

Perspectives in Macroeconomics

Recessions Since 1954: Tests of Competing Theories

The tests below are very primitive and should not be taken as definitive—but then you shouldn't take any test as being definitive! As scientists, we are supposed to remain skeptical and reflective, weighing what evidence we have but always realizing that there are many stages at which bias and error can enter into our analyses. Still, we have to try!

General Background

Each of the eight theories we cover in class is tested below. These are not full-scale but focus only on the most unique aspects of each. For example, the Monetarist view also posits a specific relationship between the money supply and inflation. That is not examined here, only their contention that inflation affects employment.

The predictions of each school of thought are compared to three stages of the business cycle:

Earl to Mid: all quarters of the expansion except the last four.

Late: the last four quarters of expansion.

Recession: all quarters of the recession.

Note that expansions and recessions are defined relative to real GDP growth and not unemployment. It is therefore possible, though unlikely, for unemployment to be high during an expansion and low during a recession. Note, too, that unemployment can rise very quickly in the downturn (sometimes even starting to do so in late expansion) but usually takes a long time to recover in expansion. This means that unemployment is usually highest in the recession and lowest in late expansion. I mention this because some of the business cycle theories are really theories about fluctuating unemployment and not changes in real GDP (specifically the Monetarist, New Classical, and Real Business Cycle views). However, for simplicity I made the assumption that the above characterization regarding unemployment in each business cycle stage always holds.

Note that in each case below, every cycle was evaluated in isolation. In other words, there was no attempt to see if the changes from the last recession going into the next expansion were consistent with the theory in question, only whether or not subsequent stages in a single cycle made sense. This was done merely for simplicity. As basic as they are, these tests can nevertheless get very tedious very quickly.

Last, the following was assumed everywhere:

- Real GDP growth is lowest in recession and highest in late expansion.
- Unemployment is highest in recession and lowest in late expansion.

Notes on Specific Tests

Exogenous Business Cycle Theories

Keynesian: Keynesians believe that the primary determinants of business cycles are monetary and fiscal policy, especially the former. As evidence of this, the famous Neoclassical economist Rudiger Dornbusch once said, “None of the U.S. expansions of the past 40 years died in bed of old age; every one was murdered by the Federal Reserve.” Hence, below, both the government’s budget balance and the federal funds interest rate are compared to the various stages of the business cycle.

The assumption is that as the government spends more in deficit so this adds to demand and raises real GDP growth. Meanwhile, they assume that lower interest rates will encourage spending by both consumers and firms, thus raising real GDP growth. What Neoclassical Keynesians expect is that rising interest rates and shrinking budget deficits (i.e., rising budgets) over the business cycle eventually cause recession. We should therefore expect interest rates and government budget balances to be higher in late expansion than earlier to mid.

One important note on the budget balance. Unfortunately, the line of causation between it and economic growth runs in both directions so that it is difficult to clearly interpret its effect. For example, if the government passes a new law that changes spending or taxation and that new law affects real GDP, it is clear that fiscal policy affected real output. But, as the economy expands (for whatever reason), rising incomes and falling unemployment means that tax revenues increase and spending for income-support programs declines. Hence, *the budget automatically moves towards balance as the economy grows*. This creates the following problem: if we see that the government budget is moving toward balance (or surplus), should we expect this to cause a decline in GDP growth or is it merely the *result* of GDP growth? Economists have devised various means of separating out the cause and effect parts of government budgets, but none of them is without flaw. It’s just messy!

Monetarist: Monetarists argue that unemployment fluctuates because workers don’t understand what the real rate of inflation is. When it is higher than they expected, they treat the wages being offered by firms as more attractive than they really are. They hence go back to work. The opposite occurs when workers overestimate the actual rate of inflation. Below, rates of actual inflation are compared to the various stages of the business cycle. The assumption is that workers’ perception of actual inflation lags such that if it is accelerating, workers underestimate it and go back to work--unemployment falls; if it is decelerating, workers overestimate it and unemployment rises. We should therefore expect to see inflation accelerating into periods when unemployment is falling (recession to early-to-mid expansion and then early-to-mid expansion to late expansion).

