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Productivity Growth and Employment

Productivity growth in the United States has rebounded sharply over the past decade, after the disappointingly sluggish growth in the prior two decades. But stronger productivity growth has coincided with sharply declining manufacturing employment, leading some analysts to suggest that the rise in U.S. productivity growth may have destroyed jobs, as companies need fewer workers to produce the same amount of output.

A recent NBER Working Paper by **William Nordhaus** investigates the productivity rebound along with the relationship between productivity growth and employment in manufacturing. In **The Sources of the Productivity Rebound and the Manufacturing Employment Puzzle** (NBER Working Paper No. 11354), Nordhaus looks at detailed industrial productivity and employment data for almost 60 years, with the focus on the U.S. productivity renaissance since 1995.

Based on a range of measures, U.S. productivity growth has averaged 2 to 3 percent per year in the period 1995-2004, compared with less than 1.5 percent per year from 1973 to 1995. The strong productivity growth of the past decade is comparable with the 1948-73 period. The two peak years in the recent period have equalled the peaks of the earlier 1948-73 period. The improvement in productivity growth has survived the stock market bust of 2000, the subsequent decline in invest-

ment, a recession, rising fiscal deficits, wars, and skyrocketing oil prices.

About 40 percent of the rebound in productivity growth has been concentrated in "New Economy" industries. But there has also been rapid productivity growth in areas such as retailing and wholesaling, financial services — including securities and insurance — and real estate. The government and construction sectors have seen no productivity growth.

ufacturing industry following the advent of the personal computer. But from the perspective of manufacturing as a whole, or of major manufacturing industries, the lower prices that result from higher productivity have increased demand growth and more than offset the employment-lowering effect of higher productivity.

It appears that the cause of lower manufacturing employment over the last decade is not higher productivity

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In addition, Nordhaus uses detailed data on productivity and employment to study the relationship between productivity shocks and employment changes in manufacturing. In the paper, Nordhaus uses a number of datasets on industrial production and productivity, and a range of econometric tests, to examine the relationship between productivity and employment. Examining the relevant "elasticities" between employment and productivity growth, he shows that more rapid productivity growth leads to higher rather than lower employment in manufacturing. This shows up most sharply for the most recent period, since 1998.

For individual companies or industries, higher productivity growth may lead to a loss of jobs, Nordhaus says, citing the example of the decline in employment in the typewriter man-

growth in the United States, Nordhaus says. Rather, the source is likely to be higher productivity growth, and more pronounced price declines, among foreign manufacturers that compete with U.S. companies. In China in particular, productivity has been rising and costs have been declining more rapidly than in the United States — particularly in industries such as consumer electronics and apparel, where China did not compete with the United States two decades ago.

The results in this paper suggest that productivity is not to be feared — at least not in manufacturing, where the largest recent employment declines have occurred, Nordhaus says.

— Andrew Balls

Changing Work Behavior of Married Women

Married women apparently are becoming accustomed to working outside the home. Maybe they like having their own careers. Or maybe they worry that, with a high divorce rate, they might split from their husband and need a separate income and career. Whatever the cause, women in the 1990s were less likely to leave employment or to reduce their annual work hours if their husbands got a pay hike than was the case in the 1980s. And, women were less likely to become employed or work more hours if their spouse got a pay cut. In other words, their labor supply decisions were less sensitive to their husband's income than they had been in the past. Equally interesting is that their work decisions also became much less sensitive to their own pay — whether it was high or mediocre — than before.

These are among the findings of **Francine Blau** and **Lawrence Kahn** in **Changes in the Labor Supply Behavior of Married Women: 1980-2000** (NBER Working Paper No. 11230). The dramatic increase in the participation of women in the paid labor force since World War II is well known. In 1947, 31.5 percent of women and 86.8 percent of men were in the labor force. By 1999, women's labor force participation had roughly doubled to 60 percent, while men's had fallen moderately to 74.7 percent. What was a comparatively rare event in the late 1940s — women working outside the home — had become the mode by the 1990s. Women were only 15 percentage points less likely to work for money than men.

Beginning in the late 1970s or early 1980s, the authors further note, women's wages relative to those of men also rose: the female/male ratio of annual earnings of full-time, full-year workers increased from 60.2 percent in 1980 to 72.2 percent in 1999. That change partially reflected a slight decline in men's real wages in the 1980s, followed by some recovery in the 1990s. Moreover, after 1970, more and more women proportionately got high paying professional and managerial jobs.

