country. 8/ Feldstein and Horioka find that there is a strong positive association across countries between saving and investment rates--perhaps because of the greater risk of long-term investments abroad.

Thus, an increase in the domestic saving rate is likely, but not certain, to lead to a corresponding increase in domestic investment. Even if an increase in the U.S. saving were directed toward foreign investment, however, Americans would have increased their claim on future world output.

8/ Martin Feldstein and Charles Horioka, "Domestic Savings and International Capital Flows," National Bureau of Economic Research Working Paper 310 (January 1979).

CHAPTER III. POLICIES TO INCREASE THE STOCK OF PHYSICAL CAPITAL

An important determinant of labor productivity is the amount of physical capital per worker. For this reason, proposals to increase productivity often emphasize measures to increase capital investment. This chapter discusses the relationship between capital investment and productivity growth, the factors that contribute to capital investment, and the ways in which tax incentives can be used to stimulate it.

CAPITAL FORMATION AND PRODUCTIVITY GROWTH

The relationship between capital investment, or capital formation, and gains in productivity has been the subject of considerable study. This research has produced substantially different estimates of the contribution made by capital to productivity growth. 1/ Using a combination of gross and net measures of the capital stock, Edward F. Denison has estimated that increases in the amount of capital per worker contributed about 0.34 of a percentage point to the annual growth in national income per worker in the nonresidential business sector during the 1948-1978 period (see Table 11). In contrast, J.R. Norsworthy, Michael J. Harper, and Kent Kunze have calculated that increases in the net capital stock per manhour accounted for roughly 0.67 of a percentage point of the average annual growth in output per manhour in the private business sector during the same period. Still others such as Peter K. Clark have arrived at different estimates, based on somewhat different measures of capital, labor, and output.

1/ The contribution of capital formation to productivity growth generally is calculated as the percentage change in the capital-labor ratio weighted by the share of output or income attributable to capital. Quantitative estimates of the contribution can differ because of alternative approaches to the measurement of capital, labor, and output.

TABLE 11. ESTIMATES OF THE EFFECT OF CAPITAL FORMATION ON PRODUCTIVITY GROWTH, 1948-1978

Period	Average Annual Productivity Growth (percent)	Productivity Growth Resulting from Capital Formation (percent)
	(Edward F. Denison)	
1948-1953	2.83	0.48
1953-1964	2.82	0.40
1964-1969	1.81	0.35
1969-1973	1.63	0.28
1973-1978	0.31	0.13
1948-1978 a/	2.08	0.34
	(J.R. Norsworthy, Michael J. Harper, and Kent Kunze)	
1948-1965	3.32	0.76
1965-1973	2.32	0.75
1973-1978	1.20	0.21
1948-1978 a/	2.70	0.67
	(Peter K. Clark)	
1948:III - 1955:IV	2.71	0.48 - 1.15
1955:IV - 1965:II	2.94	0.54 - 1.29
1965:II - 1973:II	2.34	0.26 - 0.62
1973:II - 1976:IV	1.19	0.10 - 0.25
1948:III - 1976:IV a/	2.49	0.39 - 0.94

(Continued)

Despite the conceptual and methodological differences among these studies of the contribution made by capital to productivity growth, it is clear that they all attribute a significant role to capital accumulation. It is also apparent that the estimated contribution of capital has declined substantially in recent years, although there is some disagreement about when the decline began.

TABLE 11. (Continued)

NOTE: Growth in labor productivity is measured by Denison as the growth in national income per person employed in the nonresidential business sector. The use of national income as the measure of output excludes the replacement of capital (depreciation) from the labor-productivity measure, and reduces the weight assigned to capital in determining its contribution to productivity growth. In contrast, Norsworthy, Harper, and Kunze measure labor productivity in terms of gross domestic product (GDP) per hour worked in the private business sector. Since GDP includes capital depreciation, their calculation assigns relatively more importance to capital formation in the determination of productivity growth. Finally, while Clark includes depreciation in his measure of output in the nonfarm business sector, his approach differs from those of the other two studies in that he attempts to adjust statistically for cyclical variations in the use of capital.

