Behind This Structural Boom:
The Role of Asset Valuations

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We are in the midst of a structural boom the force of which has not been seen in this country since the 1920's. After the U.S. unemployment rate hit 6 percent in late 1994, following its two-year recovery, many experts assumed that unemployment had regained its natural-rate path.[1] The natural unemployment rate in the second half of the 1980's had been put at around 6.5 percent in several estimates, and if the trend reduction in the natural rate brought about by the continuing relative decline of high-school dropouts in the labor force and those whose education stopped at the diploma is placed at 0.07 per annum, it would have declined on that account to around 6 percent by 1995 (Phelps and Gylfi Zoega, 1997).[2] Furthermore, we saw in 1995 the end of

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[1] In the theoretical framework here, there is an equilibrium path of the unemployment rate corresponding to the economy's present (initial) state. In this paper and my latest papers generally, I take the present natural rate to be the unemployment rate on this path at the present time. If there are hiring-cost frictions slowing the adjustment of employment to current condition, one may think of the present natural rate as its value on the equilibrium path a year or so ahead, when most of the adjustment to present conditions will have been made.

[2] I would add that, beginning sometime in the mid-1980's if not earlier (after 15 years of tax hikes on labor and some 10 years under the great productivity slowdown), workers must have found their assets at a level relative to posttax paycheck that was higher than they wanted to sustain. As they sought to slow their accumulation of assets, their real assets as a ratio to their aftertax pay ought to have been declining. The corresponding decline in the imputed and pecuniary income from these assets would reduce quitting, shirking, and related behaviors, and thus add another downward pull on the natural rate. Households do indeed appear to be trying to save less in this period, although the rise in real asset prices has prevented any fall in the *value* of their assets— their real wealth. But it is not clear that asset prices have the same significance for employee behavior as the services of houses, cars, and other consumer durables.

money-wage deceleration and in the next year a whiff of wage acceleration. Yet the unemployment rate went on falling: 5.6 percent in 1995, 5.4 percent in 1996, 4.9 percent in 1997, 4.6 percent in 1998. And the wage acceleration that had reared its head in 1996 went away and has reappeared only in 1998.

There seems, therefore, to have been a steep decline, temporary or permanent as the case may be, of the natural rate. (By definition, the so-called NAIRU was reduced over this period.) I would say that the fall was as much as 1.5 points, which exceeds the dip that may have occurred in the second half of the 1960's and that in the early 1950's. However, since the natural-rate concept means the unemployment rate when *equilibrium* is prevailing in all markets (where equilibrium means correct expectations), it may well be that not all of this structural boom represents a genuine drop of the natural rate—a possibility that I will recognize later on.

As critics of the natural rate see it, this uncommon decline of joblessness unaccompanied by any appreciable rise in wage inflation comes as a revelation confirming their long-held belief in the inutility and invalidity of the natural-rate idea. They say that, if the natural rate moves unpredictably or mysteriously, that renders it useless for predicting and understanding the determination of the level of economic activity and its fluctuation. The irony of this complaint coming from Keynesians is that Keynes himself centered his model around the marginal efficiency of capital, which was a purely subjective entity reflecting the animal spirits of entrepreneurs. Precisely because of its unpredictability, Keynes was not optimistic that either wage-setters operating in decentralized markets or monetary policymakers operating from the governmental center could succeed very well at stabilizing the level of activity around its equilibrium path.

The critics' complaint betrays an odd philosophy of science. In physics there is no insistence on explaining a particle's every quantum jump, or indeed any jump (as Albert Einstein famously complained). We in the social sciences are accustomed to have to cope with knowing only a part of the behavior of the systems we study. In any case, the criticism is premature: it remains to be seen whether the surprising development can be interpreted as a structural boom in a way that will satisfy most scholars.

As I see it, though, this uncommon development is grist for the mill of those of us who have been developing endogenous natural-rate models over the past ten years—both the recent intertemporal models (e.g., Phelps, 1994) and the latest static models (from S. C. Salop [1979] and Guillermo A. Calvo [1979] to R. Layard et al. [1991]). In fact, it invites a new focus that promises to be exciting. In my 1994 book, for example, with its models of the equilibrium path of unemployment, the focus was on how some presumably *secular* parametric changes shift the equilibrium path (generally the entire path), and the emphasis was on the endpoint of that path (the steady-state unemployment rate) or at least on the medium-term stretch of the path, since the background to that research was the *secular* rise of joblessness in the OECD nations between the early 1970's and the mid-1980's. The same framework can be used, however, to show how some presumably *cyclical* forces can perturb the equilibrium unemployment rate over the near term while not necessarily lowering the endpoint of the equilibrium path. (This second focus in natural-rate research would draw it closer in spirit to the neoclassical real-business-cycle models, though major contrasts in their view of information would remain.) This paper is an effort to assemble my preliminary thoughts on this new focus, the *cyclical fluctuations* in the natural rate (defined as the unemployment rate over the near term given by the current equilibrium path).