Since 1990, though, the increase in the participation of women in the labor force and the gain in their wages relative to men have both slowed from previous decades. Women's labor force participation rose only from 57.5 percent to 60 percent between 1990 and 1999. The female/male annual earnings ratio barely increased, from 71.6 percent in 1990 to 72.2 percent in 1999.

Using Current Population Surveys done each March by the Census Bureau, Blau and Kahn examine the 1980-2000 changes in married women's labor supply, taking account of demographic factors, such as the number and age of their children, and other factors, including non-labor income. As women's relative wages increased, more and more went to work — but less so in the 1990s than in the 1980s. "This is a significant new development," the authors write.

What economists call the "labor supply elasticity" of women declined from a range of about .8 to .9 in 1980 to about .6 in 1990 and .4 by the year 2000. In other words, by 2000, a wage increase had only about half as much effect on women's decision about how many hours to work during the year than in 1980. Further, married women's work hours became less responsive to their husbands' wages as well — the effect of, say, an increase in their spouses' wages on married women's work hours fell by between 38 and 47 percent. "Fewer and fewer women are on the margin between participating and not participating in the labor force," Blau and Kahn note.

In contrast, the "labor supply elasticity" of husbands has always been very low (0 to .1) and has changed little in the two decades. Nor does a change in the pay of their spouses have much influence on married men's labor supply.

Going back decades, women were perceived as secondary earners within the family, more likely to be affected by their spouses' wages. Now the traditional division of labor between men and women is breaking down. Men and women are more equally sharing home and market responsibilities, although women still bear a larger share of housework and child care than men do. These changes in gender roles are likely to help explain the authors' finding that the responsiveness of women's labor supply to economic incentives is becoming more like men's. That result holds up, the authors find, if tested under a variety of alternative specifications for married women and their mates. It holds under

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various tax regimes, say if the couple is eligible for the earned income tax credit, or if the couple is not legally married but rather cohabiting. It holds for different education levels and for mothers of small children. It also holds when some of the income of married women is unearned, that is, from investments. And it holds under a variety of assumptions about the wages women who are currently out of the labor market were offered.

These findings have implications for the national debate over supply-side tax policy — tax cuts aimed at encouraging more work. If married women's labor-supply elasticity has declined, then "the potential for marginal tax rate cuts to increase the labor supply is much smaller now than 20 years ago, since tax rates were much higher then as was married women's labor supply responsiveness," the authors write.

— David R. Francis

Fundamentals and Systematic Risk in Stock Returns

Economists have long evaluated the risk of a given stock by its beta, or the sensitivity of the stock's return to the return on the market as a whole. More recently, a two-beta model has been developed in which the required return on a stock is determined not by its overall beta but rather by its "bad beta," with market cash-flow shocks that earn a high premium, and by its "good beta," with market discount rates that earn a low premium. It has further been found that value stocks have relatively high bad betas, while growth stocks have relatively high good betas.

In **Growth or Glamour? Fundamentals and Systematic Risk in Stock Returns** (NBER Working Paper No. 11389), co-authors **John Campbell, Christopher Polk,** and **Tuomo Vuolteenaho** examine whether stocks' bad and good betas are determined by the characteristics of their cash flows — the fundamentals view — or whether they arise from the discount rates, possibly driven by sentiment, that investors apply to those cash flows. The researchers subject both the fundamentals view and the sentiment view to a number of tests. Their results, they say, have important implications for understanding the underlying cash-flow risks of value and growth companies, strongly suggesting there is more to growth than mere "glamour."

In a first test, the researchers break firm-level returns of value and growth stocks into components driven by cash-flow shocks and discount-rate shocks. They then look at these components for value and growth portfolios, regressing portfolio-level cash-flow and discount-rate news on the market's cash-flow and discount-rate news to determine whether sentiment or cash-flow fundamentals drive the systematic risks of value and growth stocks. The data indicate that the bad beta of value stocks and the good beta of growth stocks are both primarily determined by the cash-flow news of those stocks.

In another test, Campbell, Polk, and Vuolteenaho regress the accounting profitability of value and growth portfolios on the market's cash-flow and discount-rate news, measured by the market's profitability and price-earnings ratio. They examine longer-term trends rather than short-term fluctuations in profitability. Here they find that the profitability of value stocks is more sensitive to the market's profitability but less sensitive to the market's price-earnings ratio than is the profitability of growth stocks.