SOURCES: Edward F. Denison, Accounting for Slower Economic Growth (Brookings Institution, 1979); J.R. Norsworthy, Michael J. Harper, and Kent Kunze, "The Slowdown in Productivity Growth: Analysis of Some Contributing Factors," in Brookings Papers on Economic Activity (1979:2), pp. 387-421; and Peter K. Clark, "Capital Formation and the Recent Productivity Slowdown," The Journal of Finance, vol. 33, no. 3 (June 1978), pp. 965-75.

a/ These figures were calculated as time-period weighted averages of the subperiod estimates.

Variations over time in the contribution of capital to labor productivity growth primarily reflect changes in the growth rate of the capital-labor ratio. Differences in the way capital and labor are measured lead to different estimates of when the growth in this ratio began to decline. Most estimates agree that, while capital and labor in the nonfarm, nonresidential business sector

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both grew more slowly during the 1973-1978 period, the slowdown in the rate of capital formation was more pronounced, and hence growth of the capital-labor ratio was retarded (see Table 12). Whether or not slower growth in the capital-labor ratio began earlier (in the 1965-1973 period) depends on how labor is measured. During that earlier period, the growth of both capital and labor accelerated, but the number of hours worked grew substantially slower than the number of full-time and part-time employees. As a result, the growth of the capital-hours ratio accelerated, while the growth of the capital-employment ratio slowed. Those who measure labor in terms of hours worked (such as Norsworthy, Harper, and Kunze) thus conclude that the contribution of capital to labor productivity did not begin to decline until the 1973-1978 period. 2/ In contrast, those such as Denison, who measure labor in terms of the number of employees, report that the contribution of capital began to decline earlier. From a policymaking viewpoint, however, the issue of when capital formation began to contribute less to productivity is not as important as the observation that its contribution has diminished.

INVESTMENT TRENDS AND THE DETERMINANTS OF INVESTMENT

Increases in the capital stock are made through investment. Various measures of the performance of investment in the post-World War II period are presented in Table 13.

2/ Although hours worked is the measure employed by the Bureau of Labor Statistics to calculate labor productivity, its use can result in movements of the capital-labor ratio that may not be related to labor productivity. As noted by Clark, a decline in the average workweek during the 1965-1973 period caused hours to grow sufficiently less than employment so that the growth of capital per hour worked actually increased, even though the growth in the capital-employment ratio declined. Yet, a decrease in average weekly hours represents a less intensive use of available capital rather than a move to a more capital-intensive production process. See Peter K. Clark, "Issues in the Analysis of Capital Formation and Productivity Growth," in Brookings Papers on Economic Activity (1979:2), pp. 423-31.

TABLE 12. VARIOUS MEASURES OF THE GROWTH IN CAPITAL AND THE RATIO OF CAPITAL TO LABOR IN THE NONFARM, NONRESIDENTIAL BUSINESS SECTOR (Average annual rate of growth, in percent)

Measure	1948 to 1965	1965 to 1973	1973 to 1978
Gross Capital Stock a/	3.40	4.52	3.24
Gross Capital Stock per:			
Hour worked	2.44	2.83	1.71
Full- and part-time employee	2.19	2.08	1.14
Net Capital Stock a/	3.92	4.81	2.87
Net Capital Stock per:			
Hour worked	2.96	3.12	1.34
Full- and part-time employee	2.71	2.37	0.77

SOURCE: CBO calculations based on Table 1 in Peter K. Clark, "Issues in the Analysis of Capital Formation and Productivity Growth," in Brookings Papers on Economic Activity (1979: 2), pp. 423-31.

a/ The gross capital stock measure assumes that an asset with a useful life of, say, 10 years is equally as productive in the first and tenth year. The net capital stock measure assumes that the same asset becomes 10 percent less productive each year. The net stock of capital grew faster than the gross stock in both the 1948-1965 and the 1965-1973 periods, but increased less rapidly in the most recent period. In large part, this relative decline reflects the pattern of investment, because exclusion of depreciation from the net capital stock measure makes it relatively more sensitive to cyclical swings in investment.

