

## Do Changes in Asset Prices Denote Changes in Wealth?

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When stock or bond prices drop sharply we are told that the nation's wealth has fallen. Some commentators go beyond such a vague statement and calculate how many billions of dollars of wealth have been wiped out by multiplying the percentage change in stock prices or bond prices by the previous value of outstanding stocks or bonds. This appears sensible and indeed obvious, and if the figure looks huge, for example, \$2.1 trillion (about one quarter of annual GDP) for one week in April 2000, so be it. Yet, when we look at the real economy it also seems obvious that the nation's stock of capital is the same as it was the day before the market crashed. Our factories can turn out just as many shoes, ships and tons of sealing wax as before, and our fields are just as fruitful. To be sure, if bond prices fall the value of claims we have on each other is less, but except for our net claims on (or liabilities) to foreigners, the gains of debtors and the losses of creditors wash out when we look at the nation as a whole. Even the change in the value of government debt washes out because the debt is the liability of taxpayers.

How can this paradox of seemingly rising or falling wealth when we look at security markets, and seemingly constant wealth when we look at the assets behind

these securities, be resolved? Does the change in wealth that we see in security markets denote a genuine change in welfare? I will try to show here that rising or falling security prices do not necessarily imply that the country's wealth has changed. Whether or not it has depends on the reason for the change in security prices. This should not be surprising, because security prices, like other prices, are barometers that measure the interplay of the factors determining supply and demand, and it is these factors, not the price changes per se, that matter in determining changes in real wealth. Accordingly, I take up various reasons why security prices may change, and in this way, reconcile what we see in financial markets with what we see when we look at the real economy.

Another reason why looking only at security markets and the gains or losses suffered by holders of securities provides too narrow a framework is that a change in security prices is frequently not a change in wealth, but just a change in relative prices, that is a change in the price of claims to future goods relative to the price of current goods. Or put somewhat differently, when we look only at what happens to the wealth of people who hold securities we ignore potential offsetting changes in the wealth of those who don't.

One example is the situation discussed so often by market commentators: stock

and bond prices fall because the Federal Reserve has raised interest rates. With one qualification (discussed below) this does not reduce total wealth, defined as the present value of the future stream of income that our stock of assets can provide. All that has happened is that if holders of securities try to sell their securities they get less for them. But their loss is offset by the gains experienced by the buyers of securities who can now acquire them cheaper.

At first glance it may seem that these gains and losses cannot balance out because at any one time there are many more holders of securities than there are buyers. But we should compare the number of sellers of securities to the number of buyers, not to the number of holders, and there are always as many buyers as there are sellers. This is the correct comparison because (with a qualification discussed below), unless they become sellers, security holders do not suffer an actual loss from a fall in security prices: bondholders receive the same interest payments as before, and unless corporate earnings fall, stockholders also earn as much as before. What they do suffer is only a loss of foregone opportunities. If they had held cash instead of buying bonds they would now be able to buy bonds with a higher yield, or buy stock at a lower price. But since such foregone opportunities are not included in the definition of wealth such a loss does

not reduce wealth.

It seems counter-intuitive to say that holders of securities that have declines in price do not suffer an actual loss. Most of them surely feel poorer. But that is the result of an arbitrary accounting convention. Our mental as well as actual balance sheets are usually drawn up in nominal terms, or at best are adjusted for the change in the price of consumption goods. Hence, although many people feel poorer if the prices of bonds in their portfolios falls, those who do not hold bonds do not count themselves richer when a decline in bond prices increases the purchasing power over bonds of the other assets in their portfolios. Yet consistency requires that such gains be counted.

This conclusion is, however subject to one qualification. As security prices fall not only does this directly reduce the liquidity provided by the owner's portfolio, but in addition securities provide a less valuable collateral for loans. The credit-worthiness of security holders therefore deteriorates. This is not matched by liquidity gains to holders of other assets, and hence results in a reduction in the net value of wealth. But it amounts to only a small fraction of the loss in the price of the securities, and I will therefore ignore it,

So far I have dealt --and will continue to deal -- only with the direct effects on

wealth of a change in security prices and not with the indirect effects. The latter include declines in output and employment as stockholders cut their consumption as security prices fall, and as businesses cut their investment. I also ignore any redistribution of wealth between the government and the private sector as interest rates change by treating the private sector as the owner of the government and responsible for its debt.

What determines stock prices over the longer run are the expected future earnings of corporations and the discount rate that investors apply to these expected earnings to determine their present value. This is not to dismiss the role of irrational swings between optimism and pessimism. These "psychological" factors operate largely through their influence on investors' expectations of future earnings, and through the discount rate --which includes a risk premium -- that investors apply to these earnings. They can also operate for a time through the "greater fool" theory, which induces an investor to buy a stock even though she thinks it is overvalued, in the expectation that she will be able to sell it an even more inflated price. But such a situation in which many investors think that average investors are much too optimistic seems somewhat contrived, and not likely to last a long time.