I. The Role of Enterprise Asset Valuations

The overarching theme of my structuralist models (Phelps, 1994) is that the valuation of firms' assets—human investments in employees and in customers as well as investments in tangible capital—is the proximate force driving the demand for labor; and the income from workers' wealth drives the "wage curve," which governs the cost of labor. The development of these two sets of forces shapes the equilibrium path of unemployment. The asset valuations are the net resultant of the stream of expected future returns on the assets on the one hand and the discount on future returns entailed by real interest rates *net* of productivity growth rates. The income from workers' wealth includes the pecuniary and imputed returns on the (foreign and domestic) assets they own, both their private wealth and their social wealth, notably their entitlements from the state.

My collaborators and I have obtained positive results in testing the latter hypothesis against Italian and U.K. data on private wealth (Phelps, 1997; Phelps and Zoega, 1998) and have found social wealth to be significant in those countries and also in the United States (Phelps and Zoega, 1997). On the former hypothesis, we have consistently found a significant and not unimportant role for the world real rate of interest (Phelps and Zoega, 1997, 1998) (see also the findings of Olivier Blanchard [1997]). To date, though, no one has confronted the record of unemployment rates directly with time series on the valuation of the assets enterprises invest in (human and other), as inferred from stock-market (and capital-good industry) prices.

The recent period provides observations of corporate asset valuations far above normal experience. And fortunately it comes only two decades after the observations in the 1970's of prices and earnings far below normal experience. In the interim, if previous research is right, the structure of the economy has changed in some respects. Among adverse developments, private wealth is up relative to productivity, and social wealth too; world real interest rates rose to a new plateau in 1981. Perhaps the most dire shift is one hard to quantify: the burden that learning to use the new information technologies must put on workers with little basic education. Among the positive developments is the sensational shrinkage in the number of workers without a high-school

diploma and the number without any college, both as proportions of the labor force. In this short exploratory paper, in order to focus on the role of the prices of enterprise assets, I will take the risk of abstracting from these shifts with one exception. Since the educational composition of the labor force has changed so much, I will look only at the unemployment rate of the bottom educational group, high-school dropouts, or at the index of unemployment constructed by averaging the within-education-group unemployment rates using fixed weights from the base year (Phelps and Zoega, 1997). The unemployment rate series for the four education groups are shown in Figure 1.

First consider a single asset-market indicator, market capitalization per unit of fixed capital. It captures to a degree both of the attributes that make assets desirable to invest in: the profit rate, as measured by corporate profit per unit of corporate fixed capital, and the price that investors are willing to pay for current earnings, as measured by the price–earnings ratio, the reciprocal of the earnings yield. (In fact, market capitalization, Q, as a ratio to the capital stock, K, is the product of the earnings rate, E/K, and the price earnings ratio, Q/E.)

There are several reasons why this capitalization variable (Q/K) enters positively into the aggregate labor-demand function. First, if expenditure by firms on employee training and customer acquisition were unnecessary for maximum profit, this capitalization variable would be equivalent to Tobin's q; its excess over 1 indicates the profit to be obtained by acquiring fixed capital assets at a real price of 1 when their real worth (in present value terms) is q, so it indicates the attractiveness of additional fixed investment. Increased fixed investment tends to raise the real demand wage at given employment, since some capital-goods industries, notably construction, are conspicuously more labor-intensive than production as a whole and since, even if all industries had the same factor-intensiveness, capital is not instantaneously shiftable, so that the real prices of capital-goods output are driven up, thus raising the marginal value productivity of labor in the capital-goods industries. Second, in my theoretical system, firms
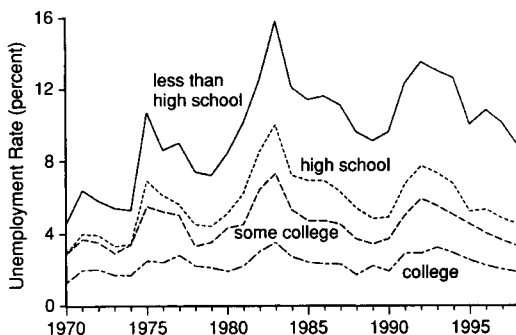

FIGURE 1. THE UNEMPLOYMENT RATE
FOR FOUR EDUCATION GROUPS

have to invest in their workforce to create functioning employees and have to invest to obtain customers. When capitalization increases, it may indicate that the profits on these human assets or their market value (or both) have increased. Firms will then hire more workers and trim mark-ups, thus raising their demand wage in terms of product. Thus, employment is increased through these channels as well.