The average of annual growth rates of all major components of real gross fixed investment declined between 1966-1973 and 1974-1979. The largest decline was in residential investment, a category especially sensitive to business cycles. Of particular importance to the productivity issue, however, is nonresidential

TABLE 13. TRENDS IN INVESTMENT SPENDING

	1949 to 1965	1966 to 1973	1974 to 1979
Average of Annual Growth Rates (percent)			
Gross fixed investment	3.8	4.2	1.7
Nonresidential investment	4.0	4.2	2.4
Nonresidential equipment	3.6	5.7	3.1
Nonresidential structures	4.8	1.8	1.3
Residential investment	3.9	4.9	0.7
Percent of Gross National Product			
Gross fixed investment	14.1	14.6	13.8
Nonresidential investment	9.2	10.3	9.9
Nonresidential equipment	5.3	6.4	6.8
Nonresidential structures	3.8	3.9	3.2
Residential investment	4.9	4.3	3.9
Percent of Gross Fixed Investment			
Nonresidential equipment	38.0	43.7	49.0
Nonresidential structures	27.2	27.1	23.0
Residential investment	34.8	29.3	28.0

NOTE: Percentages based on data in constant 1972 dollars.

SOURCE: CBO calculations based on Commerce Department data.

investment. Its average rate fell from 4.2 percent in 1966-1973 to 2.4 percent in 1974-1979. Within the nonresidential category, the average of annual growth rates for equipment investment fell by 2.6 percentage points, while that of structures declined by 0.5 percentage points.

The fraction of gross national product (GNP) devoted to investment declined to 13.8 percent during the 1974-1979 period, but the ratio of equipment investment to GNP rose to 6.8 percent--

the highest ratio observed for the periods shown in the table. Equipment investment accounted for 49.0 percent of gross investment during this period, compared to a 23.0 percent share for nonresidential structures and a 28.0 percent share for residential investment. Between 1949-1965 and 1974-1979, the ratio of equipment investment to total fixed investment increased by 11.0 percentage points, while the comparable ratios for nonresidential structures and residential investment declined by 4.2 percentage points and 6.8 percentage points, respectively.

Determinants of Business Investment

What are the major influences determining business fixed investment? The determinants of investment have been the subject of many studies. They are thought to include both nonfinancial factors, such as changes in the demand for goods and services and the rate of capacity utilization, and financial considerations, such as the rate of return on capital investments and the cost and availability of funds.

Although there is general agreement about the importance of the nonfinancial factors, there is considerable debate among economists about the magnitude of the financial influences. The issue is an empirical one that has not yet been resolved. The weight of the evidence, however, indicates that financial considerations do have a significant effect on business investment. Therefore, policy measures that reduce the cost of capital would likely be effective in stimulating productivity growth.

General agreement about the importance of nonfinancial factors for business investment decisions suggests that, during periods of economic slack, policies to promote capital accumulation might best be concentrated on returning the economy to high levels of production. In general, investment subsidies are not considered to be the most effective stabilization tools. Increased federal purchases and personal tax cuts generally have larger and quicker impacts on output and employment. As the economy approaches high levels of employment, however, such policies tend to contribute more to inflation and less to real growth in demand. As a result, the positive impact on investment dissipates, and may even become negative.

Policies to raise the capital intensity of production at high-employment levels of output (or at constant levels of resource

utilization) must include measures that reduce the cost of capital. In the absence of sufficient foreign sources of financing, however, the success of such policies requires either a decrease in the proportion of private saving devoted to residential investment or an increase in the national rate of saving. 3/ Without such changes in the rate or composition of saving, interest rates are likely to rise and offset the effect of investment incentives on the overall level of business investment. 4/ The composition of investment, however, is likely to change in favor of the specific types of investment being subsidized.

TAX INCENTIVES FOR BUSINESS INVESTMENT

A variety of investment tax incentives can be used to stimulate capital formation. These include: reducing corporate tax rates, raising the existing investment tax credit, and increasing depreciation deductions either by indexing them to the rate of inflation or by shortening depreciation periods. While all these tax changes tend to stimulate investment by reducing the cost of capital, their impact on different forms of investment can vary. This is an important consideration, because policies to stimulate capital formation will not achieve the maximum effect on productivity if they divert some capital resources away from their most productive uses by artificially raising the profitability of some investments relative to other, more productive, ones. In some cases, there may be good reasons for favoring some forms of investment over others, but the biases of particular investment subsidies should be intentional rather than inadvertent.

The corporate income tax has a nonneutral influence on investment decisions. It is biased against corporations relative to unincorporated businesses, and favors debt financing over equity financing. The main reasons for these results are that corporate

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3/ National saving includes personal saving, business saving (retained earnings and capital consumption allowances), and government surpluses. The rate of saving in this discussion is the ratio of national saving to high-employment GNP.