In a third test, the researchers run cross-sectional firm-level regressions of the ex-post beta components onto the book-market ratio. They find that a firm's book-market ratio predicts its bad beta positively and its good beta negatively, consistent with the findings of earlier studies. But when Campbell, Polk, and Vuolteenaho deconstruct

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each firm's bad and good beta into components driven by the firm's cash-flow news and discount rate news, they find that the book-market ratio primarily predicts the cash-flow component of the bad beta, not the discount-rate component.

All these test results point in the same direction: The high betas of growth stocks with the market's discount-rate shocks, as well as the high betas of value stocks with the market's cash-flow shocks, turn out to be determined by the cash-flow fundamentals of both growth and value companies. Growth stocks therefore are not merely "glamour stocks" whose systematic risks are driven solely by investors' sentiment. And while formal models are still lacking in this area, the researchers say, any structural model of the value-growth effect must relate to the underlying cash-flow risks of value and growth companies.

The study also begins a broader exploration of firm-level characteristics that predict firms' sensitivities to market cash flow and discount rate shocks. Campbell, Polk, and Vuolteenaho use cross-sectional stock-level regressions to identify characteristics of common stocks that predict their bad and good betas. They consider market-based historical risk measures, the lagged beta and volatility of stock returns; accounting-based historical risk measures, the lagged beta and volatility of a firm's return on assets (ROA); and accounting-based measures of a firm's financial status, including its ROA, debt-asset-ratio, and capital-investment-asset ratio.

The researchers find that market-based risk measures, such as historical return betas and return volatilities, predict with considerable accuracy firms' sensitivities to market discount rates, but are much less reliable forecasters of sensitivities to market cash flows. Accounting data, by contrast, are relatively important indicators of firms' sensitivities to market cash flows. This implies that accounting data should play a more important role in determining a firm's cost of capital in a two-beta model, which stresses the importance of cash-flow sensitivity, than in the traditional Capital Asset Pricing Model.

Finally, Campbell, Polk, and Vuolteenaho stress that these effects — of firm characteristics on firm sensitivities to market cash flows and discount rates — primarily operate through firm-level cash flows rather than through firm-level discount rates. This result extends their findings for growth and value stocks and suggests that fundamentals have a dominant influence on the cross-sectional pattern of systematic risks in the stock market.

— Matt Nesvisky

Alcohol Consumption, Alcohol Policies, and Risky Sexual Behaviors

The consequences of risky sexual behavior fall heavily on teenagers and young adults. In 2002, the incidence rate for chlamydia was 297 per 100,000 population for persons of all ages, 1483 for teenagers, and 1610 for young adults. Similar age disparities are found for gonorrhea, with incidence rates per 100,000 population of 125, 476, and 593, respectively. Moreover, approximately half of all new human immunodeficiency virus (HIV) infections in the United States occur among people under age 25. Current teen rates of pregnancy and out-of-wedlock birth in the United States are high by historical standards and high relative to other developed countries.

Although alcohol use has traditionally been associated with risky sexual behavior, there is still a question as to whether excess alcohol consumption causes an increase of risky sexual behavior among young adults. In **An Investigation of the Effects of Alcohol Consumption and Alcohol Policies on Youth Risky Sexual Behaviors** (NBER Working Paper No. 11378), co-authors **Sara Markowitz, Robert Kaestner,** and **Michael Grossman** ask whether alcohol use promotes risky sexual behavior and whether there are public policies that can reduce risky sexual behavior by reducing alcohol use.

The authors look at the influence of alcohol consumption on individual behavior using data from the National Longitudinal Survey of Youth and the biennial Youth Risk Behavior Surveys. Alcohol use was

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defined as the number of days in the past 30 days that an individual reported having had at least one drink of alcohol and the number of days on which five or more drinks were consumed. They conclude that, "there appears to be no evidence suggesting a causal role of alcohol use in determining the probability of having sex." There was some evidence, however, suggesting that alcohol consumption does "lower the probabilities of using birth control and condoms" among sexually active teens.

The authors use aggregate data on the reported incidence of gonorrhea and AIDS infections by state to measure whether state and federal taxes on beer, county laws banning alcohol sales, laws governing blood alcohol levels, and zero tolerance laws for underage drinking and driving affect infection rates. Though women appear unaffected, zero tolerance laws appear to decrease the gonorrhea rate in males aged 15-19, and a one percent increase in beer taxes is associated a 1.1 percent reduction in the gonorrhea rate in young men aged 15-19 and 20-24. Neither the percentage of the population living in dry counties nor laws controlling blood alcohol rates affected either rate of infection.

— Linda Gorman