Is there evidence that the capitalization variable is a driver of employment? Figure 2 records (on the right-hand vertical axis) the quarterly value, lagged two years, of the market capitalization on a large set of stocks traded on organized exchanges (provided by Datastream) expressed as a ratio to the fixed capital stock in the corporate sector. By 1973 this indicator is already down to a moderate level (from the stock-market peak around 1968) and falls at a generally slow rate until the early 1980's, whereupon the indicator regains this ground by the time of the 1987 crash and then goes on to reach a value in 1996 that is double its 1973 value. Figure 2 also records the current value of the unemployment rate of the high-school dropout group (measured on the inverted left-hand scale, so a rise means a rise of employment); thus year 1998 relates 1998 dropout employment to capitalizations in 1996. To my eye, it is striking that in the 1970's, when the asset-value indicator was depressed, the employment variable was mostly falling, and that by the early 1990's, when the value indicator was setting record highs, the employment variable was strongly rising.
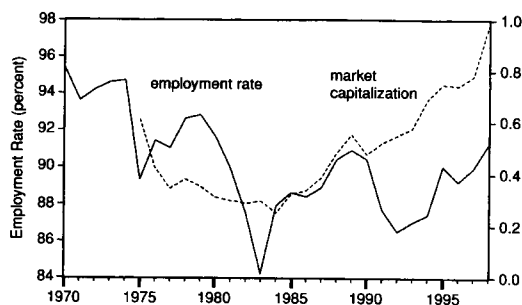
FIGURE 2. EMPLOYMENT RATE OF HIGH-SCHOOL
DROPOUTS (LEFT-HAND SCALE) AND LAGGED MARKET
CAPITALIZATION AS A RATIO TO CORPORATE CAPITAL
(RIGHT-HAND SCALE)

FIGURE 3. CORPORATE PROFITS BEFORE AND AFTER
TAX PER UNIT OF CAPITAL

I will now examine how each of the two forces lying behind the valuation of enterprise assets, the price–earnings ratio and the profit rate, appear to influence the motion of employment. Clearly, asset valuation can go up because profitability has gone up or because investors are willing to pay more for the same earnings, either because real interest rates have gone down or because future expected earnings have gone up. Not all models of the capital and credit markets imply that these two events, if they happened to exert the same pull on asset valuation, would be equivalent in their stimulus to employment.

Figure 3 records the profit rate, π, defined as the ratio of corporate profits per unit of corporate fixed capital as reported in the Bureau of Economic Analysis data of the U.S. Commerce Department. This series declined from about 13 percent in the early 1970's to about half that level, then got back to as far as 12 percent in 1997. Figure 4 records the price–earnings ratio, p/e, derived from the Standard and Poor's (S&P) 500 composite index of stock prices. From its neighborhood of 18 in the early 1970's that series fell proportionately farther, then nearly quadrupled to around 30 in 1998. Since the unemployment rate of high-school dropouts and the index of unemployment rates in the four education groups did not come close to regaining their levels in the early 1970's, one wonders whether the price–earnings ratio has a role to play. A strand of radical thought has always held that the stock market is merely a sideshow.
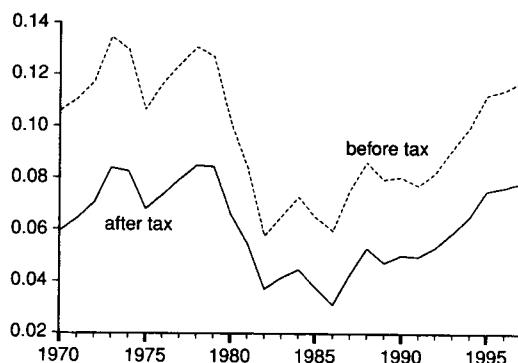
A regression was run with the fixed-weight index of unemployment rates exhibited in Figure 1. The left-hand-side variable is the employment increase from the previous year expressed as a ratio to the current-year labor force. The right-hand-side is a quadratic expression in the discrepancy between the steady-state employment rate predicted by the two independent variables and the previous year's employment rate. The second term, the squared discrepancy, permits the discrepancy to show diminishing returns in its contribution to employment growth:

$$\frac{\hat{N}_t - \hat{N}_{t-1}}{L_t}$$

$$= 1.43 \left[0.97 + 0.048 \log(\pi) + 0.033 \log(p/e) - \frac{\hat{N}_{t-1}}{L_t} \right]$$
$$\quad (3.96) \ (31.16) \quad (4.97) \quad\quad (3.42)$$

$$- 18.33 \left[0.97 + 0.048 \log(\pi) + 0.033 \log(p/e) - \frac{\hat{N}_{t-1}}{L_t} \right]^2.$$
$$\quad (-2.10)(31.16) \quad (4.97) \quad\quad (3.42)$$

