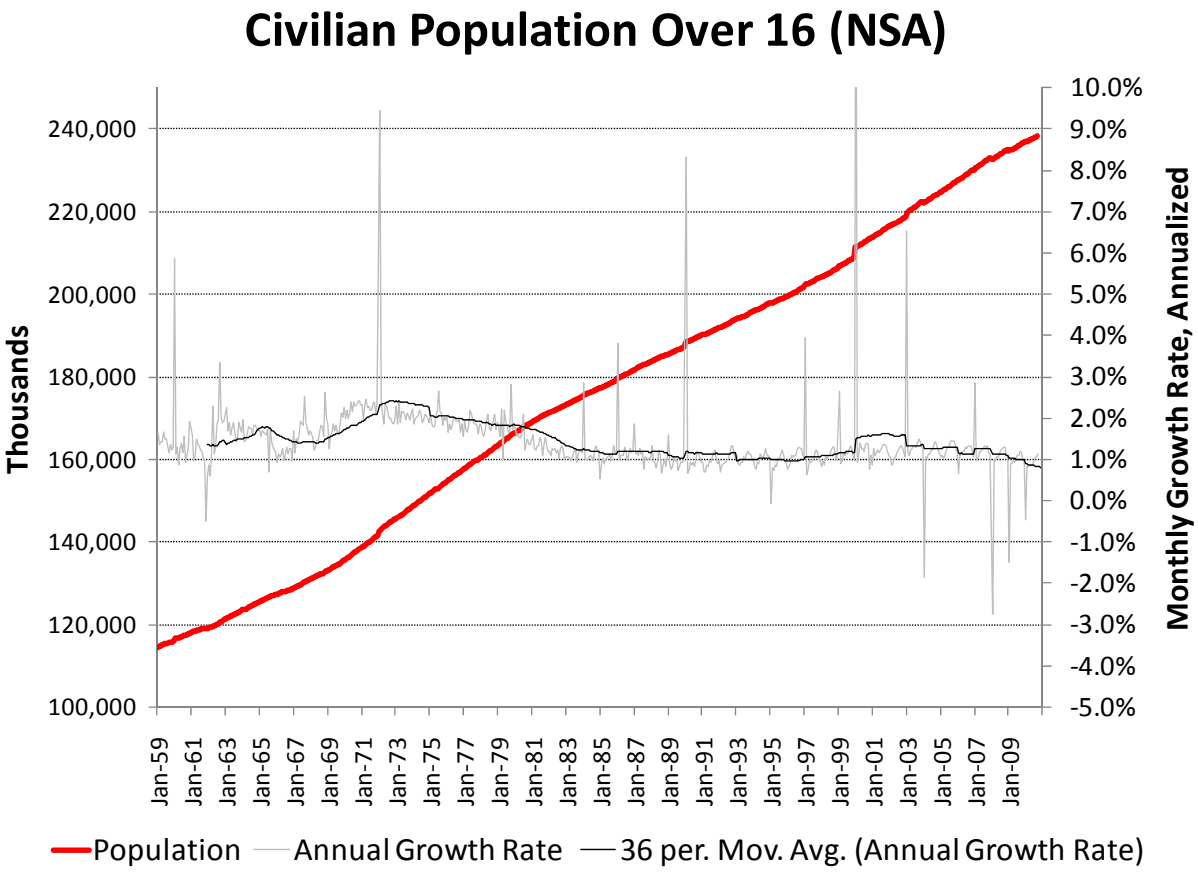


Figure 48

Figure 348presents the civilian, non-institutional population over 16 years of age. The potential labor force, measured in this way, stands at about 240 million. The monthly population data are from FRED. Obviously this is related to population, but is not exactly the same thing. When we examined the so-called dependency ratio, in the section on demographics above, we found that the fraction of the population under sixteen has been broadly shrinking over past decades.

I computed the monthly population change, at an annual rate, and this is also in Figure 48. Recall from the demographics section above that the underlying U.S. population growth rate

is around 1 percent per annum. You can see that in the 70s the potential labor force was growing faster, as the boomers continued to enter that classification. Now the potential labor force is growing closer to the rate of overall population.

There are issues with using this definition of potential labor force, even though it's widely accepted. Generally if you are under 16 in the U.S. you are required to remain in school, and you won't be eligible to be employed, at least "formally." But at the other end, we don't put an "upper bound" on the age of potential labor force members. Even though the average retirement age is around 62 in the U.S. (Gendell 2001), many people work longer than that, some well into their seventies. While there are exceptions, it's unusual to find many people in their 80s or above who are still working.

Growth in the Labor Force

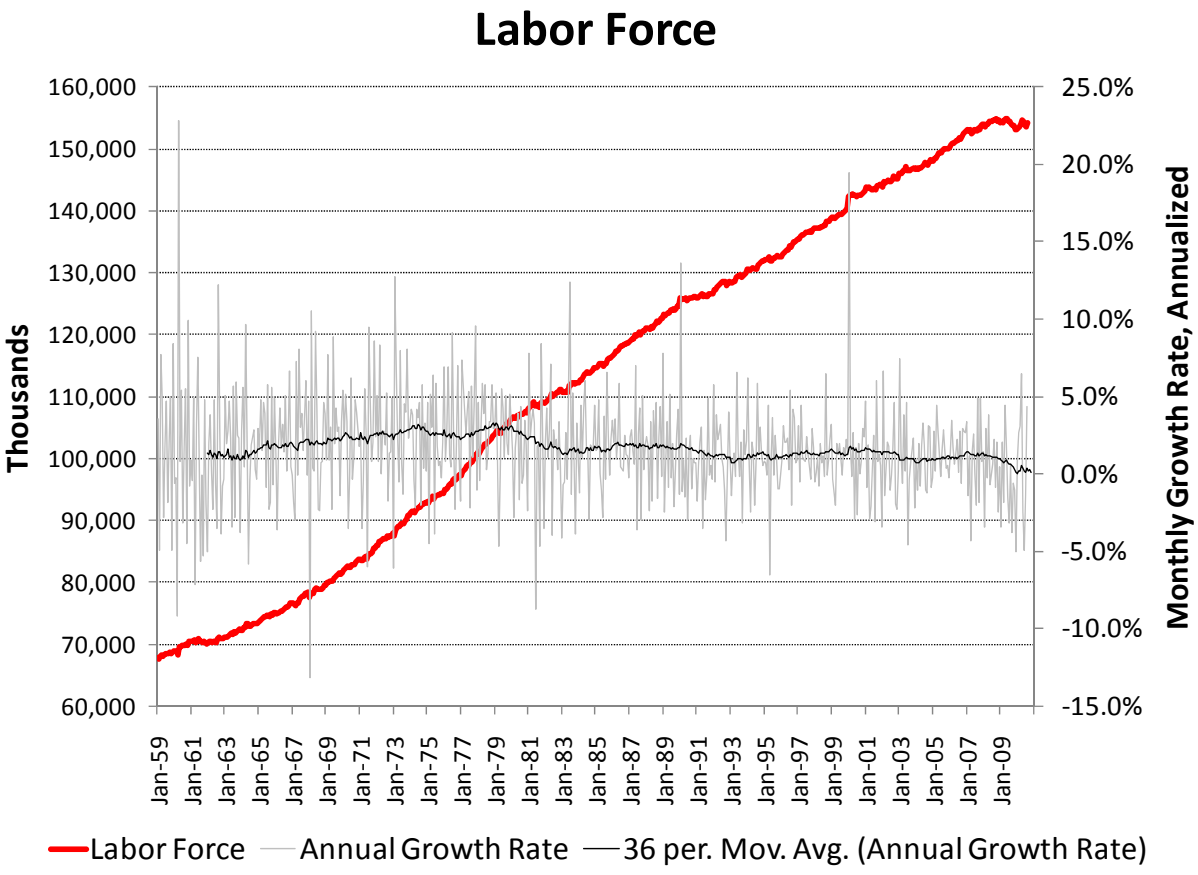


Figure 49

Figure 49 presents the labor force – those who are working, or are actively looking for work. The labor force is a little larger than the bellwether employment numbers in Figure 47, and a little less volatile, as we'd expect.

The changes are quite volatile, so I computed a 36 month moving average to smooth these changes and divine the underlying growth patterns. Again, you can see the relatively rapid increases in the seventies; recently growth has slowed to an average close to zero.

Labor Force Participation

Before we get to LFP as usually defined, it's useful to look at the ratio of the labor force to the total population. Figure 50 shows that this ratio rose steadily in the 60s, 70s and 80s, but leveled off around 20 years ago; about half our total population is either working or looking for work.

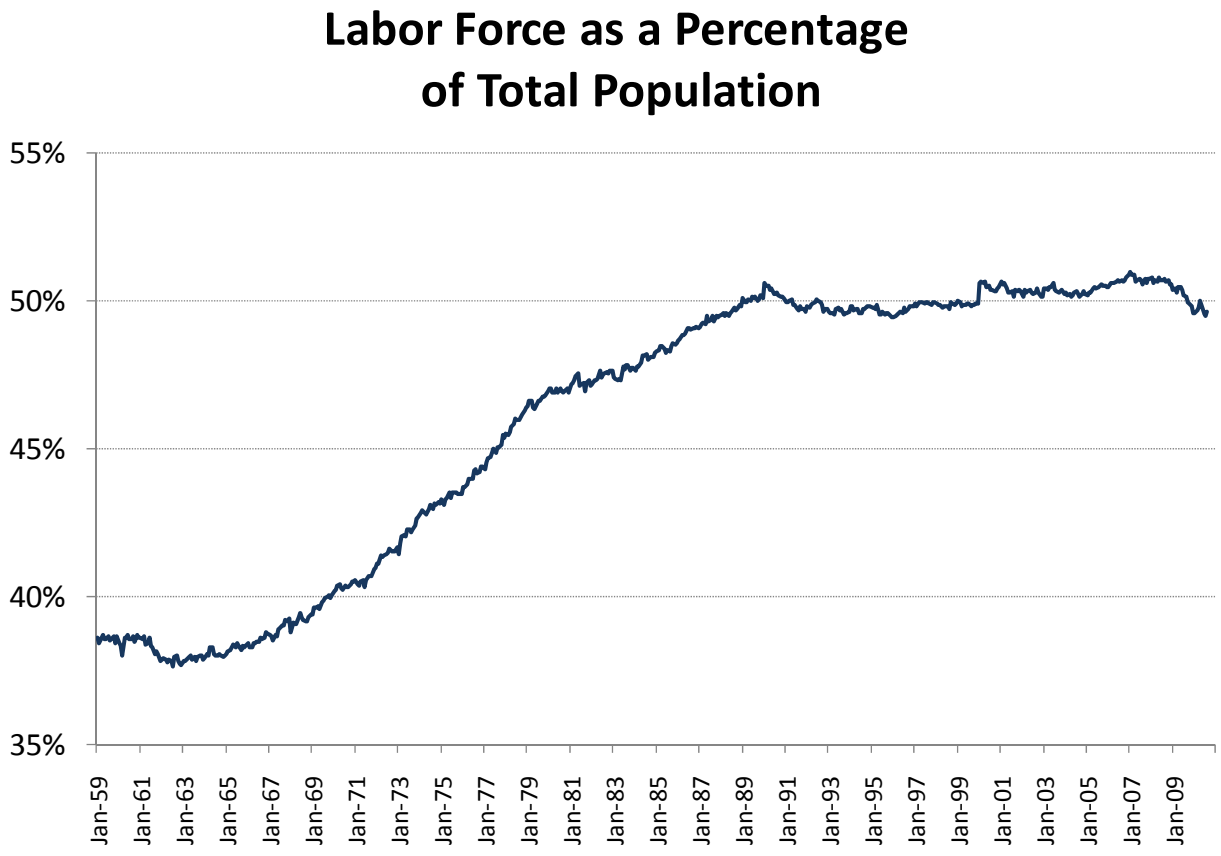


Figure 50

Figure 51 presents labor force participation, according to the standard definition. The numerator, the labor force, is once again the sum of employment and those actively looking for work. The numerator is the potential labor force, namely the civilian non-institutional population over age 16. The shifts up, especially strong in the early 1960s and the 1990s, are largely driven by increased labor force participation of women, especially married women. But note that labor force participation fell before as well as during the recent recession, and is back to a rate similar to that of 3 decades ago.

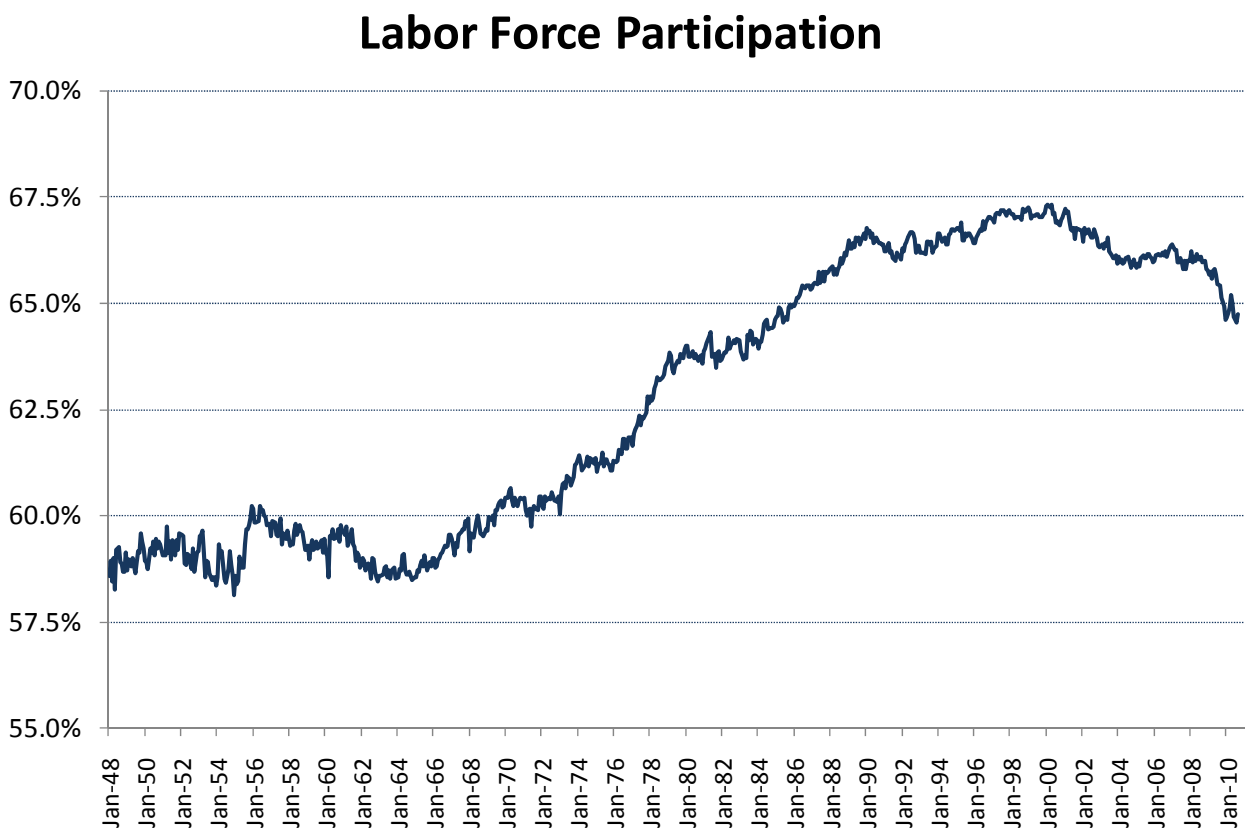


Figure 51

Unemployment

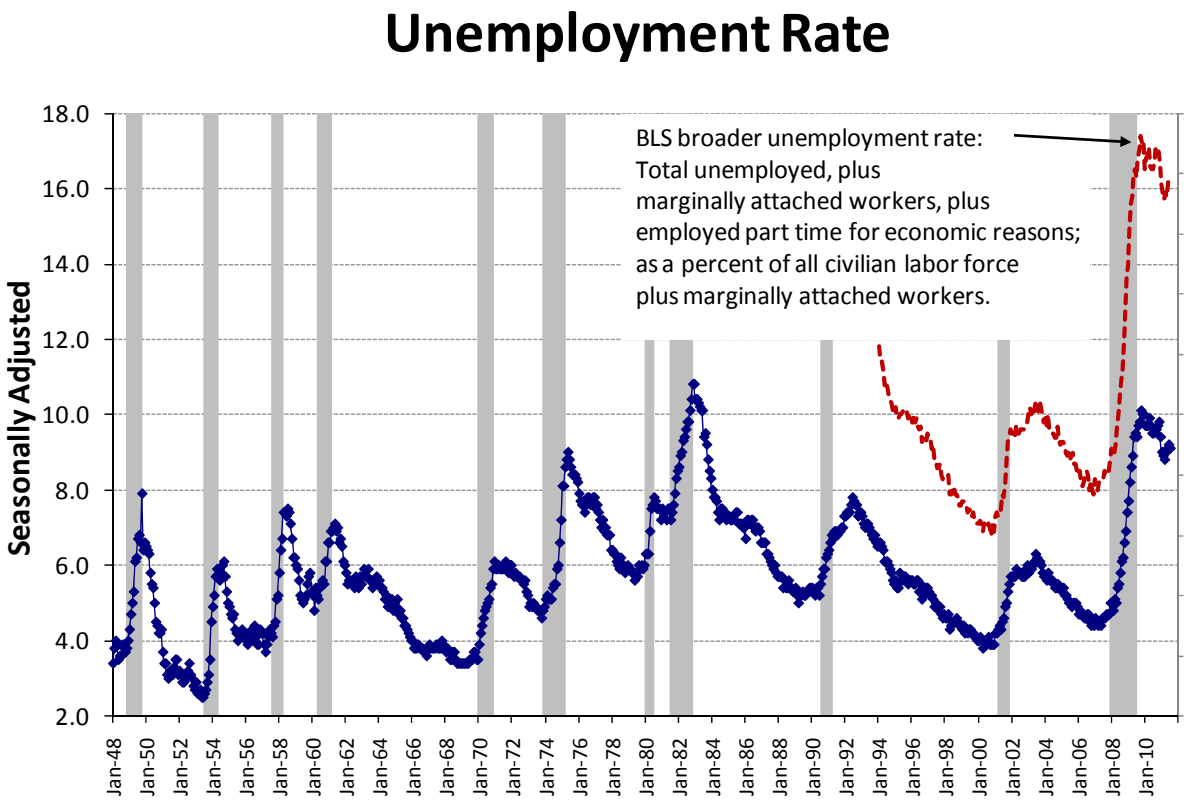


Figure 52

Finally, we get to the most widely followed headline number. Figure 52 presents the unemployment rate. Official unemployment is currently running near 10 percent, the highest we've seen since the oil price shocks of the 1980s.