New Classical: This school of thought is really an offshoot of the Monetarists, the only difference being that they think that workers’ ability to predict inflation is more sophisticated than indicated above. This is difficult to test since you need data on what workers’ expected. The University of Michigan publishes a set based on surveys, but it didn’t cover our whole period. So, I created my own expectational data by using a formula based on the research of John Sterman in System Dynamics Modeling. For those periods that

overlapped with the U of Michigan data, I compared it to see how close I was. It wasn't too far off, but who knows?! I made it up.

Their view is that when unexpected inflation is negative, we should expect unemployment to rise. When it is positive, it should fall.

Real Business Cycle: They think that business cycles are really rational reactions to exogenous changes in productivity. When productivity rises, so will wages and so workers go back to work: unemployment falls. And vice versa.

If that's right, then we should witness rising productivity in late expansion and falling in recession. To be fair, that's not exactly how they think it works. To them, it's a much longer-term phenomenon. But, my data really weren't set up for that and it would be difficult to compare to the other theories.

Endogenous

Keynes: What Keynes argued is actually quite different from what has become known as Keynesian economics. For starters, he rejected Say's Law and thought the economy was unstable and generated an endogenous business cycle. Of the factors he thought responsible, investment is no doubt the central one. He believed that at any given moment, the market for profitable physical capital was finite. In other words, we only need so many restaurants to meet demand in Fort Worth. Those built beyond that number will not be profitable. At the same time, good times will have encouraged firms to expect high profits. But, because they are each individually undertaking fewer projects as the upturn matures, realized profits tend to fall. Hence, entrepreneurs are disappointed and they then replace their error of optimism with an error of pessimism. This brings on the recession.

In terms of the test, it is set up to look for three things Keynes predicted: 1) does investment decelerate or even decline in late expansion; 2) do profits decelerate or even decline in late expansion; and 3) are entrepreneurs still optimistic in late expansion?

Kalecki: Michal Kalecki was a contemporary of Keynes and pretty much bought into everything in the previous section. Rather than look at all those all over again, however, I decided to test only one part of Kalecki's theory: does risk increase as firms take on more investment? He thought this was an important part of the reason why firms didn't just keep investing and investing.

To look at this, I took an asset return that contained risk (Moody's AAA bond rating) and compared it to one that presumably does not (or is at least extremely low: government Treasury bills). If Kalecki is right, we should see risk rise as we pass from early-to-mid expansion to late expansion.

Minsky: Minsky was a Keynes scholar and so, like Kalecki, you should assume that he pretty much buys into everything in the Keynes section. But, while it would be wrong to say that Keynes and Kalecki did not focus on the financial sector, Minsky did so to a much greater extent. In particular, he worried that during good times, agents tended to take on too much debt relative to income. This made the financial system increasingly fragile and vulnerable to collapse.

The test looks at both household and nonfinancial corporate debt and assumes that both should rise relative to income from early-to-mid expansion to late.

Mitchell: Wesley Clair Mitchell's work actually predates that of everyone else studied in this course, coming even before the Great Depression. He was a pioneer in business cycle research and helped create the National Bureau of Economic Research. The NBER remains a very important think tank and the official source of business cycle dating. Mitchell wrote thousands of pages on business cycles but I narrowed his views down to the following. First, profits are the absolute key. He thought they would decelerate or fall over the expansion, triggering financial panic and recession. However, as profit is already included under Keynes, I didn't test it with Mitchell. Instead, I looked at the what Mitchell thought caused the falling profits: rising costs of production in general, rising costs of capital equipment, and rising labor costs. If Mitchell is right, we should witness all three of these rising from early-to-mid expansion to late expansion.

Test Summaries for Exam

School	Test
<i>Exogenous</i>	
Keynesian	Govt Budget and interest rates inversely related to GDP and both will rise over expansion. Govt Budget: Early-to-mid < Late Interest rate: Early-to-mid < Late
Monetarist	Accelerating inflation causes falling unemployment (and vice versa). CPI: Early-to-mid < Late > Recession
New Classical	Unexpected inflation causes falling unemployment (and vice versa). Unexpected inflation: Late > 0; Recession < 0
RBC	Productivity inversely related to unemployment. Productivity: Late > 0; Recession < 0
<i>Endogenous</i>	
Keynes	Investment and profits decline from early-to-mid to late expansion while optimism remains high. Investment: Early-to-mid > Late Profits: Early-to-mid > Late Optimism (PMI): Late ≥ 50
Kalecki	Risk increases from early-to-mid to late expansion. Risk: Early-to-mid < Late
Minsky	Debt/income ratios rise from early-to-mid to late expansion. Household debt/income: Early-to-mid < Late Nonfinancial Corporate debt/income: Early-to-mid < Late
Mitchell	Producer prices, the cost of capital, and wages all rise from early-to-mid to late expansion. Raw materials prices: Early-to-mid < Late Price of physical capital: Early-to-mid < Late Labor costs: Early-to-mid < Late