4/ Policies that stimulate foreign investment in the United States can, however, raise the investment-output ratio without a corresponding rise in the national saving rate at full employment, provided such investment is financed abroad.

income is subject to "double taxation" (once at the corporate level and again at the stockholder level when paid out in dividends), and that interest costs are deductible whereas dividend payments are not.

A flat-rate investment tax credit of the type now available for most equipment purchases lowers the effective tax rate proportionately more for short-lived than for long-lived investment. 5/ Thus, it encourages investment in industries such as construction and motor vehicle manufacturing, which are heavy users of short-lived equipment, relative to industries such as primary metals, communications, and utilities. Also, the current investment tax credit favors investment in equipment rather than in structures, since the latter does not qualify for the credit.

The distorting effects of the investment tax credit are offset somewhat by the lack of an inflation adjustment for depreciation deductions. The use of historical cost depreciation discourages investment in general, but has a relatively greater impact on short-lived investments. A simplified explanation for this is that the average annual effect of inflation on depreciation costs (a factor affecting the rate of return) is greater for assets with relatively short useful lives. 6/

5/ An intuitive explanation is that the average yearly value of a credit equal to x dollars is greater for short-lived investments than for long-lived investments. The nonneutral character of the current investment tax credit and other investment subsidies is discussed more fully in Jane G. Gravelle, Depreciation Policy Options, Congressional Research Service, Report No. 80-182E (October 10, 1980). See also Jane G. Gravelle, The Capital Cost Recovery System and the Corporate Income Tax, Congressional Research Service, Report No. 79-230E (November 26, 1979).

6/ Consider two different $100 investments with useful lives of one year and two years, respectively. Assuming straight-line depreciation and an annual inflation rate of 10 percent, the average annual impact of inflation on depreciation costs would be $10 for the one-year asset (0.10 x $100) and $7.75 for the two-year asset (0.10 x $50 plus 0.21 x $50)/2, where the numbers 0.10 and 0.21 are the decimal expressions for percentage impacts of inflation on depreciation costs in the first and second years, respectively.

The Simplified Cost Recovery System. A prominent proposal to reduce the impact of inflation on capital cost recovery by increasing the size of depreciation deductions was introduced by the Senate Finance Committee in its Tax Reduction Act of 1980. 7/ Under this proposal, known as the "Simplified Cost Recovery System," equipment investment would be assigned to one of four depreciation categories corresponding to useful lives of two, four, seven, and ten years. 8/ Most property now eligible for the Accelerated Depreciation Range (ADR) system would be assigned to a useful life category that is at least 40 percent shorter, except that no recovery period would be shorter than two years.

The bill also would introduce "open-ended accounting" in each category. Under open-ended accounting, all assets in each category would be lumped together into a total which itself would be "depreciated" each year, instead of the present method of depreciating each asset separately. The taxpayer would have a choice among three depreciation methods: 200 percent declining balance, 150 percent declining balance, and straight-line depreciation. In the seven-year account, for example, the straight-line approach would allow 1/7 (approximately 14 percent) of the balance in the account to be written off annually. The 200 percent and 150 percent declining balance depreciation methods would permit deductions of 29 percent (2.0 times 1/7) and 21 percent (1.5 times 1/7).

Finally, the bill would modify the investment tax credit. A 2-1/2 percent credit would be provided for the two-year class, a 6 percent credit for the four-year class, and a 10 percent credit for both the seven-year and the ten-year classes. 9/

7/ This bill was introduced as H.R. 5829. It resembles the Tax Restricting Act of 1980 (H.R. 7015), a bill introduced by Chairman Ullman of the House Ways and Means Committee.

8/ The bill would not change the depreciation of public utility property, except that the variance in the depreciation range for such property would be increased from 20 to 30 percent.

9/ Currently, equipment with useful lives of at least seven years is eligible for a 10 percent credit, while equipment with useful lives of at least five years but less than seven years is limited to a 6-2/3 percent credit, and equipment with useful lives of three to five years is restricted to a 3-1/3 percent credit. Shorter-lived equipment is not eligible for a credit.

The Congressional Budget Office used three large-scale econometric models to simulate the impact of this depreciation proposal on the level of business fixed investment, output, and productivity. In each simulation, monetary policy was assumed to be conducted in a manner that held nonborrowed reserves constant, thus allowing interest rates to change. The simulation results are shown in Table 14.