In recent years BLS also has been collecting data on (1) people who have been involuntarily in part-time employment ("for economic reasons") rather than full-time; and (2) "marginally attached workers", what is more commonly called "discouraged workers." This broader measure of un/underemployment is currently at 17 percent.

In many recent commentaries on the Great Recession, media 'experts' have suggested that it's typical for employment recovery to significantly lag recovery in output. In fact, even causal perusal of Figure 43 shows something more complex. Employment recovery lagged GDP recovery (and the official NBER "call" of a trough) in 1990, 2001, and in the current recession. But in most prior post-war recessions, jobs recovered much more quickly; the peaks of unemployment was usually pretty close to the trough in output.

Why the apparent change in the behavior of unemployment? Of course with a sample of three cycles, it could be coincidence. It could be related to some combination of changes in the structure of product or labor markets. For example, there are more two-earner households, and unemployment benefits have been extended. The increasing sophistication of the temporary labor market (ManPower, Inc.) and perhaps increasing pressures to meet short term earnings targets could make firms systematically slower to hire. Extended unemployment benefits can also make unemployed choosier about their next job choice. While there are some academic papers that give at least partial support to those and other reason for increasing probability of "jobless recovers," overall I think this remains an open question.

Duration of Unemployment

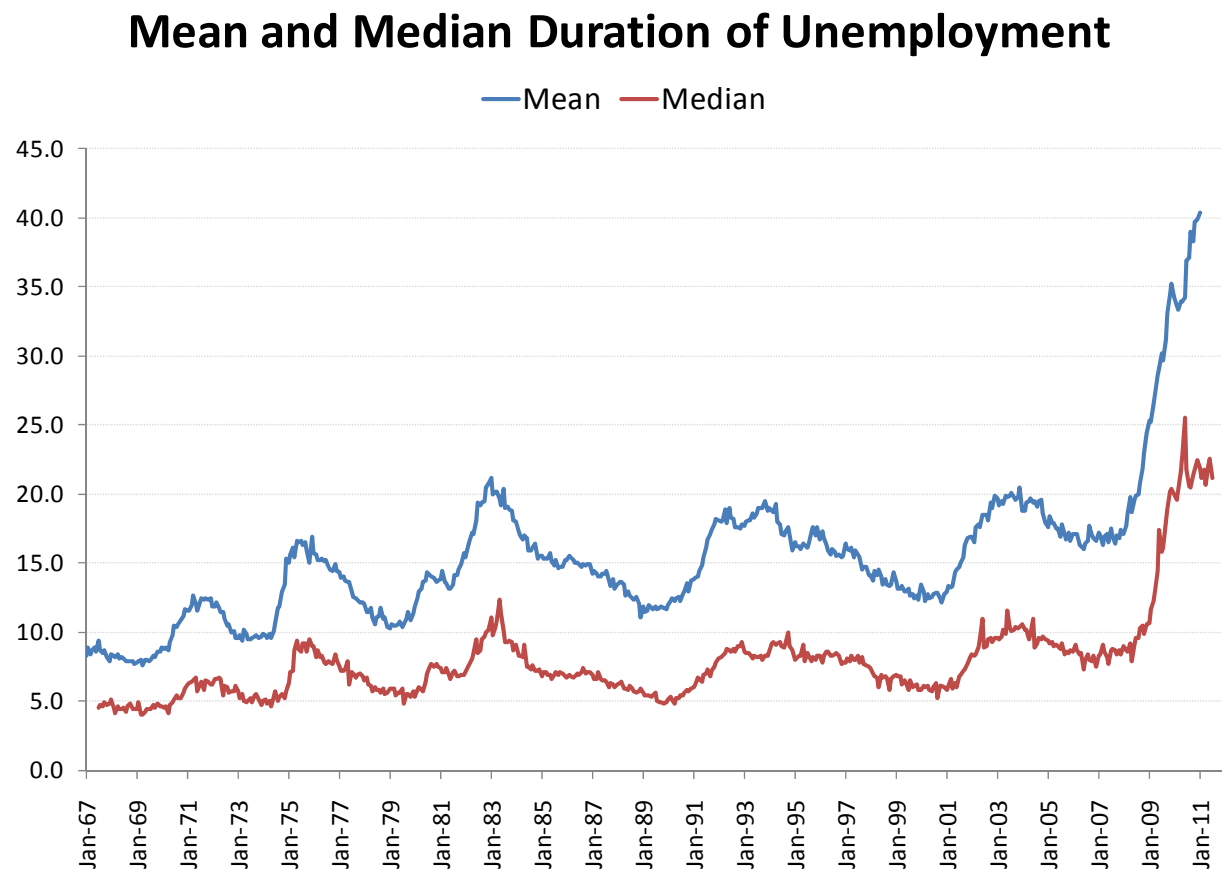


Figure 53

As Figure 52 shows, duration of unemployment is at an all-time high. This has important implications for foreclosures, as laid-off workers struggle to make payments. Even during expansions there is significant "frictional" unemployment; someone who is laid off can typically find a job within a month or two. In a deep recession, this is no longer the case.

There is a substantial difference between the mean and the median in Figure 53. Currently the average duration is 40 months, and the median is 21 months. That substantial difference exists because the distribution of unemployment duration among the undemployed is skewed to the right and "thick in the right tail;" it is not anything like a bell-shaped normal distribution.

Employment Dynamics

All the employment data we've looked at so far are, in effect, *net* numbers. There is in fact a set of much larger *gross* flows in and out of employment. Over a month or a year or a quarter, a given change in net employment (the changes behind Figures 46 and 47) masks a much bigger number of people actually laid off or fired, and corresponding much bigger numbers of people hired. The relative size of these net and gross flows is shown in Figure 54. Since 1992 the Bureau of Labor Statistics has collected and presented more detailed data on these dynamics.

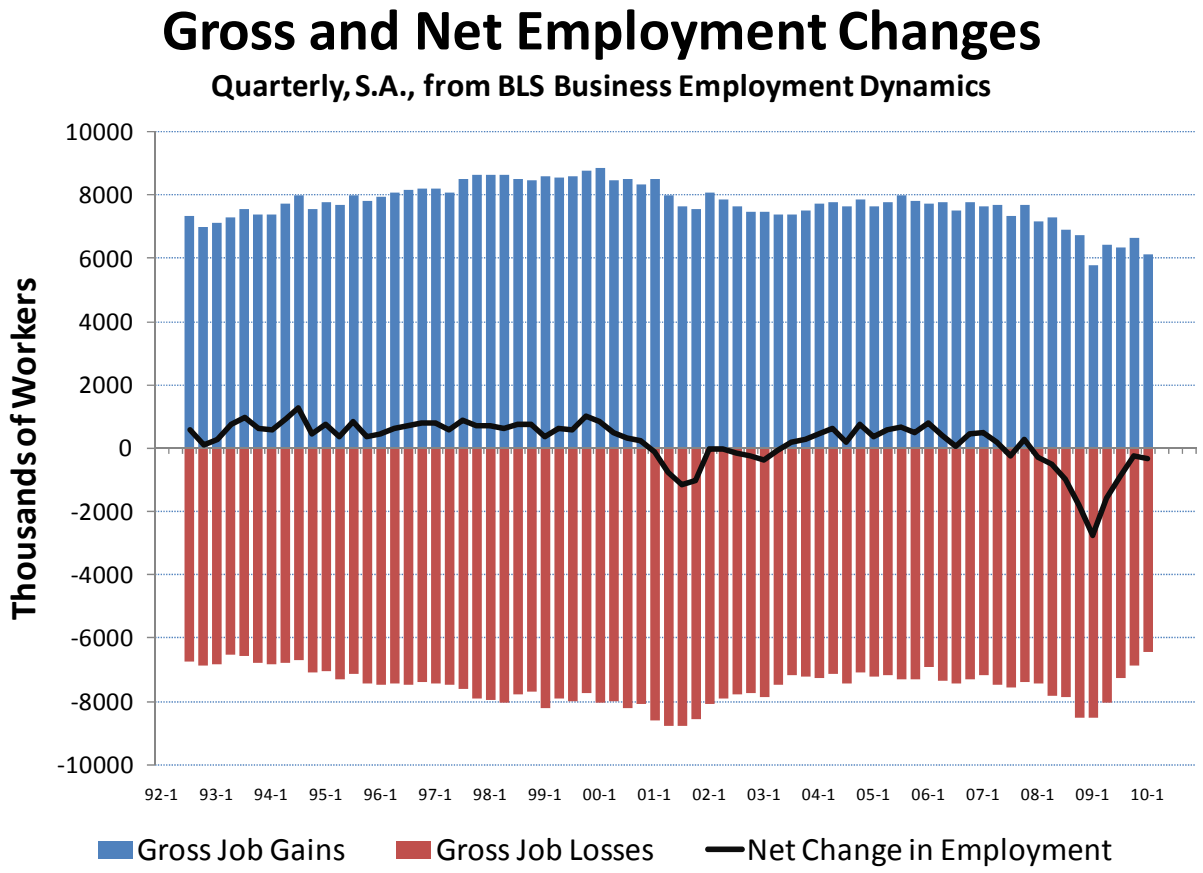


Figure 54

Take, for example, two recent years: 2005, a year of expanding employment, and 2009, a terrible year for the labor market. In 2005, net employment (the black line in Figure 54, or the data back in Figure 47) grew by more than 2.1 million. But "behind the scenes," over this period 29 million people lost jobs; and over 31 million.[26] The "churn" in the labor market is huge. In 2009, a year in which net employment fell by about 5.5 million, in fact 25 million people found work; but over 30 million jobs were lost through layoffs and plant closings.

There are actually three sources of dynamics (gross flows) labor force data, each relatively new, each with its own strengths and weaknesses. The Job Openings and Labor Turnover Survey (JOLTS) collects monthly data back to December 2001, on hires, quits, layoffs and job openings based on a survey of 8 million establishments.

[26] I say "people" but strictly speaking it's jobs – over a year some people will lose more than one job, and/or take on more than one new job. When comparing gross gains to gross losess, obviously these are often, but not always, the same people.

Business Economic Dynamics (BED) data (used in Figure 54) are based on about 7 million reports businesses must file with a state Unemployment Insurance Program. BED Data, available since 1992, provided quarterly information on gross job flows (expansions and contractions at existing establishments, and plant closures and births.) (In this note, and in class, I use "establishment" and "plant" as synonyms, though actually according to the precise definition the former term covers a wide range of business locations).

Most recently BLS has begun to release monthly gross flows data from the Current Population Survey, the same CPS used to provide the familiar monthly unemployment reports. Gross flows estimates from the CPS are now available back to 1990. CPS data are monthly and available soon after the end of the reports month.

BED data have a longer history than JOLTS or CPS gross flows, but there is not much geographic or industry detail in BED. BED data are quarterly and available two quarters after the close of a quarter; they are available by 2 digit NAICS code, by size of employer, and by state. Quarterly BED data are available since 1992. JOLTS data, monthly since 1990, are available by 2 digit NAICS code and by four Census regions. (The North American Industrial Classification System, NAICS, is the way we define industries in government and other datasets. It replaces the earlier Standard Industrial Classifications (SIC) system in 1997. We'll have much more to say about NAICS when we locate regional economies later this semester.

As already noted, Figure 54 is from the BED data. For similar charts using JOLTS and CPS data, and for further details on their usage, see Boon et al. (2208).

Employment by Industry Group

Employment is more volatile in some industry groups than in others; and many have secular trends up or down that differ from the trends in total employment. Employment sectors are defined using the so-called North American Industrial Classification System (NAICS). I track about a dozen such industry groups. The four Figures 55 through 58 are representative. Sectors not shown, include but are not limited to wholesale and retail trade, transportation, government workers, leisure and hospitality.

I usually look at the original sectoral employment data using a linear scale, as well as a log scale, percentage changes, and as a share of total employment. Of these four sample charts, two are linear and two are logarithmic. All four show the ratio to total employment.

Figure 54 shows construction employment, of great interest of all real estate professionals as well as those in the industry itself. The Figure highlights the postwar growth of construction employment, as well as its cyclical nature and the changing trend as a share of employment

through four decades from the 50s through the 90s. A few years ago, however, this pattern was reversed. In 2007 construction employment peaked in total numbers around 8 million, and at a fraction of total employment that we hadn't seen since the early 1950s. Then it crashed back down during the Great Recession numbers and ratios similar to those we saw back in 1990.

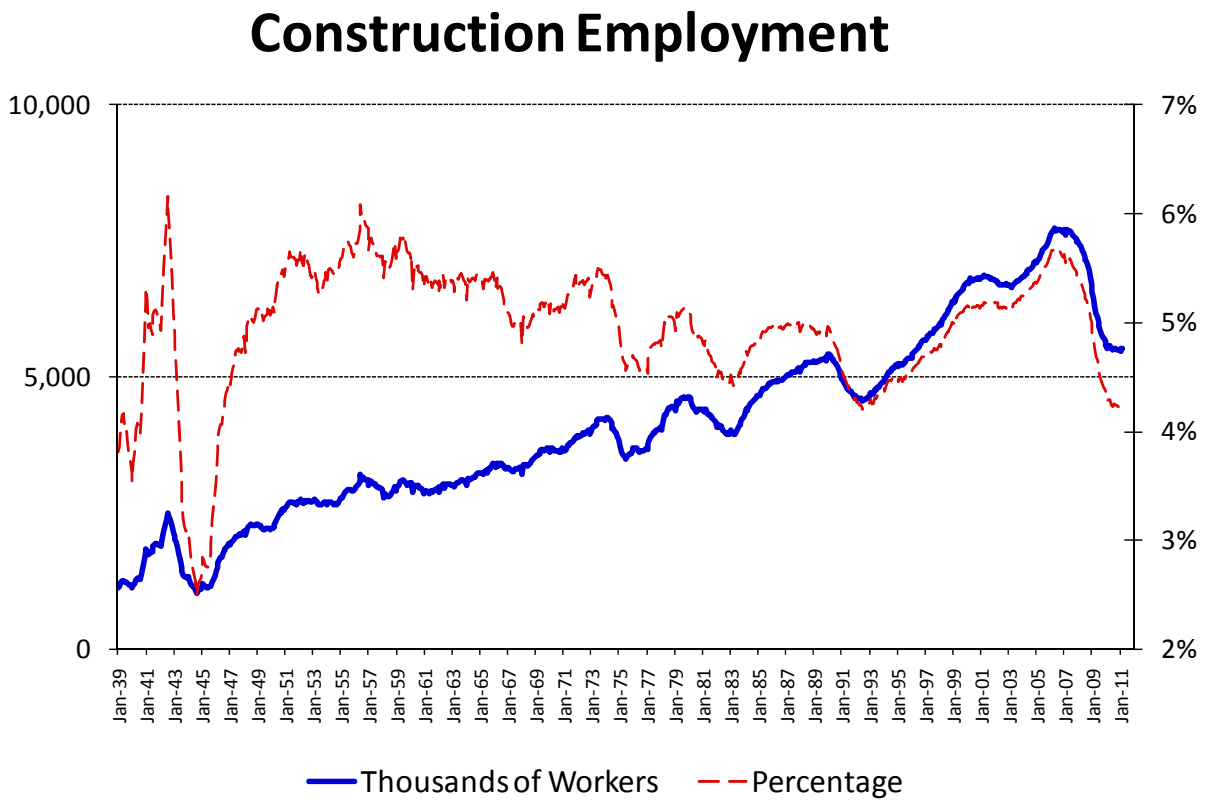


Figure 55

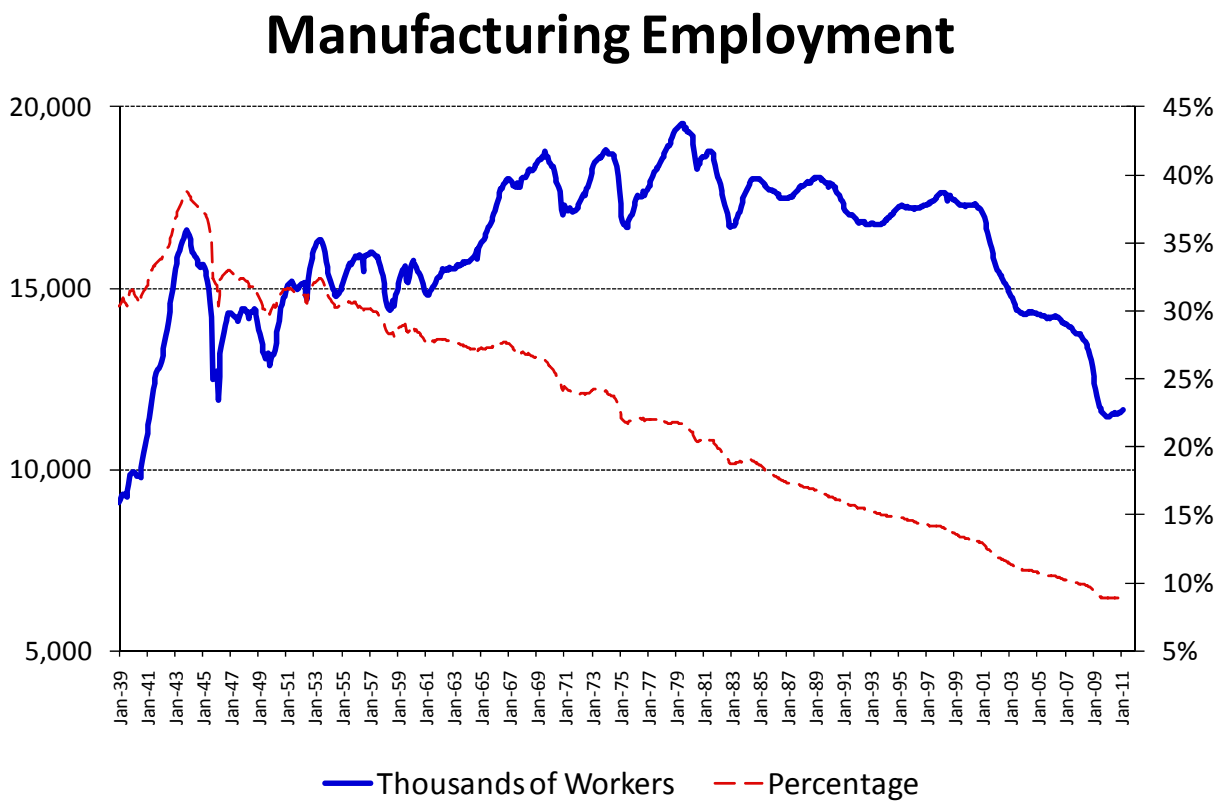


Figure 56

Figure 56 shows another bellwether group, namely manufacturing employment. It's not widely known that actually manufacturing employment grew in numbers throughout the 50s and 60s, to level out around 17 to 18 million from the late 60s until the tech wreck of 2001. Then the number has fallen steadily for most of the last decade, possibly stabilizing recently, at least for a few recent months. Whatever happens to the level, since World War II the share of employment in manufacturing has been in steady decline, from about a third of the labor force at the end of the war to 10 percent today. Second, while manufacturing employment has fallen as a share of employment, manufacturing *output* [not shown] has grown substantially; and US manufacturing output as a share of total output has fallen only slightly since the 1950s, from about 16% than to about 14% today. Why? A strong increase in manufacturing labor productivity, or output per worker. Studies of the determinants of declining share of manufacturing employment demonstrate that the lion's share of the shift is due to changes in labor productivity. Changes in demand patterns from goods to services, and competition from abroad, have contributed but have had more modest effects than productivity growth. See Schweitzer and Zaman (2006) and Fisher and Rupert (2005).