Both explanatory variables are highly significant (the t ratios are shown below the coefficients), and the coefficient of the log of the price–earnings ratio is not far below that of the profit rate.[3] According to these coeffi-

[3] The adjusted R^2 is 0.48, and the Durbin-Watson statistic is 1.61. Incidentally, if one constrains the coefficients to be equal, on the premise that it does not matter whether
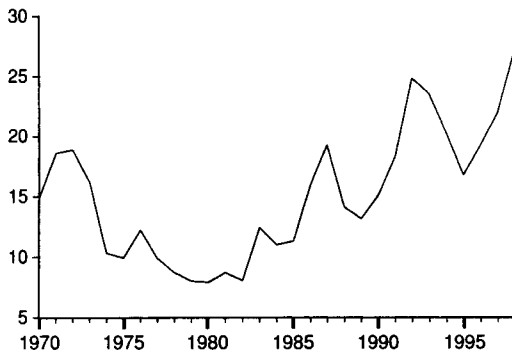
FIGURE 4. PRICE–EARNINGS RATIO OF THE
S&P 500 COMPOSITE FIRMS

the BLS price index for finished goods (WPSSOP3000). Very broadly speaking, this relative price series does exhibit a decline to a trough in the early 1980's and a recovery finally to new highs. The main difference is that the strong surge to new heights comes early (in 1993 and again in 1994), while the strongest rises in profit rate are a little later, and those in stock-market value per unit of capital later still.[4] The ensuing construction boom accounts for nearly 23 percent of the decline of unemployment between 1994 and 1998. The parallel boom in the equipment sector, which is larger and has been aided by productivity gains and growth of overseas customers, surely accounts for an even larger share.

II. Concluding Thoughts

The thesis here is that the natural rate does not shift only with changes in demographics, institutions, taxes, the global economic climate, and so forth. Forces apt to be cyclical also drive the natural rate. In my framework, the real valuations of the sorts of assets that enterprises invest in are a key force, and they may exhibit cyclical fluctuations. The preliminary findings here sustain my thesis that share prices are a powerful driver of the employment rate. Apparently they are a good proxy for the valuations of the underlying assets: functional employees, loyal customers, and tangible capital. And Keynes-Tobin arbitrage between stocks and assets may go on as well.

Much more research will be needed to verify these results. It is possible that my findings are no more than a spurious correlation. Yet my regression is no mere *ex post* rationalization. It is grounded in a theory I developed in the early 1990's, when stocks were far below their recent highs.

Conceivably, recent asset-price rises correlate with near-future employment gains because the former anticipate near-future rises in the labor-demand function or declines in the wage curve attributable to recent changes in state variables

cients, a doubling of the price–earnings ratio or of the profit rate, in increasing the log by 1.0 and thus the discrepancy by about 0.4, would raise the steady-state N/L by 0.4, an impressive fall of the unemployment rate by 4 percentage points.

To strengthen the argument, it would help to show that those categories of enterprise assets whose prices are directly observable and reliably measured have shown a decline and subsequent rise (in real terms) that mirrors at least roughly the profile exhibited by the stock-market valuation of the enterprises themselves (as a ratio to their fixed capital). Since there are no off-the-shelf data on the prices that firms pay for performance-ready employees and for customers, one is left with the categories of tangible capital. The price indexes available for construction are generally thought to be relatively problem-free. One can examine the construction-goods price index of the Bureau of Labor Statistics (BLS), labeled materials and components for construction, which starts in 1974, expressed as a ratio to

it is profitability or the price–earnings ratio that drives valuation up or down, the result is an equation with $\log[(p/e)\pi]$ as the sole independent variable in place of the two. (In concept, this gives market valuation per share. However, this derived series based on the S&P 500 p/e is not identical to the series in Fig. 2 from Datastream.) This constrained regression also gives good results, of course. (The Datastream valuation series does not deliver a statistically significant coefficient. For me, though, Figure 2 is amply persuasive, as is the regression result in the text.)

[4] The corresponding relative price index for capital equipment does not hit new highs, undoubtedly because of downward adjustments made as an effort to adjust for quality change.

and parameters. If so, the stock market's estimated power may shrink if the other causal forces behind the wage curve and demand curve (wealth, domestic capital, productivity, etc.) are readmitted to the equation. (On productivity growth see C. A. Pissarides [1990] and Hian Teck Hoon and Phelps [1997].)

Another question that hangs over this paper is whether the recent fall of the structural volume of unemployment is a genuine fall of the natural rate or instead the attainment of an *unnatural* unemployment rate borne of misforecasts about future real interest rates or future real returns. I have merely argued that structural forces involving the real prices of assets are at work.

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