Business Cycle Assumptions

	Early-to-mid	Late	Recession
Real GDP	middle	highest	lowest
Unemployment	middle	lowest	highest

Because exogenous theories were less likely to pass since they required two conditions instead of just one, they were given partial credit to even the playing field.

KEYNESIAN: Fiscal and Monetary Policy

Cycle	Early-to-mid	Late	Recession	Consistent?
Ike I Exp 1954:3 to 1957:2 (12 qtrs) Rec 1957:3 to 1958:2 (4 qtrs)	\$3.99 1.55%	\$20.51 -0.70%	-\$41.90 -0.96%	YES no
Ike II Exp 1958:3 to 1960:1 (7 qtrs) Rec 1960:2 to 1961:1 (4 qtrs)	-\$45.64 1.73%	\$5.43 2.25%	\$1.48 1.22%	YES YES
Vietnam Exp 1961:2 to 1969:3 (34 qtrs) Rec 1969:4 to 1970:4 (5 qtrs)	-\$20.91 1.63%	-\$1.75 1.92%	-\$118.77 1.79%	YES YES
Oil Shock I Exp 1971:1 to 1973:3 (11 qtrs) Rec 1973:4 to 1975:1 (6 qtrs)	-\$189.79 1.13%	-\$122.63 0.66%	-\$149.32 -1.54%	YES no
Oil Shock II Exp 1975:2 to 1979:4 (19 qtrs) Rec 1980:1 to 1980:3 (3 qtrs)	-\$212.71 -0.84%	-\$89.02 -1.45%	-\$180.50 -0.36%	YES no
Volcker Exp 1980:4 to 1981:2 (3 qtrs) Rec 1981:3 to 1982:4 (6 qtrs)	NA	-\$155.75 6.12%	-\$283.85 7.34%	- - -
Desert Storm Exp 1983:1 to 1990:2 (30 qtrs) Rec 1990:3 to 1991:1 (3 qtrs)	-\$293.33 4.53%	-\$279.12 3.95%	-\$313.62 1.75%	YES no
September 11 Exp 1991:2 to 2000:4 (39 qtrs) Rec 2001:1 to 2001:4 (4 qtrs)	-\$264.49 2.19%	\$203.42 2.79%	-\$60.07 2.00%	YES YES
Subprime Crisis Exp 2002:1 to 2007:3 (23 qtrs) Rec 2007:4 to 2009:2 (7 qtrs)	-\$474.68 -0.58%	-\$308.86 2.83%	-\$934.34 -0.14%	YES YES
Govt Budget	-\$187.20	-\$71.50	-\$224.63	YES
AVG without Volcker Fed Funds Int	1.42%	1.53%	0.51%	YES

Variable	Expected	Actual on Avg	Cycles Correct
Govt Budget	Early-to-mid < Late	Early-to-mid < Late	8 of 8
Fed Funds Int	Early-to-mid < Late	Early-to-mid < Late	4 of 8

DATA: Govt Budget = Net Government Budget Balance in Billions of 2009 Dollars.
Fed Funds Int = Federal Funds Interest Rate Deflated by CPI.