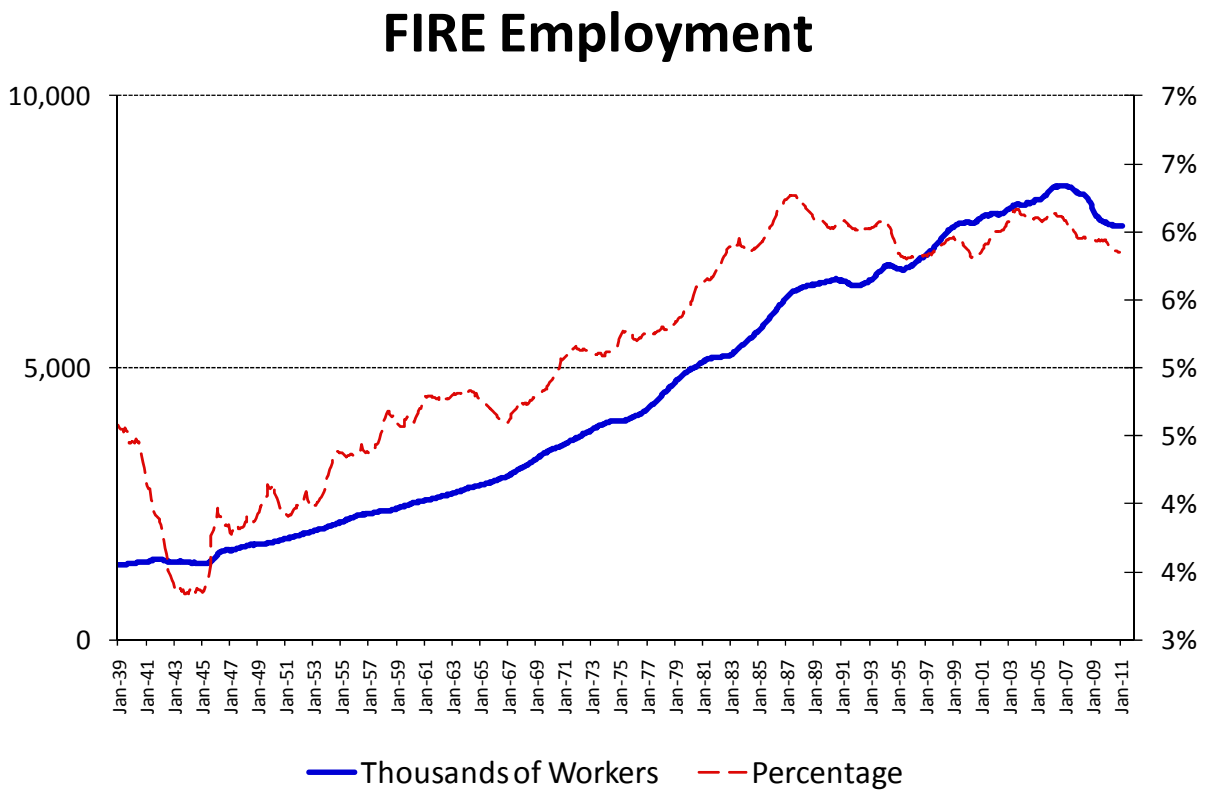


Figure 57

Employment in finance, insurance and real estate (FIRE) is often used as a proxy for demand for office space. See my note on the four quadrant model of DiPasquale and Wheaton for a discussion of alternative proxies for this demand. Nevertheless, FIRE employment is closely followed by many in the office real estate industry. Figure 57 shows the general rise in this type of employment over recent decades. We also see that it leveled off as a share of employment about 20 years ago; and the decline associated with the Great Recession was substantial.

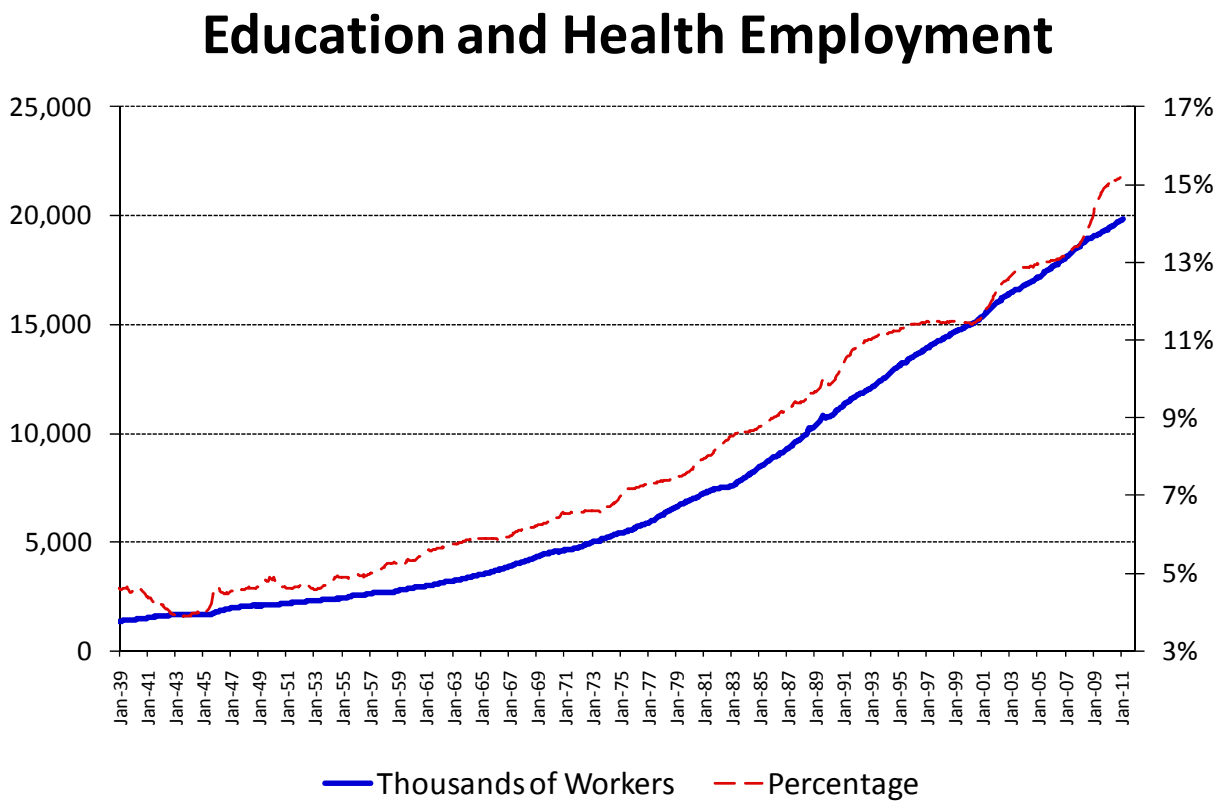


Figure 58

Not all employment is highly cyclical. If there is a recession in education and health employment, it's hard to see it in Figure 58. The well-known aging of the baby boom will drive health-care expenditures up; changes in healthcare costs and financing will also drive changes in this sector's employment.

VI. Productivity and Incomes

Productivity may not be everything, but it's most of it, at least if "it" is something economic as a number of economists have said (and demonstrated). Productivity measurement and determinants are huge topics and we will come back to this topic repeatedly in our course.

For now we simply want to explain and present some basic statistics on labor productivity, and total factor productivity; then see how these map into increases in GDP and incomes.

Labor Productivity

Labor productivity is a good place to start because conceptually it's easy to understand, and at least a crude measure is straightforward to calculate. BLS provides data on output per hour worked, which is presented in Figure 59. Neoclassical labor economics predicts that wages are determined primarily by labor productivity, so we also present an index of total labor compensation for comparison.

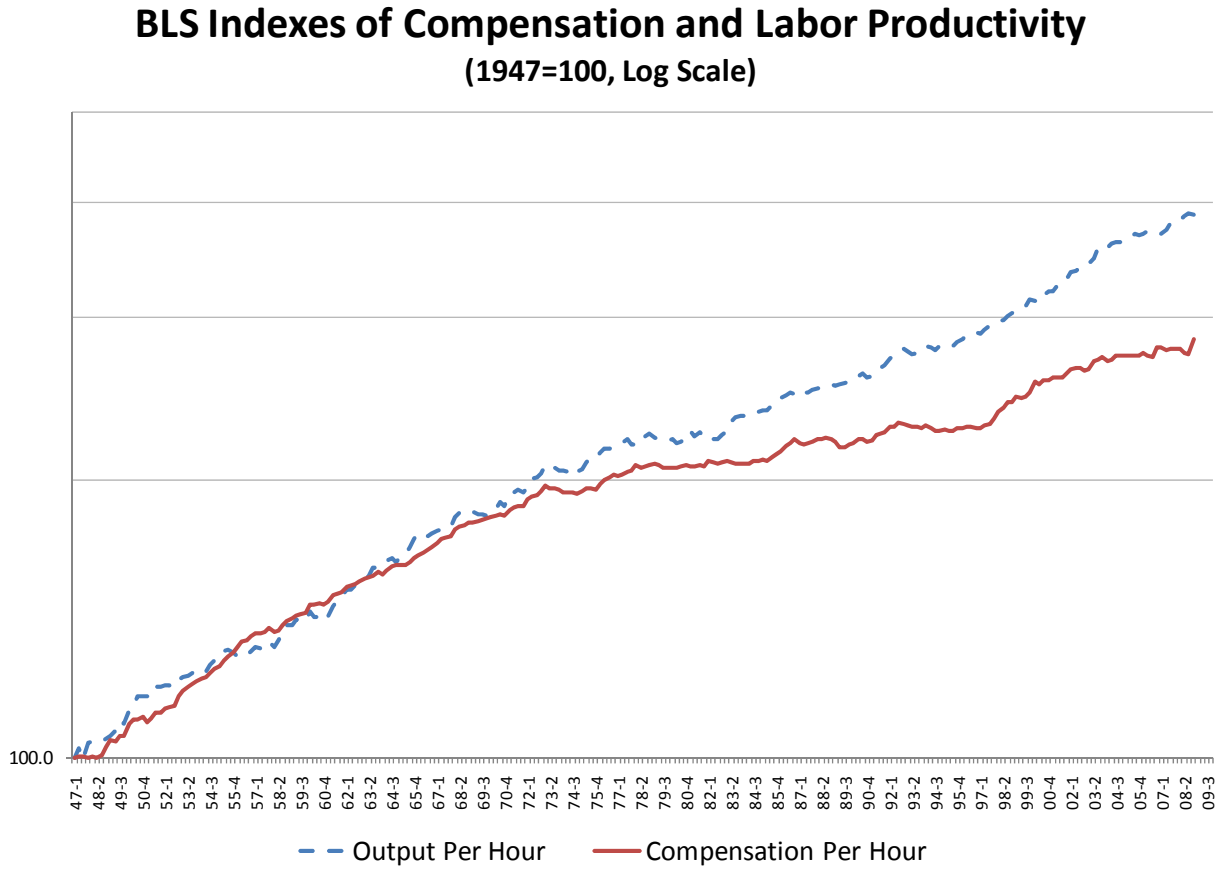


Figure 59

Both have been increasing, but for the past several decades, compensation has been lagging productivity. (More on this next edition.)

How Do GDP and Productivity Map into Income?

When we produce more – whether because of increases in inputs (K, L) or increases in productivity – how is the resultant output shared between households (labor), corporations, governments, and other entities? Let's now look at incomes, in the aggregate, and decomposed in several ways (by distribution among households, between labor income and returns to capital, etc.)

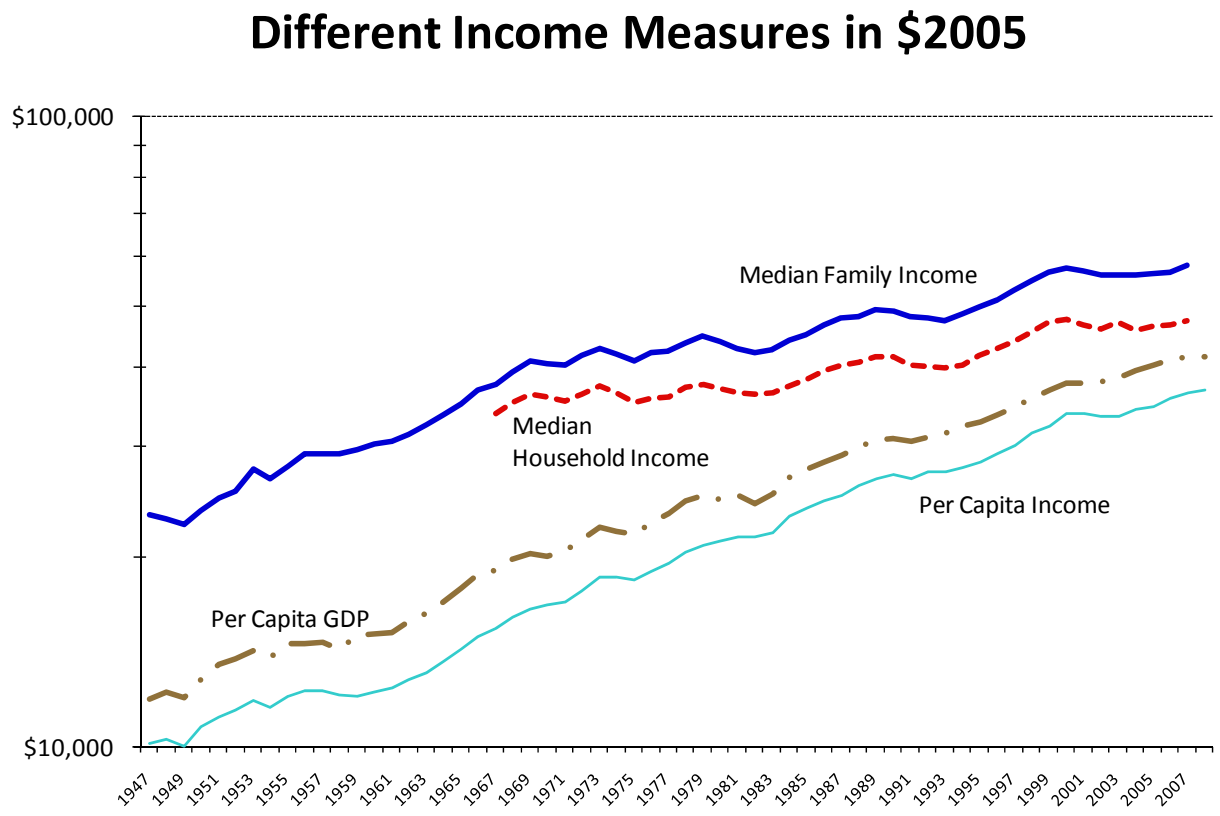


Figure 60

Figure 60 shows the time path of several basic inflation-adjusted income numbers. Families are 2 or more related people living together. Households are families plus single people, and unrelated people living together. Can you explain why median family income, then, is higher than median household income?

The Distribution of Income

By now you've surely heard the statistician joke from me, maybe more than once. Let's look *within* the distribution of income for two charts, rather than simply medians, which only tell us about the middle.

Figure 61 presents annual data from Census on household income distribution.[27] Specifically, every year Census ranks (appropriately weighted) sample households by income, and splits the sample into 5 quintiles; then they compute the mean income within each quintile. Incomes are measured after cash transfers (like social security or housing vouchers) but neglecting in-kind transfers (like lower rents in public housing or Section 42 units, or health care spending from Medicaid or Medicare). They also present the measures before tax. Figure 61 presents these data, deflated using the CPI.