Suppose that stock prices fall for the first of these reasons (an expected decline in earnings), perhaps because the chances of a recession have increased. It may seem obvious that wealth has fallen, and that the extent of this fall can be measured reasonably well in the usual way by multiplying the volume of outstanding stocks by the percentage decline. But the story is more complex. One reason is that we have to distinguish between expected and actual earnings. Suppose that while yesterday investors believed that a certain stock would earn, say \$10 per year, today they believe that it will earn only \$8, even though there has been no significant news bearing on this stock. (This is the sort of thing that happened in the 1987 crash.) Are investors right today, or were they right yesterday? And if they are right today this implies that no actual wealth was wiped out; just that an unrealistic appraisal was replaced by a more realistic one. So, if we are told that, say \$1 trillion of wealth has been wiped out this estimate is no more reliable than the changeable estimates made by investors. Such estimates may well be the best ones we have, but "best" does not always imply "good".

This distinction between expected and actual earnings is important not only for an objective appraisal of wealth, but also for estimating the wealth effect on consumption. It is likely that in considering how much they can afford to consume

many investors do not value their securities entirely at today's market values, but look also at their average value over a longer horizon. This is so particularly for the stocks they hold in their retirement accounts. Estimates of the wealth effect on consumption make an implicit allowance for this in their calculations of the propensity to consume out of wealth.

Leaving this problem aside, suppose that a change in stock prices correctly reflects the extent to which earnings will change, and that the discount rate is unchanged. Here the change in the value of stocks measures correctly the change in stockholder's wealth. But this is not necessarily an adequate measure of the change in a broad measure of wealth that includes what economists call "human capital", that is the present value of the stream of earnings that will accrue to labor. Suppose, for example, that stock prices rise because the capital gains tax is cut and social security taxes are raised to make up the lost revenue. That may, or may not, be good policy, but it can be said to have a direct effect on wealth only if wealth is defined as it generally is by non-economists and by the generally available data, to encompass only nonhuman capital. Likewise, one needs to be careful in talking about a change in wealth when stock prices respond to changes in regulations, such as the antitrust laws. Only if the change in corporate earnings leaves the incomes of

others approximately constant does the change in stock prices adequately gauge the change in the broad measure of capital.

Now consider the case where expected corporate earnings are constant, but stock prices fall because the discount rate used to determine the present value of future earnings rises. This discount rate has two components, (1) the pure interest rate, that is the interest rate on riskless assets (which can be approximated by the yield on Treasury bills) and (2) the premium for risk-taking that investors require to induce them to hold corporate stock instead of Treasury bills.

Suppose that it is the risk premium that has risen because stocks have become riskier in the sense that the variance of future returns has risen while their mean is constant, and that investors are aware of this. Since they dislike risk they attach a lower present value to claims to these earnings, so that wealth falls. And this is a genuine fall because it mirrors the sacrifice of utility that investors experience when they hold stock.

Alternatively, suppose now that the riskiness of securities is the same as before, but that people are less willing to bear the risk of holding securities. The resulting fall in security prices represents a fall in wealth. It reflects that the economy is now poorer since it now takes a greater sacrifice of utility to hold the same capital stock



and produce the same output as before.

The same applies if people instead of becoming more risk averse become more averse to postponing consumption. They now offer fewer current goods in exchange for claim on future goods, so that security prices fall. Again, the economy is now poorer in the sense that it would take a greater loss of utility to maintain the previous level of capital and output.

Now consider what happens if security prices rise because foreigners invest more in the U.S., or Americans shift their assets from foreign securities to U.S. securities, thus bidding up security prices. The resulting capital gain on sales to foreigners raises the wealth of Americans, but the gains of those who sell the now higher priced securities to other Americans are balanced by the losses of the buyers. Hence multiplying the rise in the price of securities by their outstanding volume gives a grossly exaggerated estimate of the increase in American wealth. Alternatively, assume that the government deficit rises. The increased government borrowing raises interest rates and hence lowers the prices of stocks and bonds. This does not by itself lower the country's wealth; as already discussed, it is just a change in a relative price. To be sure, the deficit itself may --or may not - have effects that lower wealth, but that is independent of its direct effect on security prices.

An increase in investment also raises interest rates which, as in the case of a deficit, lowers security prices. To be sure, the factor that cause investment in new plant and equipment to rise are likely to raise also the prices of existing plant and equipment, and thus of the stocks that represent claims on them. But that is another story. This fall in security prices, too, does not denote a reduction in the country's wealth, but is just a change in the relative price of current vs. future goods.

In summary then, whether or not a fall in security prices lowers wealth depends upon its cause. If it is due to a more restrictive Fed policy, then it does not represent a reduction in wealth. However, if it is due to a decline in expected corporate earnings -- and this expectation turns out to be correct -- then the fall in security prices does measure the decline in wealth as usually defined. But using a broader definition of wealth that includes human capital that need no longer be true; it then depends on how labor earnings will be affected. If instead the cause is a rise in the risk premium, either because securities have become riskier, or because investors are less willing to bear risk, then, wealth declined correspondingly. And the value of wealth also declines correspondingly if people's preferences change so, that they become more reluctant to postpone consumption.

But if it is a sale of American securities by foreigners that has lowered security

prices, then American wealth is unaffected, except for the capital losses that Americans incur on their sales to foreigners. And if the cause is an increase in the interest rate due to a rise in the government deficit or in investment, then wealth does not decline at all.

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