MONETARIST: Consumer Price Inflation

Cycle	Early-to-mid	Late	Recession	Consistent?
Ike I Exp 1954:3 to 1957:2 (12 qtrs) Rec 1957:3 to 1958:2 (4 qtrs)	0.24%	3.61%	3.28%	1
Ike II Exp 1958:3 to 1960:1 (7 qtrs) Rec 1960:2 to 1961:1 (4 qtrs)	0.29%	1.39%	1.51%	½
Vietnam Exp 1961:2 to 1969:3 (34 qtrs) Rec 1969:4 to 1970:4 (5 qtrs)	2.16%	5.53%	5.74%	½
Oil Shock I Exp 1971:1 to 1973:3 (11 qtrs) Rec 1973:4 to 1975:1 (6 qtrs)	3.33%	6.58%	11.26%	½
Oil Shock II Exp 1975:2 to 1979:4 (19 qtrs) Rec 1980:1 to 1980:3 (3 qtrs)	6.91%	12.65%	12.89%	½
Volcker Exp 1980:4 to 1981:2 (3 qtrs) Rec 1981:3 to 1982:4 (6 qtrs)	NA	10.61%	6.02%	-
Desert Storm Exp 1983:1 to 1990:2 (30 qtrs) Rec 1990:3 to 1991:1 (3 qtrs)	3.66%	4.59%	5.69%	½
September 11 Exp 1991:2 to 2000:4 (39 qtrs) Rec 2001:1 to 2001:4 (4 qtrs)	2.58%	3.44%	1.89%	1
Subprime Crisis Exp 2002:1 to 2007:3 (23 qtrs) Rec 2007:4 to 2009:2 (7 qtrs)	2.89%	2.38%	1.66%	½
AVG without Volcker	2.76%	5.06%	5.49%	½

Variable	Expected*	Actual on Avg	Cycles Correct
CPI	Early-to-mid < Late > Recession	Recession > Late > Early-to-mid	5 of 8

*On the assumption that unemployment is lowest in late recession and highest in recession.

DATA: Consumer Price Index, All Urban Consumers, Annualized Rates of Change.

NEW CLASSICAL: Unexpected Consumer Price Inflation

Cycle	Early-to-mid	Late	Recession	Consistent?
Ike I Exp 1954:3 to 1957:2 (12 qtrs) Rec 1957:3 to 1958:2 (4 qtrs)	-0.08%	3.54%	0.71%	½
Ike II Exp 1958:3 to 1960:1 (7 qtrs) Rec 1960:2 to 1961:1 (4 qtrs)	-3.02%	-1.15%	0.51%	no
Vietnam Exp 1961:2 to 1969:3 (34 qtrs) Rec 1969:4 to 1970:4 (5 qtrs)	0.52%	1.94%	0.62%	½
Oil Shock I Exp 1971:1 to 1973:3 (11 qtrs) Rec 1973:4 to 1975:1 (6 qtrs)	-2.10%	3.35%	5.64%	½
Oil Shock II Exp 1975:2 to 1979:4 (19 qtrs) Rec 1980:1 to 1980:3 (3 qtrs)	-1.26%	5.54%	2.77%	½
Volcker Exp 1980:4 to 1981:2 (3 qtrs) Rec 1981:3 to 1982:4 (6 qtrs)	NA	-2.69%	-5.74%	-
Desert Storm Exp 1983:1 to 1990:2 (30 qtrs) Rec 1990:3 to 1991:1 (3 qtrs)	-0.28%	0.23%	0.86%	½
September 11 Exp 1991:2 to 2000:4 (39 qtrs) Rec 2001:1 to 2001:4 (4 qtrs)	-0.53%	1.42%	-1.38%	1
Subprime Crisis Exp 2002:1 to 2007:3 (23 qtrs) Rec 2007:4 to 2009:2 (7 qtrs)	0.43%	-1.42%	-1.40%	½
AVG without Volcker	-0.79%	1.67%	1.04%	½

Variable	Expected*	Actual on Avg	Cycles Correct
Unexp CPI	Late > 0 Recession < 0	Late > 0 Recession > 0	4 of 8

*Early-to-mid expansion can be ambiguous, but there is a high likelihood of falling unemployment in late expansion and rising unemployment in recession.

DATA: Consumer Price Index, All Urban Consumers, Annualized Rates of Change. Unexpected portion determined by author calculations.