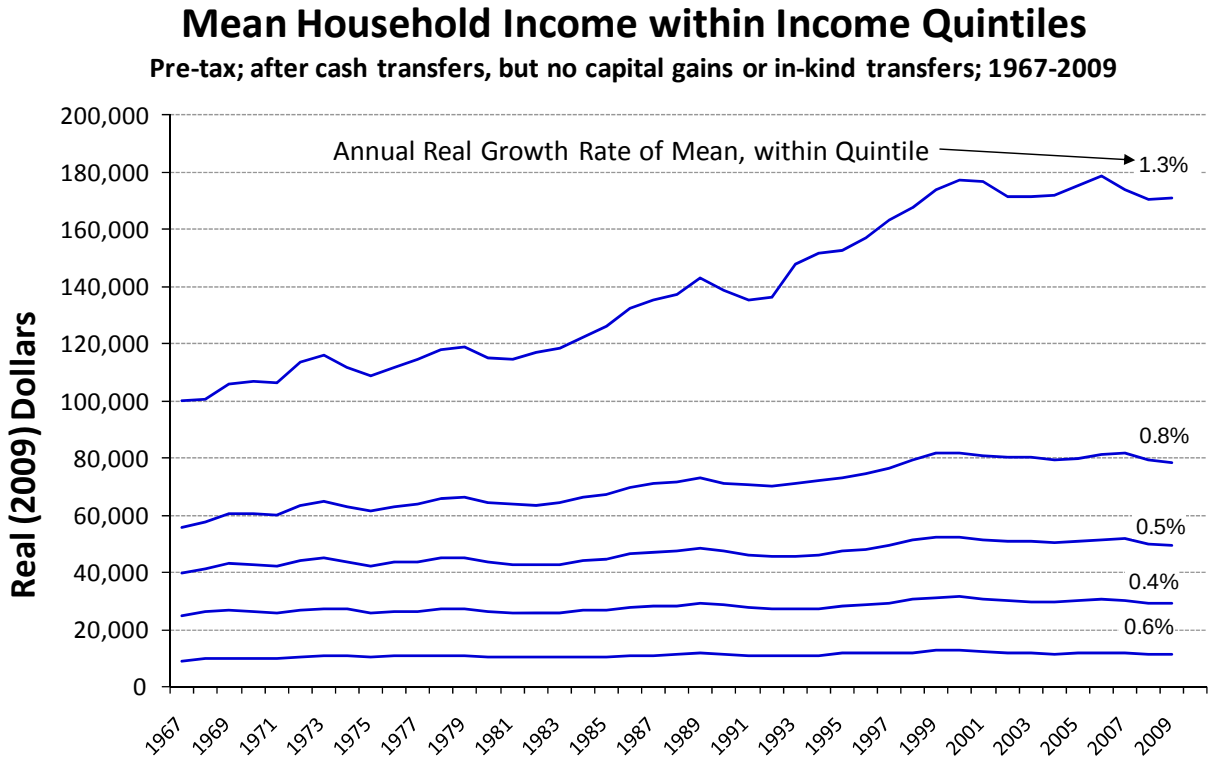


Figure 61

[27] Current Population Reports, Income Poverty and Health Insurance Coverage in the United States: 2009. This report is issued annually, the current report can be found at http://www.census.gov/prod/2010pubs/p60-238.pdf .

Income has been growing fastest for the top income quintile, which is no surprise. Many studies suggest this is connected in no small part to income growth for college grads and the educated workers, compared to say high school dropouts. Of course many other things matter including "luck" or economic shocks.

But the pattern within this top quintile, too, is arresting. See the discussion of Figure 63 below. But even looking at this first cut, three points are immediately apparent.

First while visual inspection might make it appear that lower quartiles are not growing, in fact they are growing by 0.5 to 0.7 percent per year, after inflation is netted out. This growth is not negligible, though clearly it's much better to grow at the rate of the top quintile, double or more!

Second, each year's calculation is based on the survey for that year only. Individual households do move up and down between quintiles, though this is not reflected in this particular data.

Third, this is a good place to mention an important point about such household mobility (even though it is not shown in the chart, per se). Figure 62 provides a quick summary of the rate of mobility in the long run.

		Family Income Quintile of Adult Children,				
		by Parents Family Income Quintile				
		(Percent of Quintile Sample)				
		Parent's Family Income Quintile				
Child's Family		**Bottom**	**Second**	**Middle**	**Fourth**	**Top**
Income Quintile						
	Top	6	10	19	26	39
	Fourth	11	18	17	32	23
	Middle	19	24	23	19	14
	Second	23	23	24	15	15
	Bottom	42	25	17	8	9
Source: Isaacs, Sawhill and Haskins (2009).						

Figure 62

A common myth is that the U.S. has one of the highest rates of mobility between quintiles; in fact by some measures, it has one of the lower rates of such mobility. More specifically, studies like Isaacs, Sawhill and Haskins have shown that the U.S. has a fairly high mobility from the middle of the income distribution up into the top quintile; but compared to other countries it has one of the lowest rates of mobility from the bottom quintile, upward.

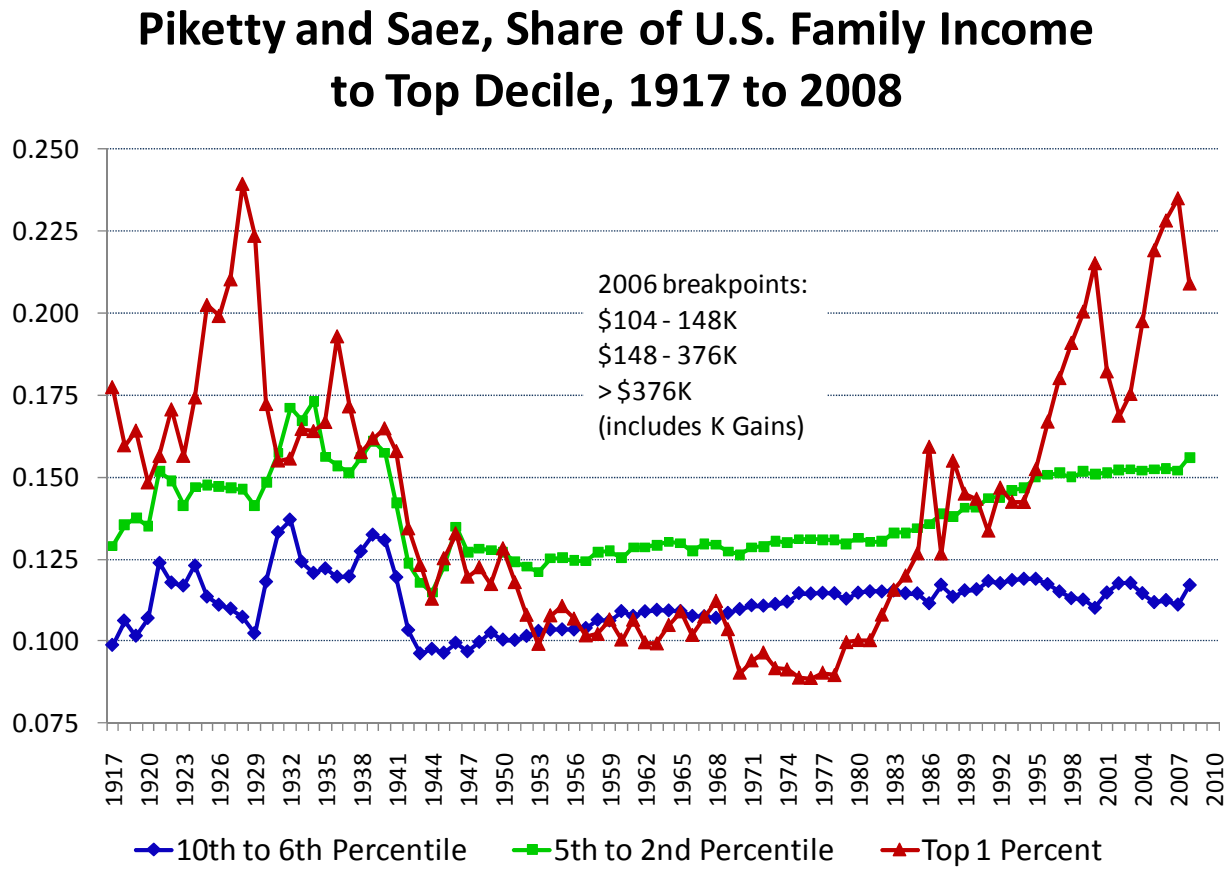


Figure 63

Now, let's turn to the top of the income distribution. Piketty and Saez use Internal Revenue Service data to examine the distribution of income within the top decile. Figure 63 shows how volatile that top 1percent is. While we have no data yet, my Bayesian prior is this share will fall as a result of the financial crisis.

Human Capital

Human capital is a broader concept than education, to be sure; it also incorporates intelligence, level of effort, focus, health, and other attributes of workers that allow them to be more of less productive. But for our purposed we'll focus on level of education. (Quality of education is certainly important as well, see many studies such as those reviewed in Hanushek and Woessmann 2007).

Recall our distinction, made earlier, of three main kinds of capital: financial, tangible (real estate, equipment, infrastructure, etc.); and human capital (education, skills, level of effort). Human capital, the present value of the fruits of our labor over our remaining lifetimes, is probably the largest of the here, even if it is also the hardest to measure (see Haveman Bershadker and Schwabish 2003).

Studies of the returns to human capital, dating back to Jacob Mincer (1958) have established the following stylized facts. First, investment in human capital often yields favorable returns, which will no doubt be of great comfort to you the next time your tuition bill id due (or, even more so, the next time you contemplate the wages you have foregone during the semester). Second, following the principle of diminishing marginal productivity (of most factors of production), the highest returns tend to accrue to the first years of education. As productive as this year of study in Wisconsin's real estate program might be, it pales in contrast to the returns of the first grade. (Among other things, you learned to read and write).

The third stylized fact is that there are significant external benefits to education in addition to the private benefits we have just discussed. Furthermore, there is evidence that these external benefits are largest for early grades, but remain large for secondary and university education, and beyond. See Psacharopolous (2004) for details.

Figure 64 presents one set of numbers that confirm the wisdom of your decision to invest in higher education. The two lines show the time path of average incoming for two categories of households: household headed by a college graduate (or better); and households headed by a high school dropout. The break in the data in 1989 is due to a modest definitional change.

The data are rough but arresting. In 1960, a college educated headed household had a median income of two-thirds greater than a dropout. By 1990, the college-educated-headed household's median income was three times the dropout's median. This came despite the fact that a higher fraction of households are headed by college grads today.

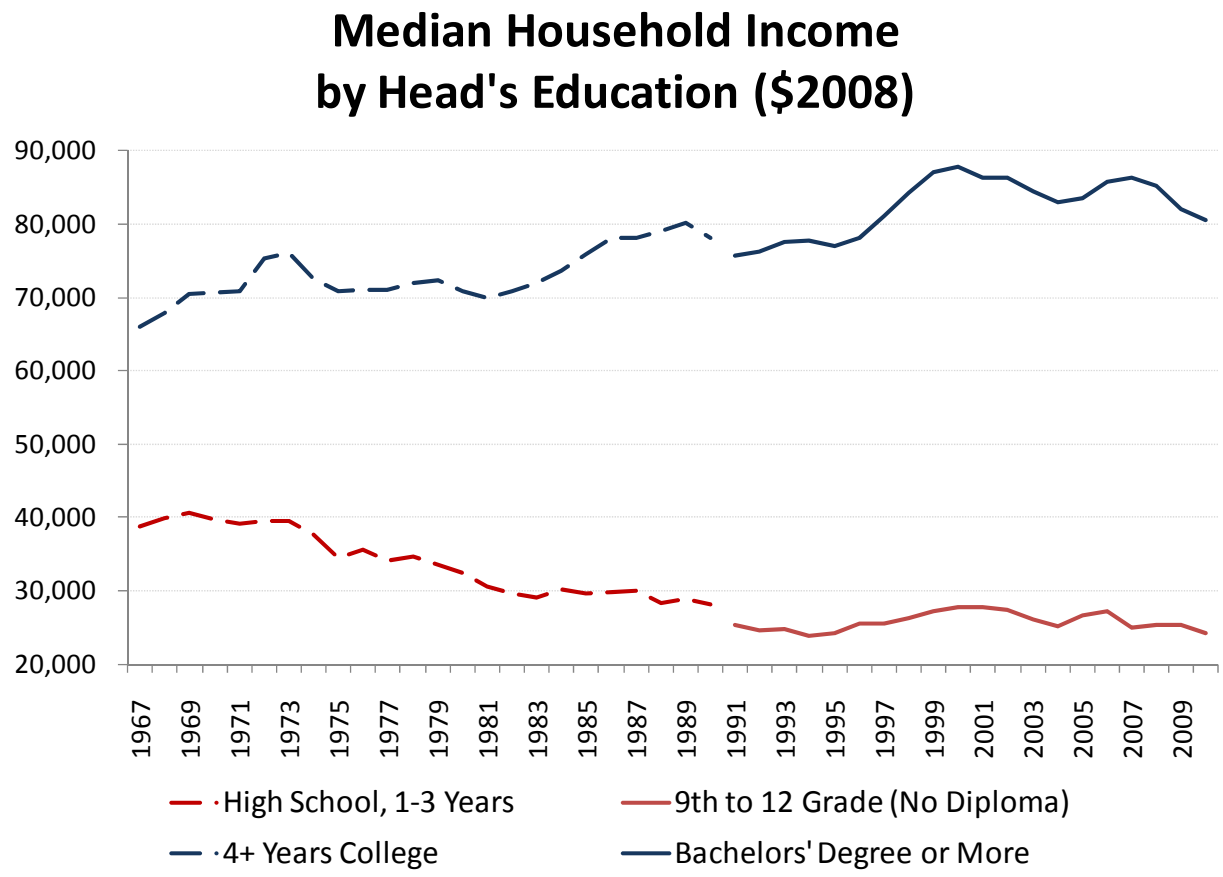


Figure 64

Figure 65, taken directly from the Census website, shows the difference in individual income and employment unemployment by education level. These data are restricted to individuals over 25 years old which is why the unemployment rate in the figure averages 8.2 percent, about a point lower than the headline unemployment rate reported in 2010.

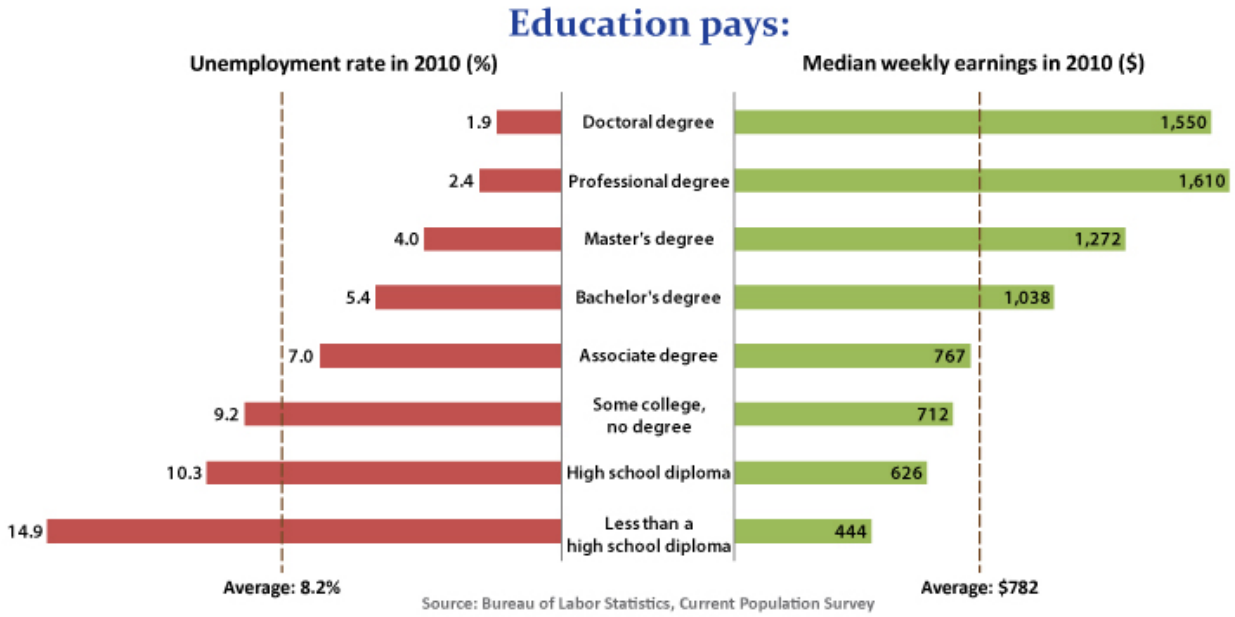


Figure 65

Business Income: Corporate Profits, and Proprietor's Income

It is common to use employment and income, generally, as drivers of the demand for many kinds of real estate. We have already discussed how we can estimate subsets of employment that are more closely related to (say) office employment or industrial employment (and we will discuss such estimation procedures further in class). We can, in principle, undertake broadly similar estimations for subsets of income using detailed BEA data. But these are still household income based. We can also look at income that accrues to firms, such as corporate profits, or proprietor's income. Figure 66 presents these two series.

