

Homework 8- Quantity Theory Calculations

1. The Quantity Theory is an equation together with an assumption. The equation and the assumption are repeated below:

- $MV = PY$
- Assumption: V is constant
- M is money, V is velocity, P is the price level and Y is real GDP.

It is straight forward to see that the theory states that prices are proportional to the ratio M/Y and that the percentage growth in money must equal the percentage growth in prices plus the percentage growth in GDP. The second claim can be written as $\Delta M_t/M_t = \Delta P_t/P_t + \Delta Y_t/Y_t$.¹

This homework asks you to examine data in light of this theory. Specifically, the theory says that a scatter plot of money growth less output growth ($\Delta M_t/M_t - \Delta Y_t/Y_t$) against price growth ($\Delta P_t/P_t$) should line up along the 45 degree line. To examine this issue download the Excel spreadsheet for this homework, which has annual data on (M_t, P_t, Y_t) for the US economy.

(1) Calculate the growth rate of money less the growth rate of output on the one hand and the growth rate of the price level on the other hand. Graph the scatter plot using annual growth rates. Please make sure that price growth is on the vertical axis. Calculate the correlation between the two variables and summarize your findings.

(2) Now repeat this same exercise except that you will now do this using five-year growth rates.² Calculate the correlation between the two variables and summarize your findings.

[Note: The first growth rate is between 1959 and 1964, the second growth rate is between 1964 and 1969 and so on. Thus, you will calculate much fewer growth rates in (2) than in (1).]

¹The second claim follows in two steps. First, take the log of each side of the quantity equation. Second, differentiate each side with respect to time.

$$\log M_t + \log V_t = \log P_t + \log Y_t$$

$$dM/dt/M_t + 0 = dP/dt/P_t + dY/dt/Y_t$$

Note that in the data you will calculate annual growth rates rather than the instantaneous growth rates in the calculation above.

²The idea here is that the quantity theory predictions may have more support in US data when the growth rates computed are based on longer horizons. Thus, (1) looks at "high frequencies", whereas (2) looks at "lower frequencies".

2. BONUS PROBLEM:

I have from time to time complained about the poor quality of economic journalism in the US. The attached Washington Post editorial is an excellent example.

The Post seems to be under the impression that no economist has ever posed or answered their question or even any related question! The Post should view its job as one of repackaging the best thinking already developed by top economists over the last century. A recipe for a poor editorial is to try to invent new economics on the fly. Your job is to rewrite this editorial.

Rules:

1. Use no more than 500 words. Direct your points to an intelligent reader who has no knowledge of economics. Use as little economics jargon as possible. Make your piece interesting.

2. Keep the title and the question the same but delete everything else. Provide some argument supporting the position of funding war with debt but health care without additional debt.

3. Credit some economist or collection of economists for posing a related question and developing an answer. Remember, the job of the journalist is NOT to invent new economics.

4. Do some research. Frank Ramsey and Robert Barro are two relevant economists. Read up on tax rate smoothing, Ramsey optimal taxation and optimal war finance.

To get started, please Google GOVERNMENT SPENDING, DEFICITS AND OPTIMAL FINANCIAL POLICY.

The Washington Post

AN INDEPENDENT NEWSPAPER

EDITORIALS

A critical question

Why fund war with debt but insist that health-care reform be deficit-neutral?

A READER recently challenged us to explain what he sees as a contradiction in our editorial positions. We support the goal of universal health care, but argue that President Obama must keep his pledge not to pay for it with borrowed money. We have also backed Gen. Stanley A. McChrystal's request for additional troops and other resources for Afghanistan — but without specifying how the reinforcements should be funded. Why is it okay to finance wars with debt, asks our reader, but not to pay for health care that way?

In principle, all wars should be paid for, just like all other federal spending. We criticized President George W. Bush for sticking with tax cuts rather than calling for national sacrifice after Sept. 11, 2001, and for failing to fund the wars in Iraq and Afghanistan. If Mr. Obama were to propose offsetting the cost of additional troops in Afghanistan with a gasoline or carbon tax, we would support it.

But is a new war tax needed? In fact, if you apply the same logic to defense spending that Mr. Obama has used for health care — that projected future savings offset new spending — he has paid for the proposed escalation in Afghanistan many times over. Overall, Mr. Obama's plan for defense spending projects \$1.5 trillion in savings over 10 years. While overall federal spending will rise 75 percent from 2008 to 2019, defense spending would increase only 17 percent.

That percentage will be a bit higher if the Afghan mission is fully funded. But spending on the wars in Iraq and Afghanistan — which have been budgeted jointly since 2003 — has already fallen from \$180 billion in the 2008 budget year to \$150 billion this year. Even counting the additional troops Mr. Obama has already approved for Afghanistan, spending is due to drop to \$130 billion in 2010, and the Congressional Research Service estimates it will fall to \$70 billion in 2012. That's because in the next year, twice as many American troops are due to leave Iraq as would go to Afghanistan under Gen. McChrystal's middle-course request. If Mr. Obama supports the option of sending 40,000 more sol-

diers, annual war spending could still drop to \$110 billion.

All this assumes that defense and health care should be treated equally in the national budget. We would argue that they should not be, for two reasons. One is that wars, unlike entitlement programs, eventually come to an end. A guarantee of health care for all, particularly in the context of steadily rising costs, will bankrupt the nation if not matched by a steady stream of revenue.

The second reason has been laid out eloquently by Mr. Obama. "As president, my greatest responsibility is the security and safety of the American people," he said in an address to the Veterans of Foreign Wars two months ago. Mr. Obama went on to say that Afghanistan "is not a war of choice; this is a war of necessity. . . . This is not only a war worth fighting. This is fundamental to the defense of our people."

Universal health care, however desirable, is not "fundamental to the defense of our people." Nor is it a "necessity" that it be adopted this year: Mr. Obama chose to propose a massive new entitlement at a time of historic budget deficits. In contrast, Gen. McChrystal believes that if reinforcements are not sent to Afghanistan in the next year, the war may be lost, with catastrophic consequences for U.S. interests in South Asia. U.S. soldiers would continue to die, without the prospect of defeating the Taliban. And, as Mr. Obama put it, "if left unchecked, the Taliban insurgency will mean an even larger safe haven from which al-Qaeda would plot to kill more Americans."

So, in answer to our questioner: Wars end, and the spending for them tapers off; entitlement programs must be funded in perpetuity. Wars compel decisions, like the one now at hand; new entitlement programs can be phased in or delayed. And the nation's security must be the president's first priority. To quote Mr. Obama once more, it is "the first thing I think about when I wake up in the morning. It's the last thing I think about when I go to sleep at night." Even for a president dedicated to domestic reform, that must hold true.