REAL BUSINESS CYCLE: Labor Productivity

Cycle	Early-to-mid	Late	Recession	Consistent?
Ike I Exp 1954:3 to 1957:2 (12 qtrs) Rec 1957:3 to 1958:2 (4 qtrs)	2.34%	1.88%	2.45%	½
Ike II Exp 1958:3 to 1960:1 (7 qtrs) Rec 1960:2 to 1961:1 (4 qtrs)	4.97%	3.23%	-0.93%	1
Vietnam Exp 1961:2 to 1969:3 (34 qtrs) Rec 1969:4 to 1970:4 (5 qtrs)	3.58%	-0.15%	1.70%	no
Oil Shock I Exp 1971:1 to 1973:3 (11 qtrs) Rec 1973:4 to 1975:1 (6 qtrs)	4.33%	2.28%	-0.30%	1
Oil Shock II Exp 1975:2 to 1979:4 (19 qtrs) Rec 1980:1 to 1980:3 (3 qtrs)	2.52%	-1.35%	-0.37%	½
Volcker Exp 1980:4 to 1981:2 (3 qtrs) Rec 1981:3 to 1982:4 (6 qtrs)	NA	2.17%	0.20%	-
Desert Storm Exp 1983:1 to 1990:2 (30 qtrs) Rec 1990:3 to 1991:1 (3 qtrs)	2.07%	2.18%	-0.40%	1
September 11 Exp 1991:2 to 2000:4 (39 qtrs) Rec 2001:1 to 2001:4 (4 qtrs)	2.39%	2.55%	3.18%	½
Subprime Crisis Exp 2002:1 to 2007:3 (23 qtrs) Rec 2007:4 to 2009:2 (7 qtrs)	2.55%	2.70%	1.63%	½
AVG without Volcker	3.09%	1.66%	0.87%	½

Variable	Expected*	Actual on Avg	Cycles Correct
Productivity	Late > 0 Recession < 0	Late > 0 Recession > 0	5 of 8

*On the assumption that unemployment is lowest in late recession and highest in recession.

DATA: Nonfarm Business Sector Real Output/hour, Annualized Rates of Change.

KEYNES: Investment, Profits, Expectations

Cycle	Early-to-mid	Late	Recession	Consistent?	
Ike I Exp 1954:3 to 1957:2 (12 qtrs) Rec 1957:3 to 1958:2 (4 qtrs)	14.27% 16.51% 60.64	-3.42% 1.25% 49.68	-12.53% -18.06% 41.88	YES YES no	
Ike II Exp 1958:3 to 1960:1 (7 qtrs) Rec 1960:2 to 1961:1 (4 qtrs)	32.26% 44.12% 61.74	17.96% 9.83% 57.04	-15.02% -12.83% 45.02	YES YES YES	
Vietnam Exp 1961:2 to 1969:3 (34 qtrs) Rec 1969:4 to 1970:4 (5 qtrs)	8.93% 9.62% 57.05	9.04% -12.79% 55.70	-8.29% -15.95% 47.63	no YES YES	
Oil Shock I Exp 1971:1 to 1973:3 (11 qtrs) Rec 1973:4 to 1975:1 (6 qtrs)	17.36% 27.65% 56.70	8.14% 4.93% 66.68	-12.45% -16.05% 50.71	YES YES YES	
Oil Shock II Exp 1975:2 to 1979:4 (19 qtrs) Rec 1980:1 to 1980:3 (3 qtrs)	14.88% 19.49% 55.86	-3.30% -18.41% 52.49	-18.84% -31.33% 40.86	YES YES YES	
Volcker Exp 1980:4 to 1981:2 (3 qtrs) Rec 1981:3 to 1982:4 (6 qtrs)	NA	23.30% 17.90% 52.53	9.15% -0.78% 39.62	- - -	
Desert Storm Exp 1983:1 to 1990:2 (30 qtrs) Rec 1990:3 to 1991:1 (3 qtrs)	9.07% 6.66% 54.58	-0.57% 3.59% 47.74	-13.57% 16.47% 42.42	YES YES no	
September 11 Exp 1991:2 to 2000:4 (39 qtrs) Rec 2001:1 to 2001:4 (4 qtrs)	8.82% 5.49% 52.51	4.47% -14.43% 51.66	-10.94% 16.25% 43.41	YES YES YES	
Subprime Crisis Exp 2002:1 to 2007:3 (23 qtrs) Rec 2007:4 to 2009:2 (7 qtrs)	5.59% 15.22% 54.01	-2.41% -9.12% 51.43	-18.58% 16.82% 44.29	YES YES YES	
AVG without Volcker	Inv π PMI	13.89% 18.10% 56.64	3.74% -4.39% 54.05	-13.78% -5.58% 44.53	YES YES YES

Variable	Expected	Actual on Avg	Cycles Correct
Inv	Early-to-mid > Late	Early-to-mid > Late	7 of 8
π	Early-to-mid > Late	Early-to-mid > Late	8 of 8
PMI	Late \geq 50	Late \geq 50	6 of 8

DATA: Inv = Real Gross Private Domestic Investment, Annualized Rate of Change.