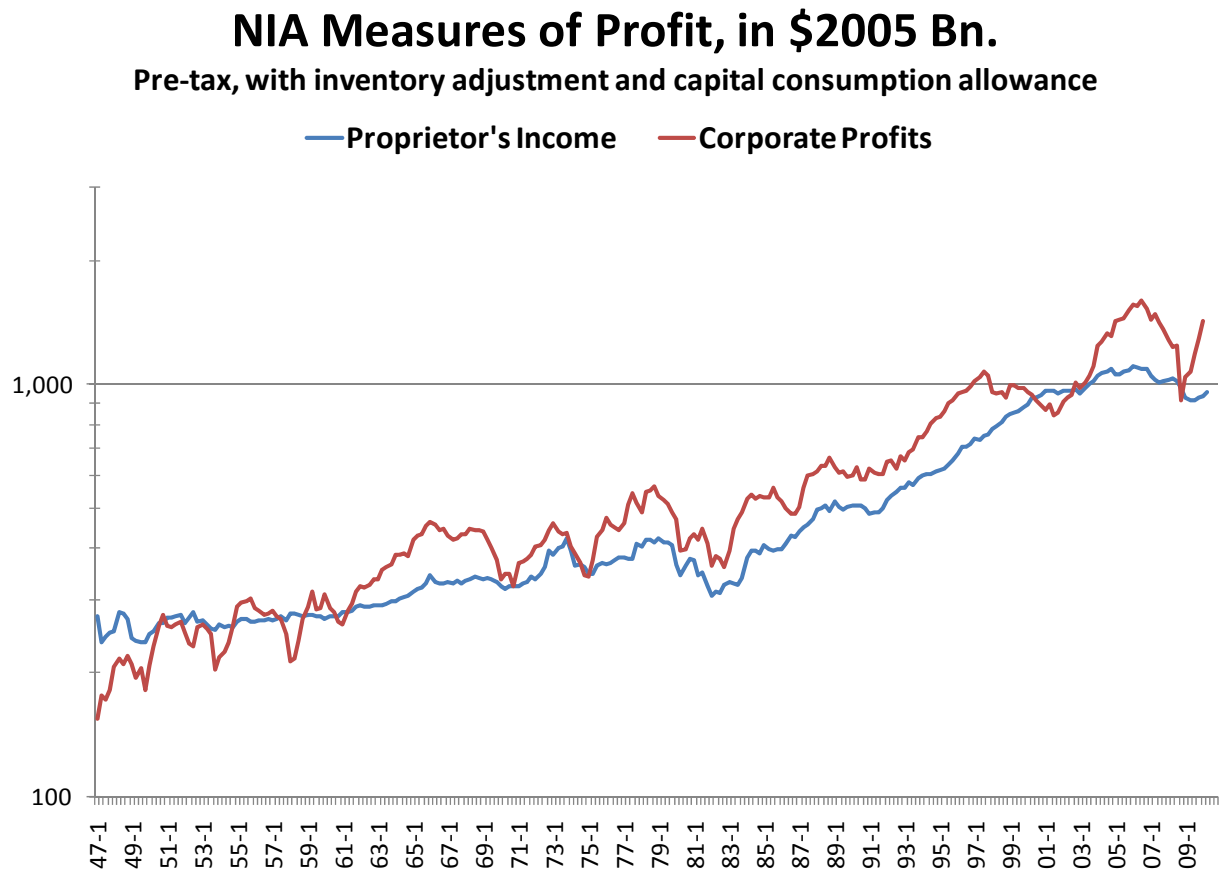


Figure 66

It can also be very instructive to examine profits by industry. Figure 67 presents some profits by major industry groups. Note that manufacturing profits used to be much larger than financial sector profits, but that these eclipsed manufacturing in the runup to the 2007-2008 financial crisis. They crashed during the crisis, but financial sector profits are back, driven in no small part by the opportunities provided by a world in which banks can borrow near zero and then invest in riskless Treasuries.

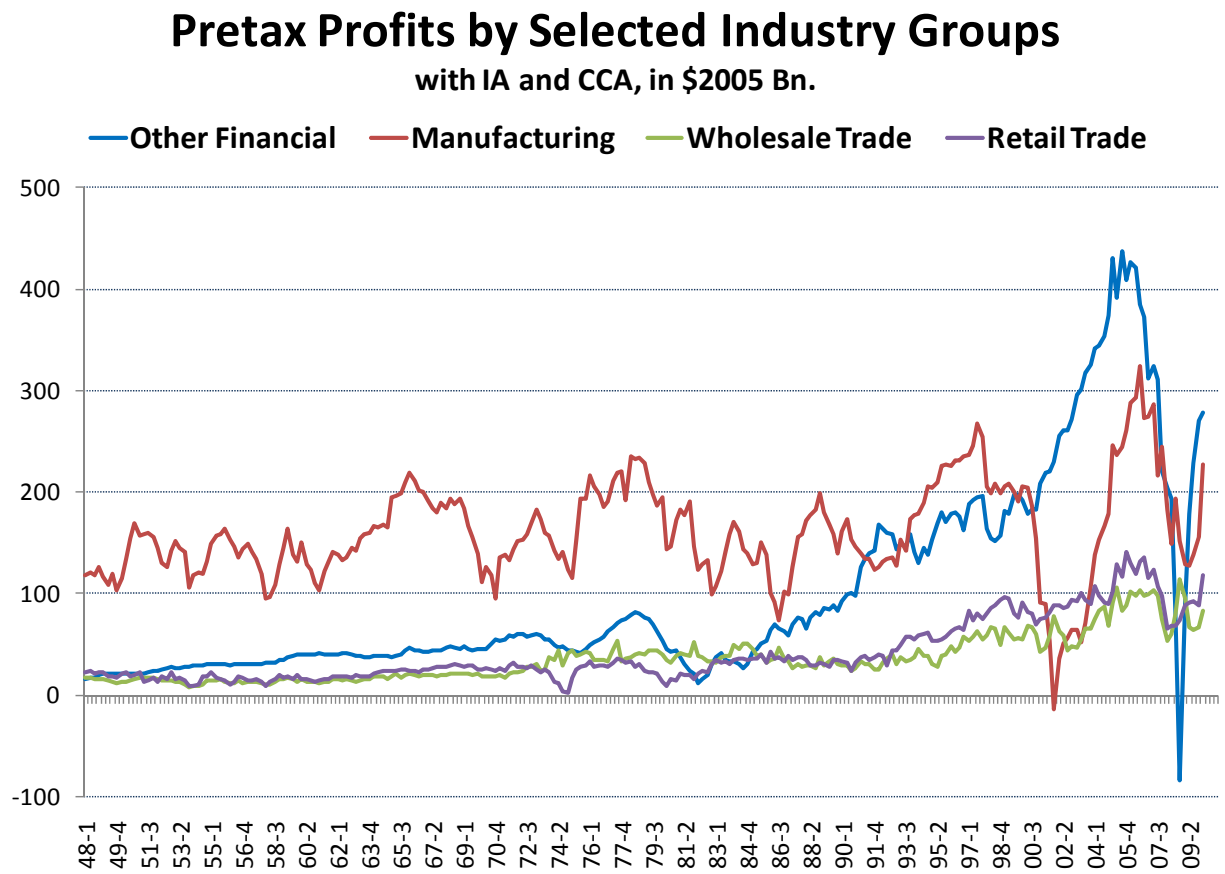


Figure 67

Sources: Go to:
http://www.bea.gov/national/nipaweb/SelectTable.asp

For data on overall corporate profits, and proprietor's income, see:
National Income and Product Accounts Table, Table 1.12. National Income by Type of Income

For detail on corporate profits using 1948 to 1987 industry definitions:
National Income and Product Accounts Table, Table 6.16B. Corporate Profits by Industry

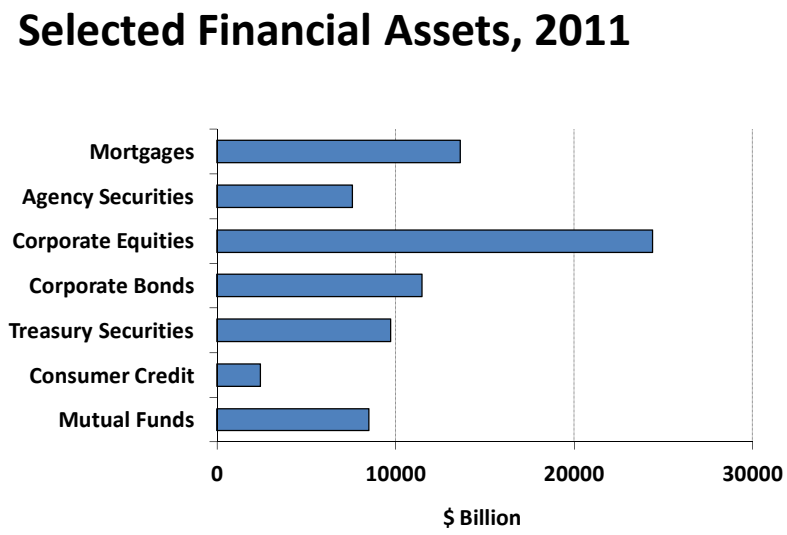
For detail on corporate profits using 1987 to 2000 industry definitions
National Income and Product Accounts Table, Table 6.16C. Corporate Profits by Industry

For detail on corporate profits using 2001 to date industry definitions
National Income and Product Accounts Table, Table 6.16D. Corporate Profits by Industry

VII. Credit Markets, Interest Rates and Inflation

You can't be interested in real estate or the aggregate economy, without being interested in credit markets.

Basic Data on Assets and Debt



As of Q2 2011, Not seasonally adjusted.
Source: Federal Reserve Flow of Funds, Table L.4.

Figure 68

Figure 68 gives us a simple stock picture of financial markets. Mortgage markets are larger than, say, corporate bonds or Treasuries, and agency securities (Fannie Mae and Freddie Mac) are also a major asset class. These numbers bounce up and down from year to year, of course. The main point for the moment is that real estate finance is a big part of the financial system.

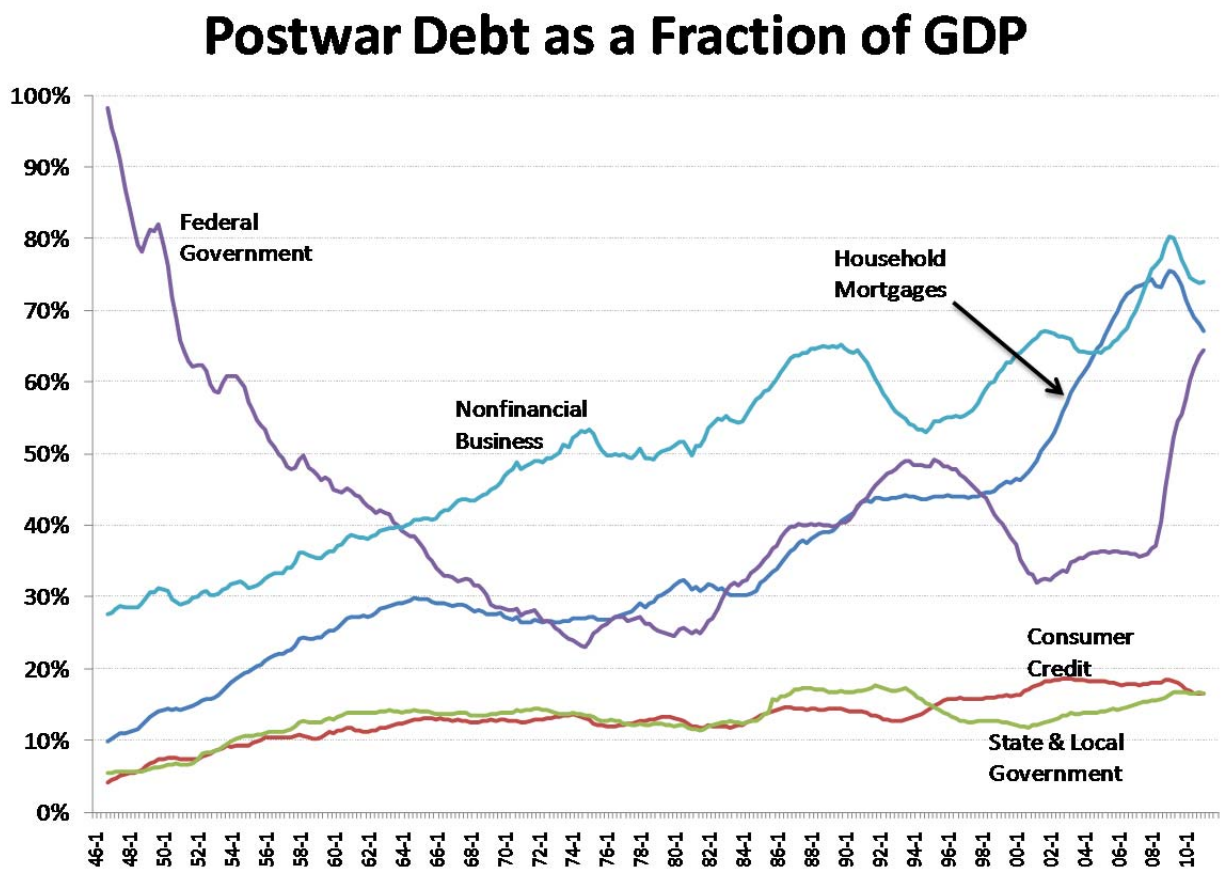


Figure 69

Figure 69 gives another look at the financial markets, this time as percent for GDP over the year. Everyone talks about the rise in mortgage debt, credit card debt, and government debt. Less has been said about the levering up of corporations, which is also substantial.

Figure70 presents the same data, but in a "stacked" chart. Figure 69 is better at showing the relative size of each kind of debt, while Figure 70 more clearly shows the overall rise in leverage of the U.S. economy.

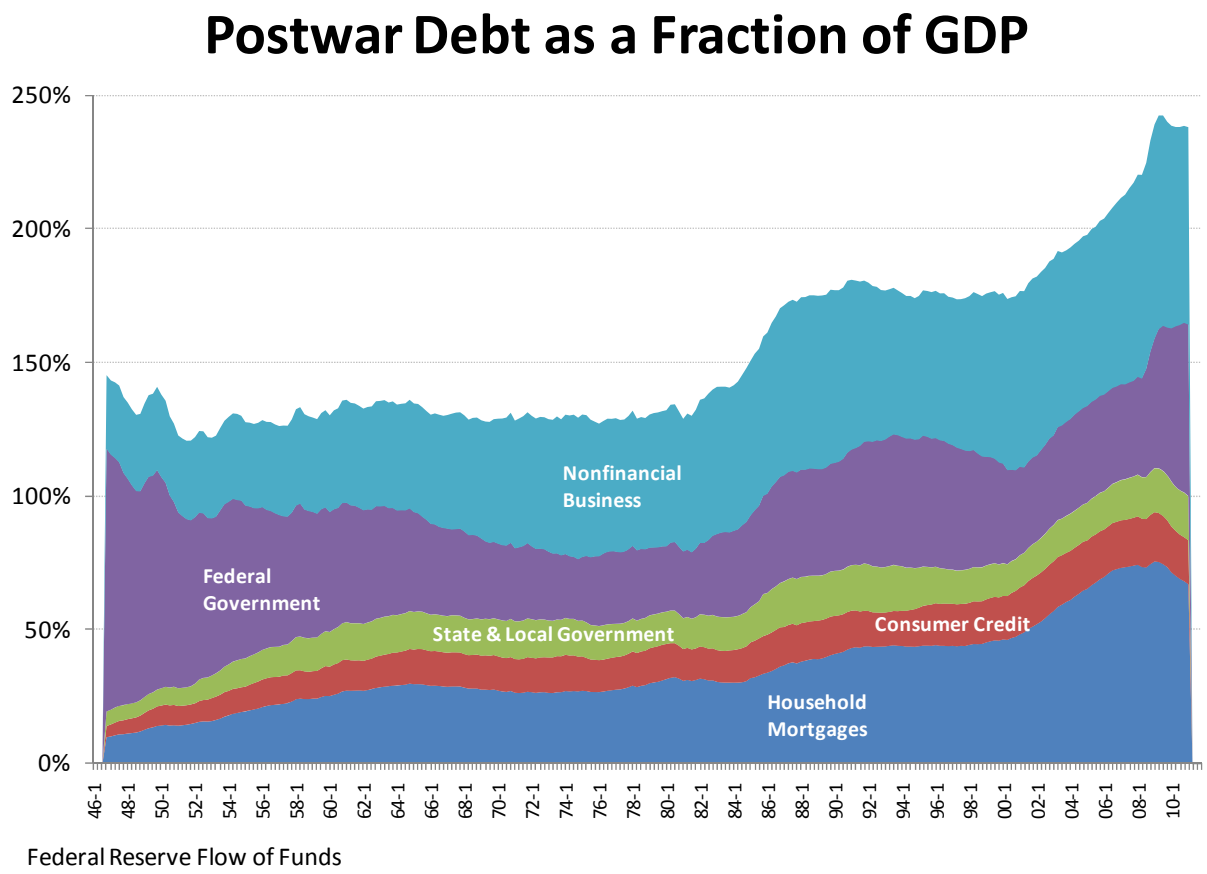


Figure 70

Derivative Markets

The basic debt market data presented by the standard Fed presentations, and in Figures 69 and 70, mainly represent debt backed directly by some commercial enterprise, or asset, or government promise to pay. But as is well known, in recent years there have been large – huge, really – increases in the size of financial markets that are only tenuously if at all linked to underlying collateral (other than perhaps the reputation of counterparties.) Figure 71 shows the notional amounts outstanding of one important class of such instruments, credit default swaps.

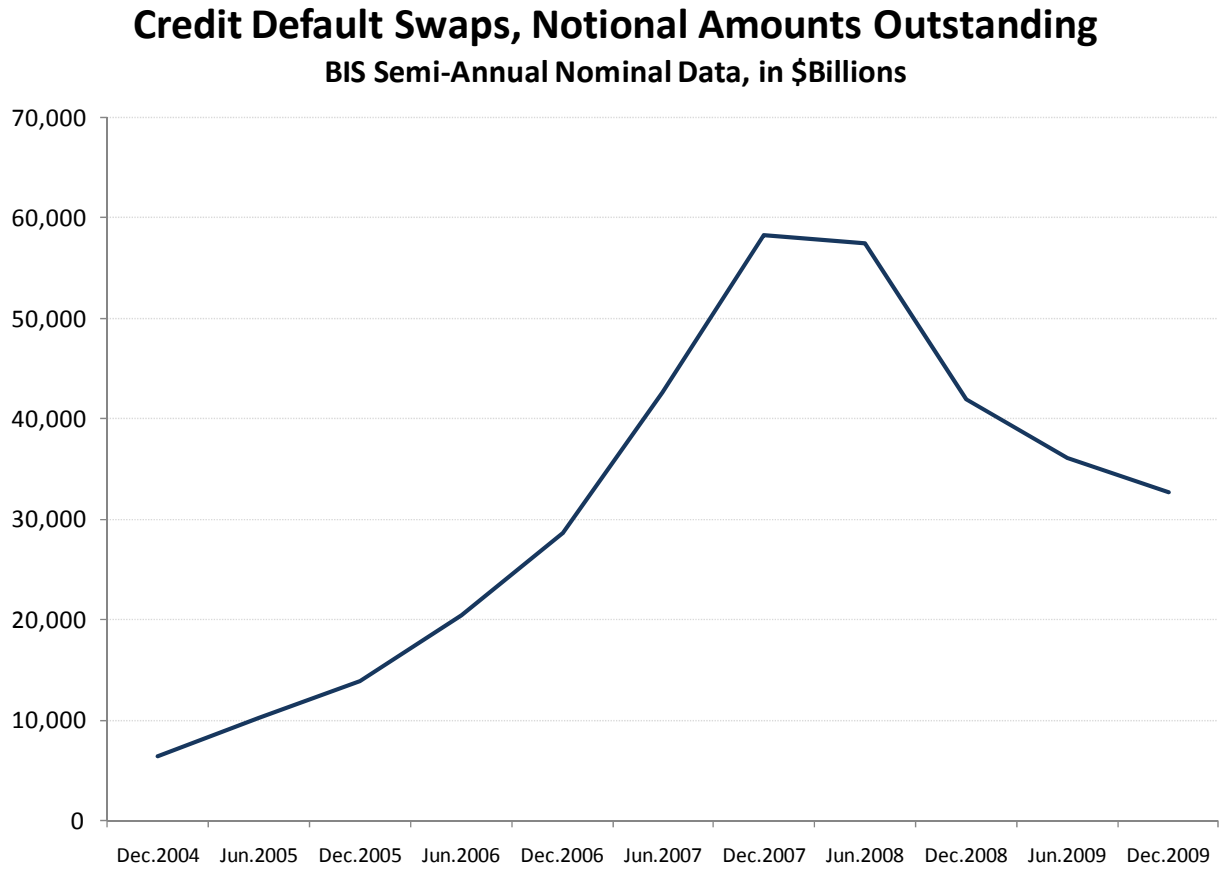


Figure 71

The pros and cons of derivatives like CDS, at least then they reach levels like $60 trillion as they did just before the financial crash of 2008, are hotly debated. I'll provide more references and a little discussion in the next edition.