π = Corporate Profits After Tax with Inventory Valuation Adjustment (IVA) and Capital Consumption Adjustment (CCAdj), Deflated, Annualized Rate of Change.

PMI = Purchasing Managers' Index (measure of their optimism, with 50 being average)

KALECKI: Increasing Risk

Cycle	Early-to-mid	Late	Recession	Consistent?
Ike I Exp 1954:3 to 1957:2 (12 qtrs) Rec 1957:3 to 1958:2 (4 qtrs)	1.33%	0.68%	1.47%	no
Ike II Exp 1958:3 to 1960:1 (7 qtrs) Rec 1960:2 to 1961:1 (4 qtrs)	1.65%	0.83%	1.84%	no
Vietnam Exp 1961:2 to 1969:3 (34 qtrs) Rec 1969:4 to 1970:4 (5 qtrs)	1.03%	0.50%	1.34%	no
Oil Shock I Exp 1971:1 to 1973:3 (11 qtrs) Rec 1973:4 to 1975:1 (6 qtrs)	3.22%	0.94%	1.01%	no
Oil Shock II Exp 1975:2 to 1979:4 (19 qtrs) Rec 1980:1 to 1980:3 (3 qtrs)	2.68%	-0.44%	0.93%	no
Volcker Exp 1980:4 to 1981:2 (3 qtrs) Rec 1981:3 to 1982:4 (6 qtrs)	NA	-0.98%	2.57%	-
Desert Storm Exp 1983:1 to 1990:2 (30 qtrs) Rec 1990:3 to 1991:1 (3 qtrs)	3.19%	1.36%	2.38%	no
September 11 Exp 1991:2 to 2000:4 (39 qtrs) Rec 2001:1 to 2001:4 (4 qtrs)	2.99%	1.81%	3.69%	no
Subprime Crisis Exp 2002:1 to 2007:3 (23 qtrs) Rec 2007:4 to 2009:2 (7 qtrs)	3.50%	0.79%	4.23%	no
AVG without Volcker	2.45%	0.81%	2.11%	no

Variable	Expected*	Actual on Avg	Cycles Correct
Risk	Early-to-mid < Late	Early-to-mid > Late	0 of 8

*On the assumption that unemployment is lowest in late recession and highest in recession.

DATA: Moodys Seasoned AAA Corporate Bond Yield minus 3-Month Treasury Bill: Secondary Market Rate.

MINSKY: Debt-to-Income Ratio

Cycle	Early-to-mid	Late	Recession	Consistent?
Ike I Exp 1954:3 to 1957:2 (12 qtrs) Rec 1957:3 to 1958:2 (4 qtrs)	45.39%	48.81%	50.33%	YES
	31.78%	33.15%	34.18%	YES
Ike II Exp 1958:3 to 1960:1 (7 qtrs) Rec 1960:2 to 1961:1 (4 qtrs)	51.40%	54.07%	56.96%	YES
	35.43%	35.65%	36.70%	YES
Vietnam Exp 1961:2 to 1969:3 (34 qtrs) Rec 1969:4 to 1970:4 (5 qtrs)	62.93%	63.58%	60.44%	YES
	40.27%	44.25%	46.50%	YES
Oil Shock I Exp 1971:1 to 1973:3 (11 qtrs) Rec 1973:4 to 1975:1 (6 qtrs)	59.71%	60.55%	60.55%	YES
	48.39%	50.20%	52.17%	YES
Oil Shock II Exp 1975:2 to 1979:4 (19 qtrs) Rec 1980:1 to 1980:3 (3 qtrs)	61.53%	67.46%	67.75%	YES
	50.41%	50.75%	51.27%	YES
Volcker Exp 1980:4 to 1981:2 (3 qtrs) Rec 1981:3 to 1982:4 (6 qtrs)	NA	66.08%	64.53%	-
		51.47%	52.80%	-
Desert Storm Exp 1983:1 to 1990:2 (30 qtrs) Rec 1990:3 to 1991:1 (3 qtrs)	72.18%	80.55%	81.95%	YES
	60.13%	64.38%	63.10%	YES
September 11 Exp 1991:2 to 2000:4 (39 qtrs) Rec 2001:1 to 2001:4 (4 qtrs)	86.37%	94.04%	97.33%	YES
	54.70%	63.75%	64.35%	YES
Subprime Crisis Exp 2002:1 to 2007:3 (23 qtrs) Rec 2007:4 to 2009:2 (7 qtrs)	114.15%	130.64%	129.06%	YES
	62.80%	66.58%	71.66%	YES
Household AVG without Volcker	69.21%	74.96%	75.55%	YES
Nonfinancial Corp	48.33%	51.09%	52.49%	YES

Variable	Expected	Actual on Avg	Cycles Correct
Household	Early-to-mid < Late	Early-to-mid < Late	8 of 8
Nonfinancial Corp	Early-to-mid < Late	Early-to-mid < Late	8 of 8

DATA: Household = United States - Households and NPISHs - All sectors - Market value - US Dollar - Adjusted for breaks, as a percent of Personal Disposable Income
 Nonfinancial Corp = United States - Non financial sector - All sectors - Market value - Percentage of GDP - Adjusted for breaks.

MITCHELL: Raw Materials Costs, Capital Equipment Costs, Labor Costs

Cycle	Early-to-mid	Late	Recession	Consistent?
Ike I Exp 1954:3 to 1957:2 (12 qtrs) Rec 1957:3 to 1958:2 (4 qtrs)	1.55% 4.76% 2.63%	2.76% 6.53% 3.88%	1.84% 3.12% 1.36%	YES YES YES
Ike II Exp 1958:3 to 1960:1 (7 qtrs) Rec 1960:2 to 1961:1 (4 qtrs)	0.29% 1.68% 0.18%	-0.10% 1.14% 1.43%	0.43% 0.11% 3.73%	no no YES
Vietnam Exp 1961:2 to 1969:3 (34 qtrs) Rec 1969:4 to 1970:4 (5 qtrs)	1.04% 1.66% 1.22%	4.29% 3.23% 7.14%	2.99% 5.33% 4.89%	YES YES YES
Oil Shock I Exp 1971:1 to 1973:3 (11 qtrs) Rec 1973:4 to 1975:1 (6 qtrs)	4.56% 2.73% 2.05%	15.85% 3.53% 5.61%	15.60% 17.96% 11.29%	YES YES YES
Oil Shock II Exp 1975:2 to 1979:4 (19 qtrs) Rec 1980:1 to 1980:3 (3 qtrs)	6.48% 7.15% 5.57%	14.55% 8.77% 12.03%	13.98% 11.91% 11.41%	YES YES YES
Volcker Exp 1980:4 to 1981:2 (3 qtrs) Rec 1981:3 to 1982:4 (6 qtrs)	NA	10.53% 10.67% 7.72%	1.41% 5.40% 6.86%	- - -
Desert Storm Exp 1983:1 to 1990:2 (30 qtrs) Rec 1990:3 to 1991:1 (3 qtrs)	1.89% 2.40% 2.33%	1.40% 3.35% 4.10%	4.03% 3.91% 4.17%	no YES YES
September 11 Exp 1991:2 to 2000:4 (39 qtrs) Rec 2001:1 to 2001:4 (4 qtrs)	1.03% 1.06% 1.39%	5.94% 1.04% 4.26%	-4.29% 0.08% 0.72%	YES no YES
Subprime Crisis Exp 2002:1 to 2007:3 (23 qtrs) Rec 2007:4 to 2009:2 (7 qtrs)	5.61% 1.13% 1.06%	4.47% 1.91% 1.97%	1.65% 2.64% 0.95%	no YES YES
Raw Materials	2.81%	6.15%	4.53%	YES
AVG without Volcker Price of K	2.82%	3.69%	5.53%	YES
Labor Costs	2.05%	5.05%	4.81%	YES

Variable	Expected	Actual on Avg	Cycles Correct
Raw Materials	Early-to-mid < Late	Early-to-mid < Late	5 of 8
Price of K	Early-to-mid < Late	Early-to-mid < Late	6 of 8
Labor Costs	Early-to-mid < Late	Early-to-mid < Late	8 of 8

DATA: Raw Materials = Producer Price Index, Annualized Rate of Change.
 Price of K = Producer Price Index, Capital Equipment, Annualized Rate of Change.
 Labor Costs = Nonfarm Business Sector: Unit Labor Cost, Annualized Rate of Change.