Equity and Credit Market Indicators

The stock market has taken some big hits. Figure 72 shows its long run increase (inflation-adjusted). Broadly, there was a long postwar boom until the mid 1960s; a 15 year slide after that period; and another long rise from about 1981 to 1998. Note the post 1998 "tech wreck" decline, the 2009 debacle, and its partial bounce back.

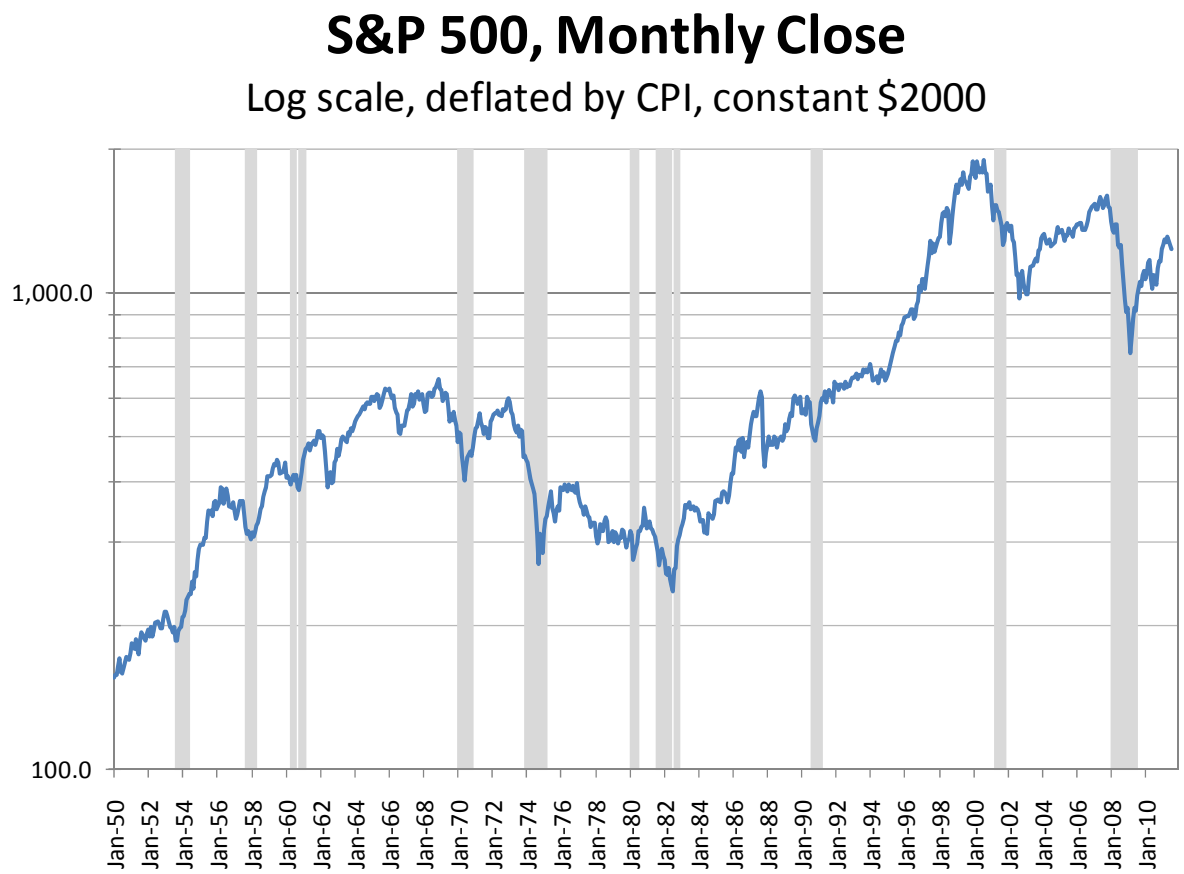


Figure 72

But the real hits are in the credit markets, as the next figure shows.

The TED Spread is the difference between government short term notes (the three month T-Bill), and the London Interbank Offer Rate (LIBOR). (TED is an acronym formed from T-Bill and ED, the ticker symbol for the Eurodollar futures contract). It is widely used as a measure of capital market conditions; when the TED spread rises, banks are becoming reluctant to lend to each other.

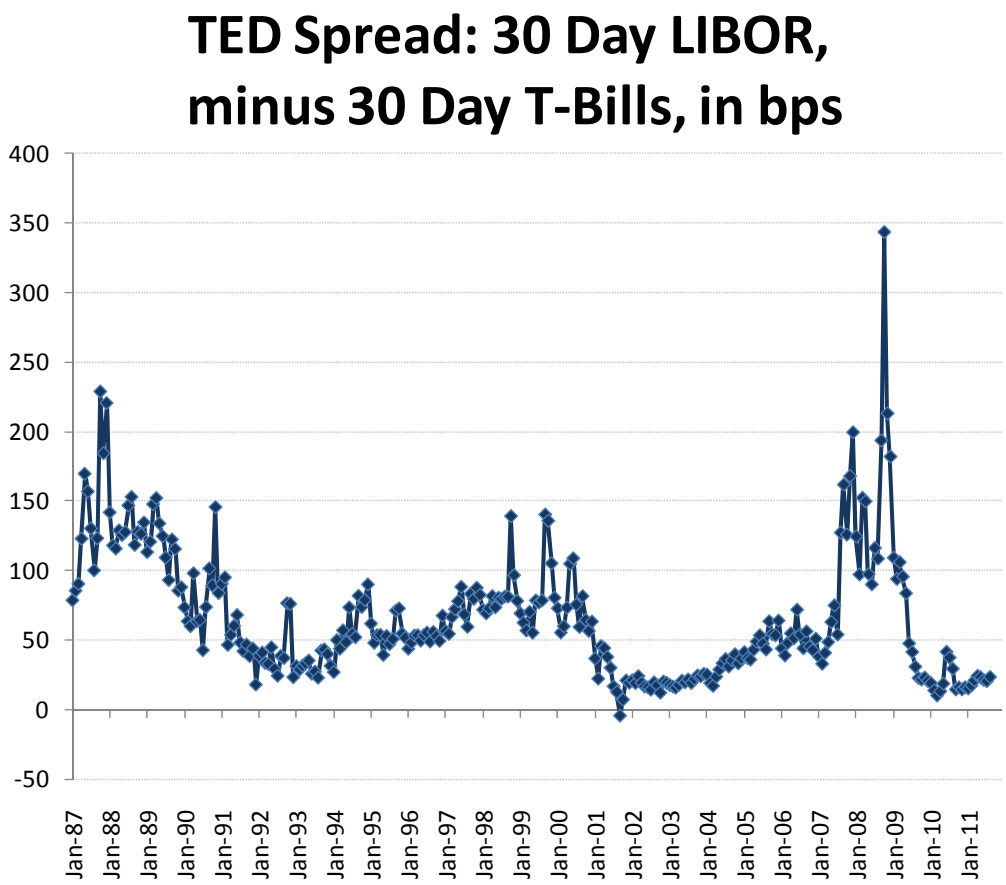


Figure 73

When TED spikes, as in 2008 and 2009 of Figure 73, banks are too afraid to lend TO EACH OTHER.

In the fall of 2008 no one knew who owned what assets, how the interlocking risks of counterparties would sort out as different shocks hit (Lehman, AIG, etc.). This was the big, and bad news last fall, much worse news that the more widely reported stock market decline. During this period other data (not shown) told us the commercial paper market that funds the day to day business of most corporations was close to shutting down. These Main Street effects of a Wall Street crisis are the real reasons we sometimes have to hold our nose and bail out investment bankers.

Interest Rates

There are two so-called "policy rates" that the Fed (more or less) directly controls through its operations: the discount rate, and the federal funds rate.

The federal funds rate, also known as the overnight rate, is the interest rate at which banks lend reserve balances (federal funds) at the Fed to other banks, usually overnight.

The federal funds target rate is just that, the target, as determined by the Federal Open Market Committee. Usually the fed funds rate and the target rate are about the same, but when things get a little weird, the observed rate can deviate somewhat from the target rate.

The discount rate is the interest rate the Fed charges banks when they borrow directly from the Fed itself. In normal times, the discount rate is set a little higher than the fed funds rate, because the Federal Reserve wants the banks to borrow and lend from each other before they tap the Fed. (Remember, the Fed is the "lender of last resort.")

These two policy rates are the rates that the Fed directly affects through its operations (open market operations, or buying or selling Treasuries; setting the discount rate directly; and setting the fraction of their deposits that banks must hold at the Fed as reserves). But changes in these rates, along with changes in the market's expectations about future Fed policy, affect other rates indirectly.

We have already looked at some of these rates indirectly when we examined "Ted Spread," or the difference between LIBOR and a short Treasury rate. The London Interbank Offered Rate (LIBOR) is the rate at which banks borrow unsecured funds from other banks in the London interbank market. In recent years LIBOR became a popular (though not the only) alternative as a benchmark rate for adjustable rate mortgages in the U.S.

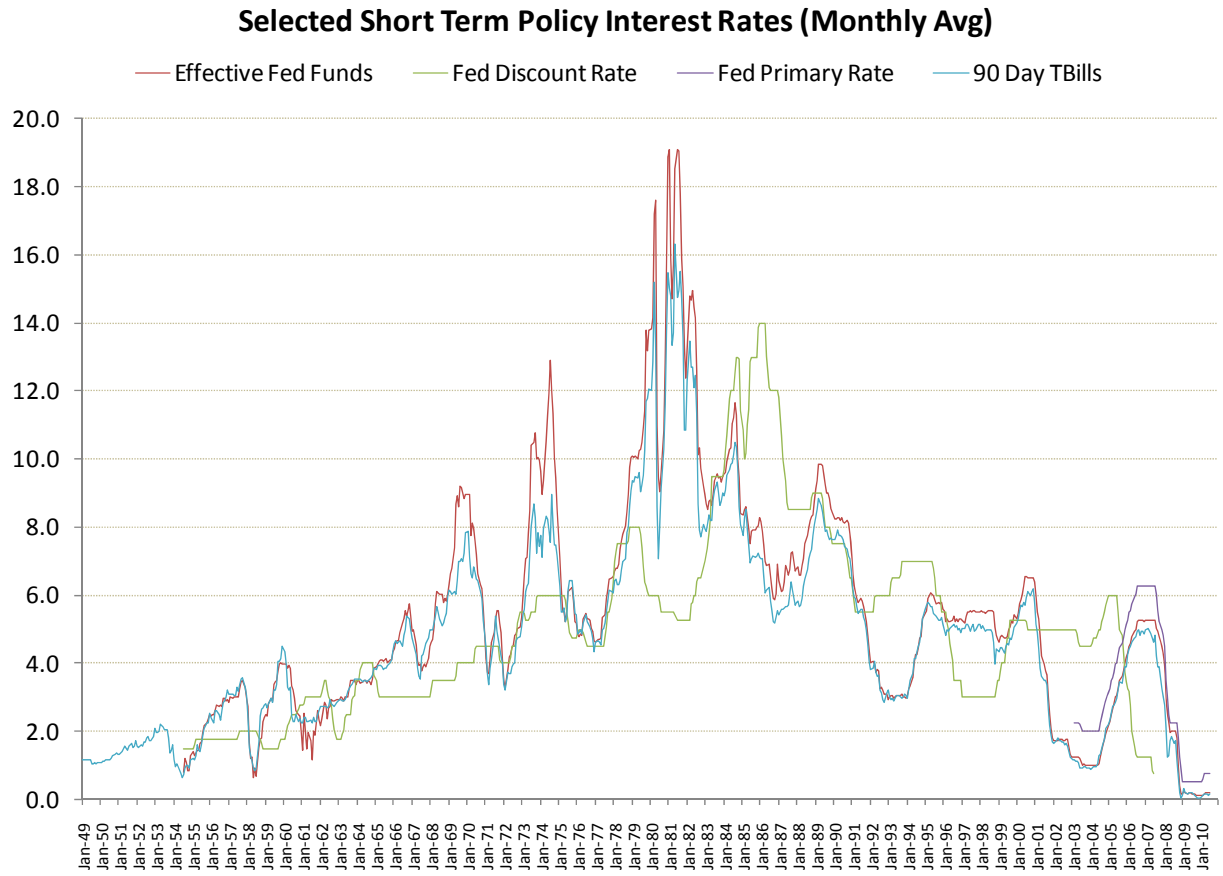


Figure 74

Treasury securities are grouped by their maturities as follows:

Treasury bills (or T-Bills) mature in less than a year. (The common maturities are 4 weeks, 13 weeks, and 26 weeks). They are zero-coupon, i.e. they do not actually pay interest prior to maturity; instead they are sold at a discount to the face value (par value) and from this discount and the maturity you back out the effective interest rate. Treasury bills are usually our proxy for the "risk free rate" though there is always some small risk from a big unexpected spike in inflation during the holding period (and of course foreign investors face FX risk).

Treasury notes (or T-Notes) mature in one to ten years. They have a coupon payment every six months, and are commonly issued with maturities dates of 1, 2, 3, 5, 7 or 10 years, for denominations from $100 to $1,000,000. They are default free, but given their duration are subject to the risk that inflation will erode their real value.

Treasury bonds (T-Bonds, or the long bond) have the longest maturity, from twenty years to thirty years. They have a coupon payment every six months like T-Notes, and are commonly

issued with maturity of thirty years. Obviously, compared to T-notes, these have still higher inflation risk.

(Note: the Treasury did not issue 30-year Treasury bonds between November 2001 and February 2006).

Treasury Inflation-Protected Securities (or TIPS) are inflation-indexed. The coupon rate is constant, but principal is adjusted by the CPI. TIPS are currently offered in 5-year, 10-year and 20-year maturities. (30 year TIPS have just become available as of February 2010). TIPS yields are now used to construct one alternate measure of expected inflation. See http://www.treas.gov/tic/mfh.txt .

There are a number of bonds that are not exactly Treasuries but are treated as close substitutes. Ginnie Mae, Fannie Mae, Freddie Mac, the Federal Home Loan Banks, and the Federal Farm Credit Bank banks are the main examples. Ginnie Mae is actually a federal agency that issues its own debt; the rest are so-called Government Sponsored Enterprises (GSEs) that, until the financial crisis of recent years, were treated by capital markets as benefiting from Treasury backing even though the backing was implicit, not an explicit "full faith and credit guarantee." As you know, the capital markets turned out to be correct, and when Fannie and Freddie hit the skids, the Treasury stepped in; the guarantee is now explicit.[28]

State and local governments also issue debt. These are differentiated both in terms of risk (in contrast to the market's view of U.S. government securities, there is some risk of default with state and local government bonds). There are also important tax differences. Individual taxpayers pay federal taxes on interest income from U.S. securities, but are exempt from state and local income taxes. State and local bond interest is generally exempt from national taxation (though they are subject to capital gains taxation). General obligation bonds are backed by the full faith and credit of the issuer; revenue bonds are backed by a specific project (e.g. a toll road) and have a higher risk of default.

Banks

The so-called "prime rate" is a little slippery: it's the rate that banks charge (or purport to charge) their best customers. In reality the prime rate varies from bank to bank (as does exactly what "best customer" means. Nevertheless, the Fed (and other sources) regularly survey banks and report this rate.

[28] There are other entities like the World Bank and other multilateral development banks, which, while not GSEs in the normal sense of the term, have some form of government guarantee and can issue bonds at modest yields over Treasuries.

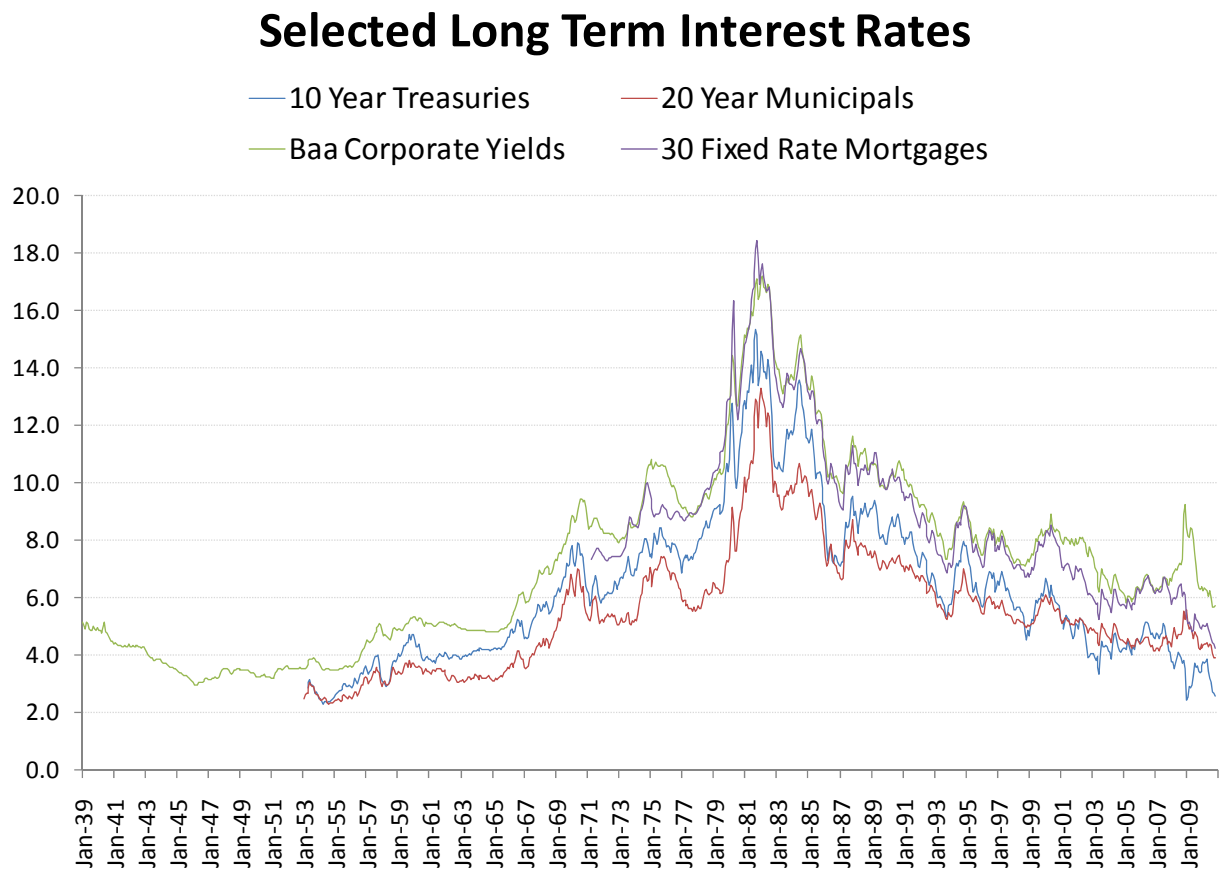
So far we have discussed interest rates related to the government, and to banks. There are a number of important benchmark rates related to private sector debt, i.e. capital markets.

Commercial paper refers to short term debt issued by large corporations.

Corporate bonds are longer term instruments. Besides the nominal duration of the bond, e.g. 10 years, corporate bonds often have options embedded in them. For example they may be "callable" by the issuer after some specific period, e.g. the issuer might have the right to require the bond holder to sell the bond back to the issuer at a pre-specified price after, say, 5 years. Alternatively, the bond may be "convertible" into equity or some other specified security at the discretion of the bond holder. Obviously the presence or absence of such options will affect the pricing and hence the effective yield of otherwise similar bonds.

Corporate instruments are (like other forms) rated by Moody's, Standard and Poors, and Fitch. Each rating agency has its own scheme, but generally they follow a similar pattern. In particular the top four ratings (AAA, AA, A and BAA according to Moody's scheme) are so-called investment grade; lower grades (BA, B, CAA, CA and C) are speculative; what the industry calls "high yield" but are referred to as "junk bonds" in common parlance.

After bank reserve requirements were increased in the 1990s, banks increasingly looked to take loans off their balance sheets to avoid the need to raise capital, depressing their returns. At the same time, many potential investors, especially large institutions like life insurance companies and pension funds were the sources of ever-increasing demand for highly rated paper, driven by a combination of demographics and the "prudent man" rule that equated high ratings from the major credit rating agencies as a true measure of risk. In order to place these loans with investors that demanded high credit quality (or at least the appearance of same), credit default swaps became an increasingly important strategy to strip the credit risk from corporate bonds and other risky securities (mortgages!) in order to take advantage of the increasing demand for AAA debt.


Selected Long Term Interest Rates
10 Year Treasuries
20 Year Municipals
Baa Corporate Yields
30 Fixed Rate Mortgages
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Jan-39
Jan-41
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Jan-09

Figure 75

Mortgage Rates

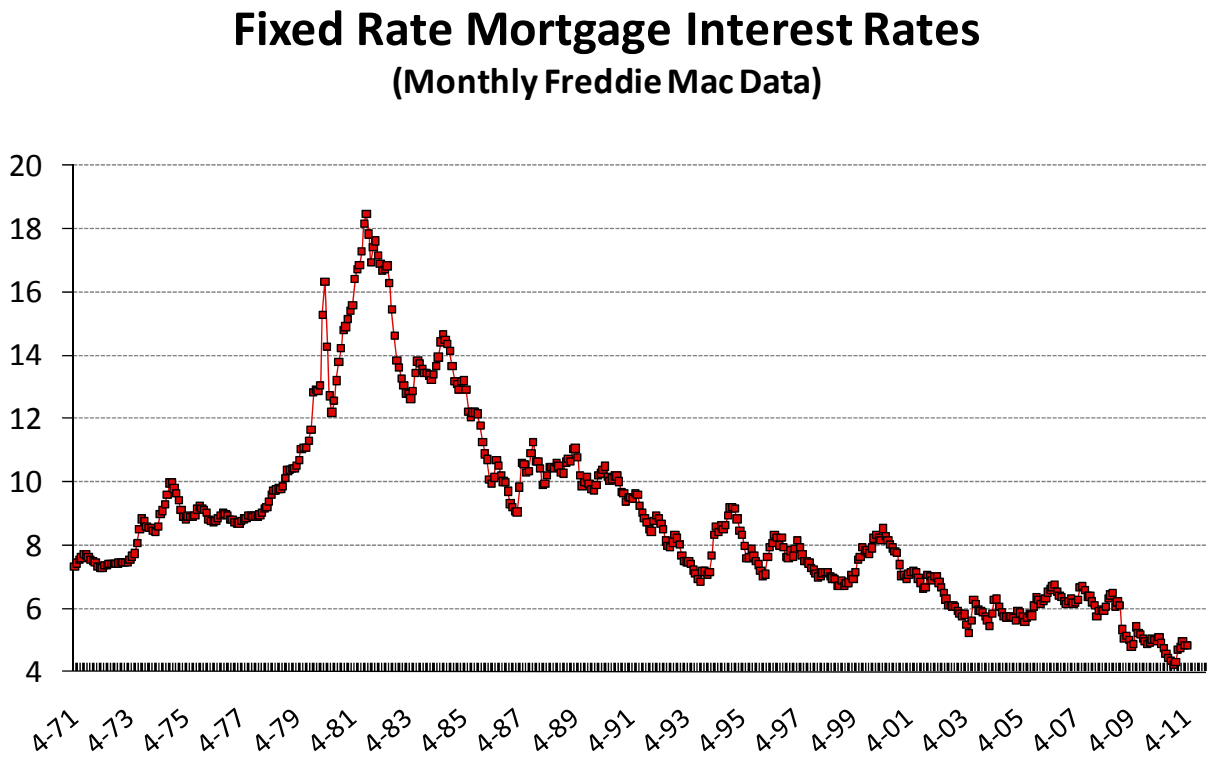

Figure 76

Whatever else went wrong, at least mortgage rates are still low - if you can qualify. See Figure 76. Note that in 1981, rates spiked by 500 basis points in 12 months. That's not a forecast of a similar spike today, just a worry that rates can change in a hurry if markets shift.

Real versus Nominal Interest Rates

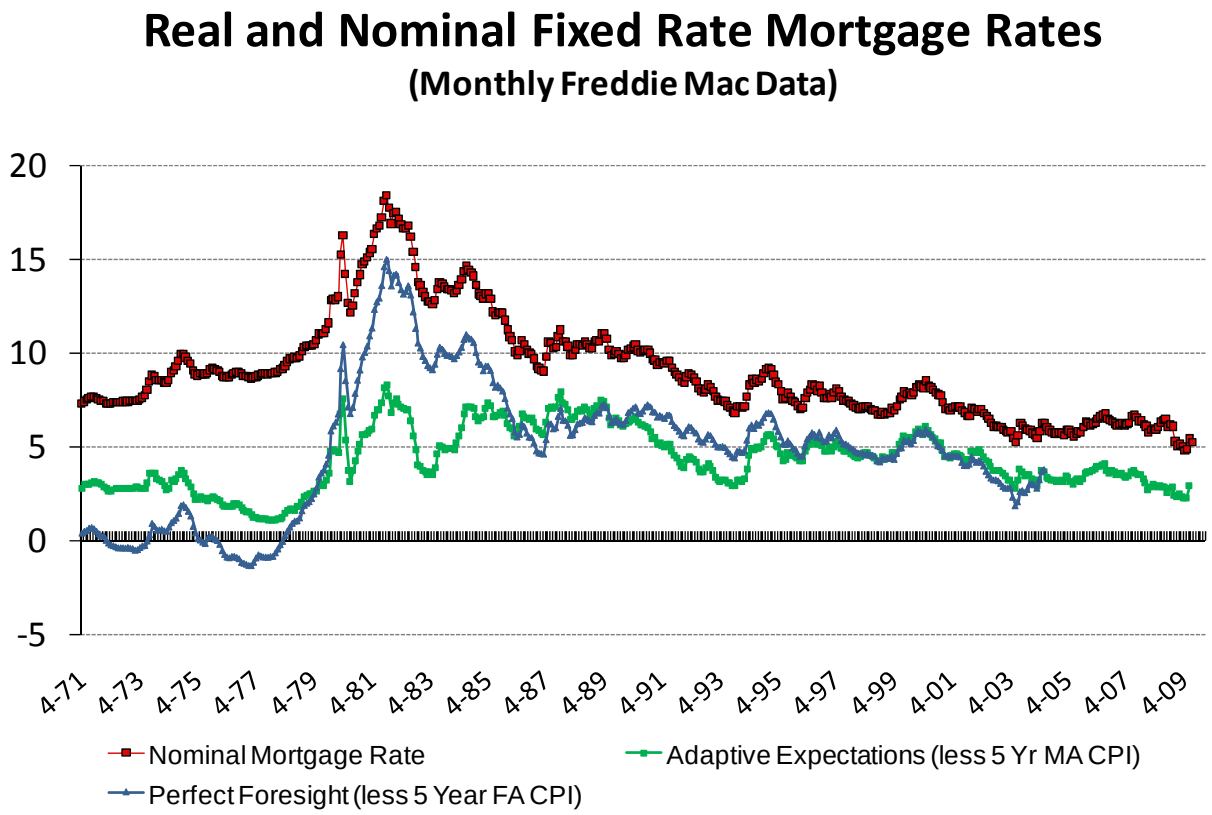

Figure 77

But Figure 76 is in nominal terms – what if we adjust for expected inflation? One problem is, nobody knows exactly what expected inflation is. Figure 77 adjusts nominal rates for two simple candidate measures. Suppose markets are really good at forecasting inflation, and we use actual inflation in the next five years – a 5 year forward average as a proxy. Or suppose markets forecast using a 5 year backward looking moving average (MA) i.e. recent inflation helps us forecast future inflation. Figure 77 presents these alternate measures. Given inflation has been low and fairly stable in the past decade, both measures give similar results. But if/when inflation picks up, as in the 70s and 80s, look out!

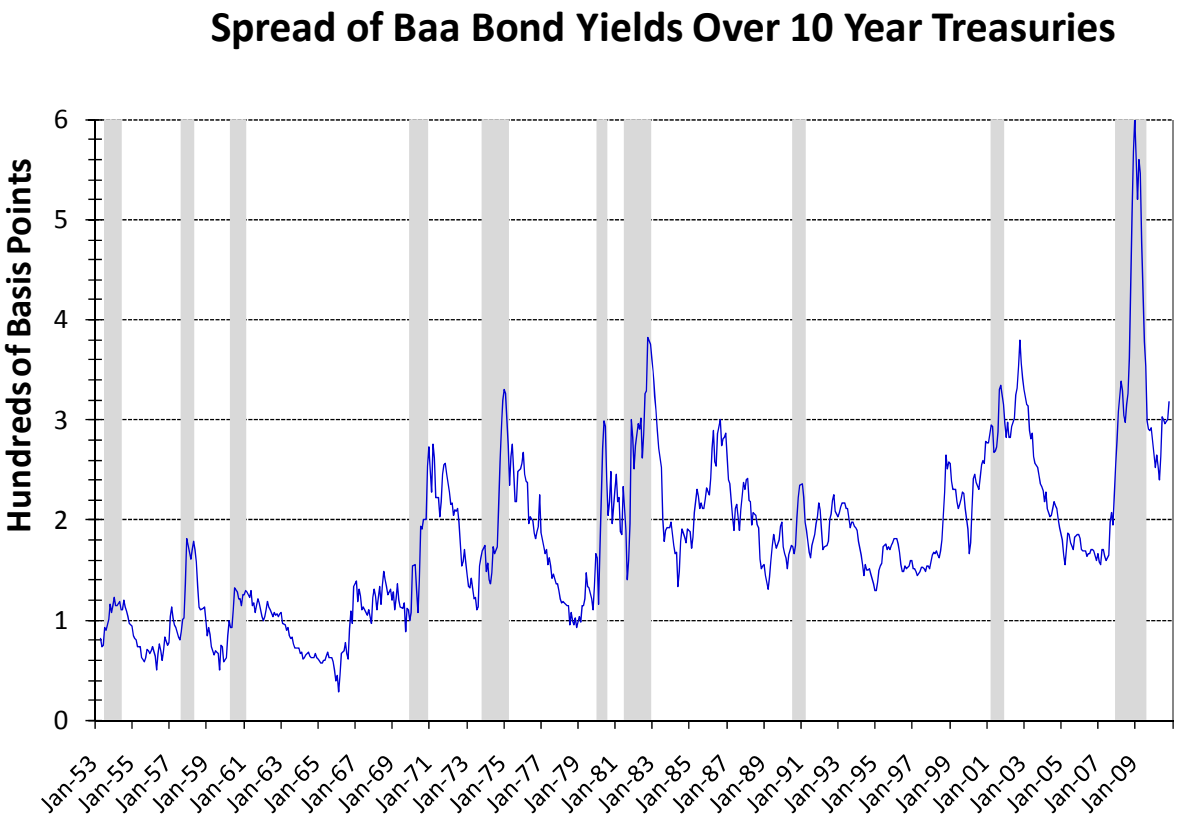

Figure 78

The Term Structure

The term structure of interest rates is another key variable. How much of a premium do investors require to hold longer term paper? Figure 79 presents those data for several different dates.[29] How does the term structure, or yield curve, evolve over time? One simple way to look at it is to just pick two points on the yield curve and take the difference.

Figure 80 shows this simple term structure measure. Economists have observed some correlation between this term structure and the onset of recessions; see some of the references at the end of this note.

[29] I used a teaching note by Professor Craig Holden of Indiana University to select some dates showing extreme curvatures.

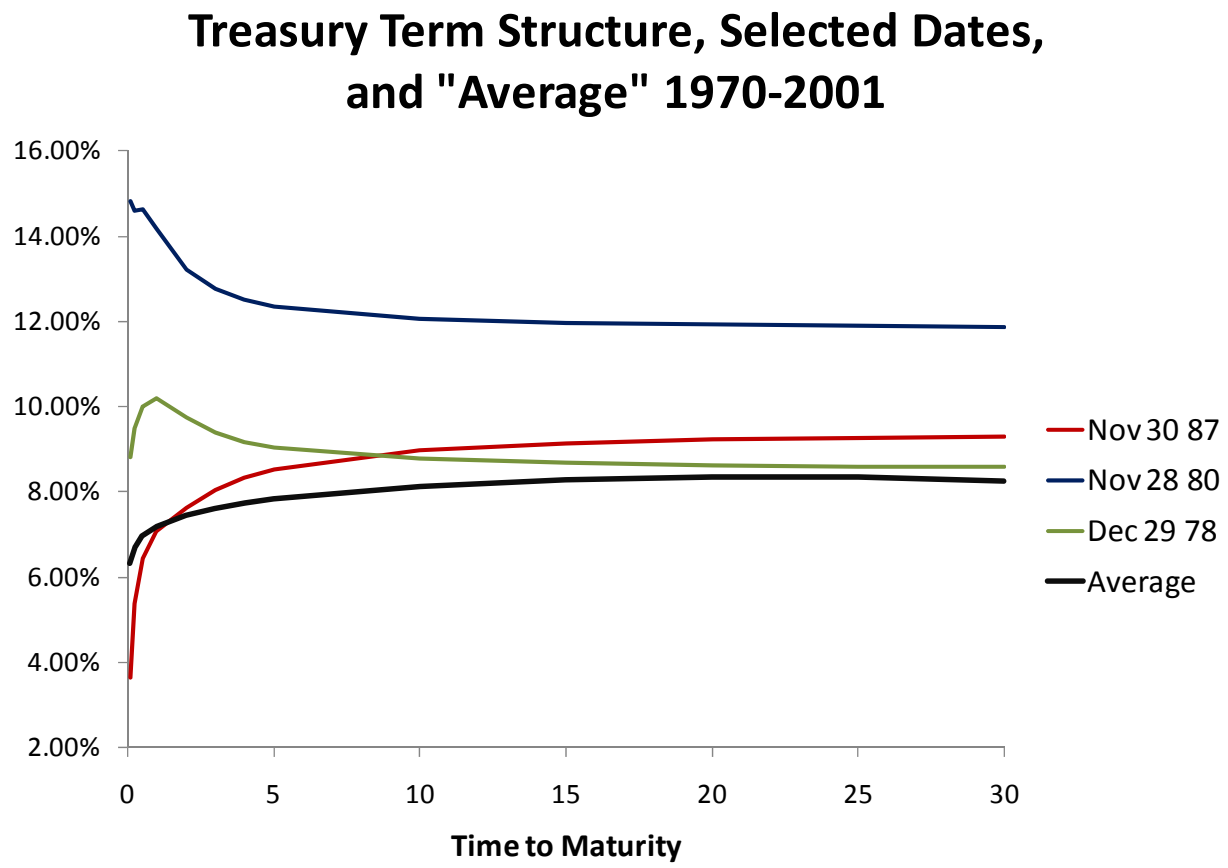

Figure 79

The term structure has had some success as a leading indicator. One way to think about this is to consider a long-term rate as approximately a discounted sum of expected short term rates over the relevant time horizon. When the economy is expanding, investors may expect real yields to rise (and may also expect some increase in inflation). When investors expect economies to tank, future bond yields will be expected to fall, and perhaps lower inflation; this causes the yield curve to flatten or even "invert" (long term rates are lower than short term rates).

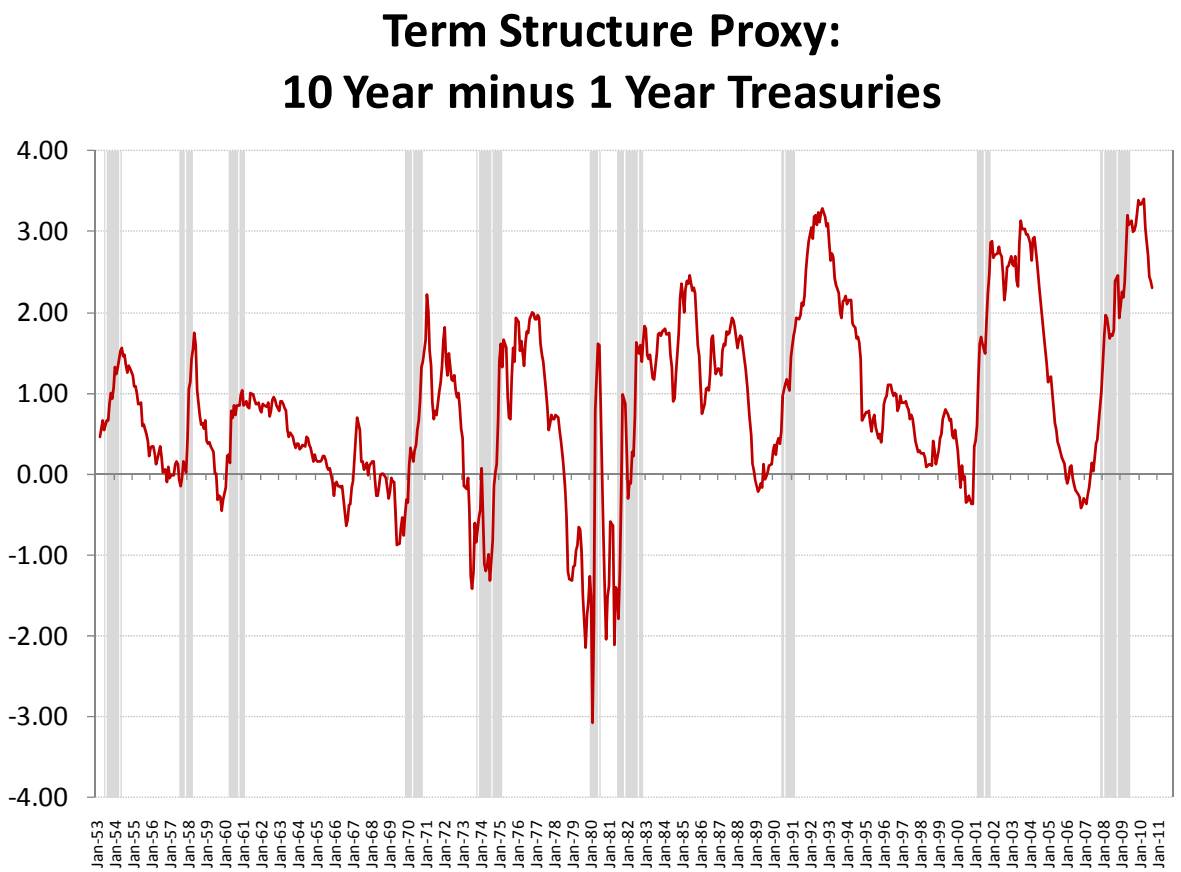

Figure 80

See Figure 80. The yield curve inverted a few months before every recession since 1958. Notice the apparent "false alarm" in 1966 when the yield curve inverted but expansion continued.

What about signals in the other direction? Generally a steep yield curve is associated with recovery but notice the volatility in the yield curve, especially in the "double dip" recession of 1980-81. It may be hard to see a clear signal. Nevertheless, the current reasonably steep yield curve is in some sense one of the arguments that we are indeed in a recovery.

An interesting thought is that to the extent NBER uses, implicitly if not explicitly, the steepness of the yield curve as one of the variables that help date business cycles, the term structure may not be a completely independent signal.

Also, there may be some interaction between the term structure and the level of interest rates. Right now the term structure can be thought of as signaling recovery, but continued low levels of both short and long term rates signal weakness.

XI. Final Comments

It's a good idea to track these aggregates over time if you want to keep abreast of the economy. Have a look at *Survey of Current Business* -- it is a tremendous resource. Professor Donald Nichols of the economics department also publishes an annual review of the Wisconsin economy, which I highly recommend. Adjunct Professor David Shulman, advisor to our AREIT program, is another regular forecaster of note. And follow the excellent blog Econbrowser, by UW's Menzie Chinn and UC San Diego's James Hamilton.

In class, I'll provide a bit more information on tips for tracking the economy, using the data we've discussed in this handout.

Practice Questions

Where possible, make your answers at least roughly quantitative. "Housing averages 20 percent of consumption" is much better than "people consume a lot of housing."

1.Explain the difference between stocks and flows. Give three paired examples of related stock and flow economic variables (for example, the flow *income* and its corresponding stock, *wealth*).

2.Explain, qualitatively, the concept of seasonal adjustment. What are the main methods used to seasonally adjust data?

3.What is the logarithm, and why is it our friend? (Discuss some of its properties).

4.What do we mean by expectations? Why is it such a central concept to real estate economics? Define myopic expectations, adaptive expectations, and rational expectations, in turn.

5.Explain the difference between nominal and real values of a variable. Which should the analyst study?

6.Give some pros and cons of the CPI, the GDP deflator as deflation indexes.

7.What is a random walk?

8.One way to test for market efficiency is to perform a statistical test to determine whether changes in the price of the asset in question follow a random walk. Why is that a useful test of market efficiency?

9.Explain serial correlation. What are the implications for the market efficiency of an asset? Explain briefly.

10.A time series can be decomposed into trend, cycles, and noise. Briefly explain each.

11.What is a "black swan?"

12.What do we mean when we say a distribution is "thick in the tails?"

13.How can thick-tailed distributions give rise to perverse incentives for investment bankers, and hence unstable financial markets? Can market discipline fix this problem?

14.Why is U.S. population growth substantially higher than Japan, many European countries, and most other rich countries? Give three plausible implications for real estate markets.

15.What is a population pyramid? Tell me 3 interesting things that population pyramids tell us about long run demographics in the U.S.

16.Discuss U.S. population growth over the past century or so, touching on the roles of natural increase, migration, and the interaction between these two. Discuss sources of migration as well.

17.What is the basic national income accounting (NIA) identity, in "principles textbook" form, and in our slightly expanded form? Which components are largest, smallest, in absolute size, in growth rates, in volatility?

18.List and briefly explain 3 significant shortcomings of GDP as a measure of economic activity/well being.

19.Some economists look at "core" CPI as a measure inflation in addition to the widely cited headline CPI. What's the difference? What's the rationale for looking at core, as a supplement to the headline figure?

20.How do we (officially) define recessions? How does this compare with "folk wisdom" definitions of recessions?

21.What is (was?) the Great Moderation? Comment on the GM in light of recent macro events.

22.Broadly, what's happened to the top quintile of U.S. income distribution over the past 40 years? How does this compare to the rest of the population?

23.Now discuss trends within the top decile. Research by Piketty and Saez will help.

24.Consumption is something on the order of 2/3 of GDP. Investment is maybe 1/6; net trade is (on average) less than 2 percent of GDP (imports around 12 percent, exports around 10 percent). Despite their relatively smaller size, we claim I and (X-M) usually drive the business cycle. Why? What role does C play? What kind of C is most critical for driving business cycles?

25.On an NIA basis, what's grown fastest, postwar: federal C+I; or state and local government C+I?

26.Housing can be viewed as both consumption and investment. Explain the difference; give a thumbnail sketch of each role.

27.Federal government spending, as measured in the National Income Accounts, is only about 12 percent of GDP. But Federal tax collections (including FICA) are about x percent of GDP. What's up with that?

28.Why aren't Social Security, Medicare, net interest on federal debt, included in NIA definitions of government spending? Discuss the implications of this fact.

29.In the broadest terms, why has the U.S. run a trade deficit (X < M) for every year since 1983, and for xx years of the past 50?

30.Broadly, why did labor force participation rise so rapidly until about 20 years ago? Why has it gradually leveled off? What's happened to LFP during the Great Recession?

31.As of this writing, the headline unemployment rate is 9.7 percent; but since 1994 BLS has published a broader measure we examined, currently at about 16 percent. What are the differences?

32.Several measures of the duration of unemployment are at all-time highs as of this writing. Explicate. What are the implications of this: for real estate, for future GDP, for future employment?

33.What is the TED spread, and why do we care about it?

34.The S&P 500 falls 5 percent in a day, and Professor Malpezzi yawns. Then the S&P falls 8 of the next 9 days. Professor Malpezzi starts to choke instead of yawn. Why?

35.The TED spread spikes 50 bps in a day and Malpezzi *immediately* chokes; no yawning involved. Why should news reporters spend much less time on the daily stock market report and more time on daily credit market conditions?

36.The Fed (more or less) controls short term rates; but there are no long term "policy" rates. Long term rates are set by the market; but the Fed does influence LT rates indirectly. Explicate.

37.What is the yield curve? Why does it seem to have some predictive power regarding the business cycle? How apparently reliable is this relationship?

Further Reading

This note is the latest revision of lecture material that I first developed in 1992. I was directly inspired by UW Professor Don Nichols' annual review of the macro economy:

> Nichols, Donald A. *The Economic Outlook.* Professor Nichols usually prepares a new version every September for the Outlook Conference held in the Fluno Center.

There's a lot of overlap between this teaching note and:

> Davis, Morris A. *Macroeconomics for Mbas and Masters of Finance*. Cambridge University Press, 2009.

See especially Chapter 1.

Any good principles text will have a good discussion of national income accounting, for example:

> Case, Karl E. and Ray C. Fair. *Principles of Economics*. Prentice Hall, 1996.

Important Data Sources:

> http://www.census.gov is the mother of all data sites. Know it. Live it.
>
> http://www.bea.gov contains, among other things, basic National Income and Product Accounts (NIPA) data; and the Regional Economic Information System (REIS), which provides basic data on metro (and other state, regional) employment, income, and population.
>
> http://www.bls.gov is the Bureau of Labor Statistics.
>
> http://research.stlouisfed.org/fred2 is the St. Louis Fed's "Federal Reserve Economic Data" or FRED website. It's a terrific data aggregator.
>
> http://www.gpoaccess.gov/eop Council of Economic Advisors. *Economic Report of the President*. Washington, D.C.: Annual. The first part of the book is a well-written review of economic events, although strictly from the point of view of whatever Administration's in power. The last part is a very useful compendium of basic macroeconomic indicators.
>
> http://www.nber.org/cycles/main.html is where you can read more about the official dating procedures of the National Bureau of Economic Research, and other tidbits about the business cycle.

A more detailed account of NIPA, and lots of useful numbers can be found in:

> Seskin, Eugene and Robert P. Parker. A Guide to the NIPAs. *Survey of Current Business*, March 1998, pp. 26-68. Available from www.bea.doc.gov/bea/an1.

Basic sources of very long run historical data include various editions of Historical Statistics of the United States. Historical Statistics used to be a published Census report very occasionally; but it's now been "privatized" and available in printed form and (even better!) online through Cambridge University Press. It can be found at: http://hsus.cambridge.org.ezproxy.library.wisc.edu/HSUSWeb/HSUSEntryServlet ; UW students have free access to this through the library, go to http://library.wisc.edu/#databases and then search for "Historical Statisics." For additional historical data on the U.S., see:

> U.S. Department of Commerce, Bureau of Economic Analysis. *The National Income and Product Accounts of the United States, 1929-88*. Two volumes. GPO, 1990.
>
> Caplow, T; Hicks, L and Wattenberg, BJ. The First Measured Century: An Illustrated Guide to Trends in America, 1900-2000. AEI Press, 2001.
>
> Mennis, EA. "Herbert Stein and Murray Foss, the Illustrated Guide to the American Economy." Business Economics, 2000, 35(3), pp. 77-77.

For more about government spending, and the taxes that pay for them, see:

> http://www.usaspending.gov/
>
> http://www.gpoaccess.gov/usbudget/
>
> Musgrave, RA, PB Musgrave, and RM Bird. 1989. Public finance in theory and practice.
>
> Quigley, JM and E Smolensky. 2000. Modern public finance: Harvard University Press.
>
> Slemrod, Joel and Jon Bakija. 2008. Taxing ourselves: A citizen's guide to the debate over taxes: MIT Press.
>
> Steuerle, C. Eugene. 2004. Contemporary U.S. Tax Policy: Urban Institute Press.

There are many general "guides to economic indicators," see for example:

> Baumohl, Bernard. *The Secrets of Economic Indicators.* Wharton, 2005.
>
> Frumkin, N. *Guide to Economic Indicators*. ME Sharpe Inc, 2000.

Plocek, JE. *Economic Indicators: How America Reads Its Financial Health*. Prentice Hall, 1991.

Yamarone, Richard. *The Trader's Guide to Key Economic Indicators*. Bloomberg Press, 2004.

On the research side, see:

S. Borağan Aruoba (2008) Data Revisions Are Not Well Behaved. *Journal of Money, Credit and Banking* 40 (2-3) , 319–340

Other surveys of real estate and macro indicators include:

Tuccillo, John and Sean Burns. *The Role of Housing and Real Estate in the Economy*. Paper prepared for the Third International Shelter Conference, Washington D.C. April 1990.

Hu, Dapeng, and Anthony Pennington-Cross. *The Evolution of Real Estate in the Economy*. Research Institute for Housing America, 2000.

Business cycles are discussed in:

Gordon, RJ. 1990. The american business cycle: Continuity and change: University of Chicago press.

Zarnowitz, V. 1996. Business cycles: Theory, history, indicators, and forecasting: University of Chicago Press.

Is GDP really the best possible measure of income, or welfare? See:

Arrow, K, B Bolin, R Costanza, P Dasgupta, C Folke, CS Holling, BO Jansson, S Levin, KG Mäler, and C Perrings. 1996. Economic growth, carrying capacity, and the environment. Environment and Development Economics 1, no. 01: 104-110.

Fleurbaey, M. 2009. Beyond gdp: The quest for a measure of social welfare. Journal of Economic Literature 47, no. 4: 1029-1075.

Kenny, C. 2005. Why are we worried about income? Nearly everything that matters is converging. World Development 33, no. 1: 1-19.

Nordhaus, WD, RN Stavins, and ML Weitzman. 1992. Lethal model 2: The limits to growth revisited. Brookings Papers on Economic Activity 1992, no. 2: 1-59.

For international data, see the relevant country's national income accounts, or for some comparative data see:

OECD. National Accounts Volume I: Main Aggregates. (Published every few years).

OECD. National Accounts Volume II: Detailed Tables. (Ditto).

United Nations. National Accounts Statistics: Main Aggregates and Detailed Tables, (Year). New York, Annual.

United Nations. *Statistical Yearbook*. Department of International Economic and Social Affairs. Annual.

More interpretative discussions of international indicators can be found at:

Angel, S and Mayo, SK. "Enabling Policies and Their Effects on Housing Sector Performance: A Global Comparison," International meeting of the American Real Estate and Urban Economics Association, Orlando1996.

Malpezzi, S and Mayo, SK. "Housing and Urban Developement Indicators; a Good Idea Whose Time Has Returned." *Real Estate Economics*, 1997, 25(1).

Expectations are discussed further in:

Muth, J. F. (1961). "Rational Expectations and the Theory of Price Movements." Econometrica 29(3): 315-335.

Sargent, T. J. and N. Wallace (1976). "Rational Expectations and the Theory of Economic Policy." Journal of Monetary Economics 2(2): 169-183.

The efficiency of stock prices and other major financial markets is debated in:

De Bondt, W. F. and R. Thaler (1985). "Does the Stock Market Overreact?" Journal of Finance 40(3): 793-805.

Fama, E. F. (1998). "Market Efficiency, Long-term Returns, and Behavioral Finance." Journal of Financial Economics 49(3): 283-306.

Gatzlaff, D. H. and D. Tirtiroglu (1995). "Real Estate Market Efficiency: Issues and Evidence." Journal of Real Estate Literature 3(2): 157-189.

Shiller, R. J. (1981). "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?" American Economic Review 71(3): 421-436.

Summers, L. H. (1986). "Does the Stock Market Rationally Reflect Fundamental Values?" Journal of Finance: 591-601.

For non-technical explanations of key properties of time series, see:

Dickey, DA, DW Jansen, and DL Thornton. 1991. A Primer On Cointegration With An Application To Money And Income. Federal Reserve Bank of St. Louis Review 73, no. 2: 58-78.

Franses, PH. 1998. Time series models for business and economic forecasting: Cambridge Univ Pr.

Murray, Michael P. 2006. Econometrics: A modern introduction: Pearson Addison Wesley.

Nelson Charles, R and R Charles. 1982. Trends and random walks in macroeconomic time series:: Some evidence and implications. Journal of Monetary Economics 10, no. 2: 139-162.

A fun book that teaches you a substantial amount of econometrics “painlessly” is:

Fair, RC. 2002. Predicting presidential elections and other things: Stanford Economics and Finance.

A thorough but more technical treatment can be found in:

Hamilton, JD. 1994. Time series analysis: Princeton University Press.

The “Great Moderation” hypothesis is analyzed in:

Bean, Charles. "The Great Moderation, the Great Panic, and the Great Contraction," Annual Conference of the European Economic Association. Barcelona, 2009.

Brown, C., J. C. Haltiwanger, et al. (2006). Economic Turbulence: Is a Volatile Economy Good for America?, University of Chicago Press.

Bernanke, BS. 2004. The great moderation.

Demographic references include:

Frey, WH; Abresch, B and Yeasting, J. *America by the Numbers: A Field Guide to the Us Population*. New Press, 2001.

Myers, Dowall (ed.). Housing Demography. University of Wisconsin Press, 1991.

Parker, John. Degrees of Separation: A Survey of America. The Economist, July 16, 2005.

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