TABLE 14. THREE ECONOMETRIC ESTIMATES OF THE IMPACTS OF THE SIMPLIFIED COST RECOVERY SYSTEM (1981-1985 annual averages)

Area of Impact	DRI a/	Chase b/	WEFA c/
Business Fixed Investment			
Equipment (increase in billions of 1972 dollars)	8.5	1.8	1.9
Structures (increase in billions of 1972 dollars)	3.0	0.9	0.8
Level of Real GNP (percent change from baseline)	0.8	0.3	0.5
Level of Productivity (percent change from baseline)	0.6	0.3	0.3

SOURCE: Congressional Budget Office.

a/ Data Resources, Inc.
b/ Chase Econometrics, Inc.
c/ Wharton Econometric Forecasting Associates, Inc.

According to the DRI model simulations, the Simplified Cost Recovery System would produce an average annual increase of $11.5 billion (8.8 percent) in the level of real business fixed investment during the 1981-1985 period. The Chase and WEFA model simulations show much smaller gains of $2.7 billion. The DRI model estimated that the average annual level of real GNP would be 0.8

TABLE 15. EFFECTIVE TAX RATES ON VARIOUS ASSETS UNDER CURRENT LAW AND UNDER H.R. 5829 AT DIFFERENT INFLATION RATES

Asset Class a/	Inflation Rate 6 Percent		Inflation Rate 12 Percent	
	Current Law	H.R. 5829	Current Law	H.R. 5829
Trucks, Buses, and Trailers	0.09	-0.04 b/	0.42	0.12
Construction Machinery	0.06	-0.03 b/	0.34	0.09
General Industrial Equipment	0.16	0	0.36	0.19
Industrial Steam Machinery	0.31	0.19	0.44	0.34
Commercial Structures	0.48	0.38	0.51	0.44

NOTE: The effect of current law and proposed revisions on effective tax rates is derived from a complex formula, and the results may not be intuitive. The formula for the effective

(Continued)

percent higher as a result of the new depreciation rules. The comparable estimates from the simulations with the Chase and WEFA models are 0.3 percent and 0.5 percent, respectively. Finally, the DRI model simulation results suggest that the average annual level of productivity would increase by 0.6 percent, while the Chase and WEFA models both estimate productivity gains of 0.3 percent.

A drawback to the Simplified Cost Recovery system is that it would not be neutral with respect to assets of different longevities (see Table 15), and thus would not maximize productivity gains. Tax rates on short-lived equipment (for example, motor

TABLE 15. (Continued)

tax rate is $(r^* - r)/r^*$, where r^* is the real pre-tax return and r is the real after-tax return. r^* is in turn determined by the formula:

$$r^* = \frac{(r + d)(1 - uz - k)}{(1 - u)} - d$$

where d is the economic depreciation rate, u is the tax rate, z is the present value of depreciation deductions (discounted at the rate r + p, where p is the inflation rate, except in the case of indexing, where depreciation deductions are discounted at the rate r), and k is the value of the investment credit.

SOURCE: Jane G. Gravelle, Depreciation Policy Options, Congressional Research Service, Report No. 80-182E (October 10, 1980), Table 2, p. 19.

a/ These asset classes are representative of investments with different durability. For example, trucks, buses, and trailers have a shorter useful life than construction machinery, which in turn has a shorter useful life than general industrial equipment.

b/ A negative effective tax rate results when the present value of depreciation deductions and the investment tax credit is worth more than immediate expensing.

vehicles and construction equipment) would fall proportionately more than tax rates on long-lived equipment and structures, and in some cases would become negative. This would increase the bias of the current tax law. Moreover, because the proposal does not directly relate depreciation deductions to the rate of inflation, the tax rate distortions among industries with assets that differ in durability would remain sensitive to the rate of inflation.

Alternative Investment Tax Incentives. An alternative to the Simplified Cost Recovery System would be to index depreciation deductions for inflation. A simplified version of indexation would

not necessarily be difficult to administer. Indexing depreciation would, however, magnify the existing bias of the tax code in favor of short-lived equipment, unless the investment tax credit were repealed or transformed into one that varied inversely with the life of an asset and that was available to structures as well as to equipment. Moreover, to reduce current distortions between debt-financed and equity-financed investment, indexing of depreciation deductions should be accompanied by an inflation adjustment for net interest payments and capital gains. Comprehensive indexing of this nature might pose difficult administrative problems.

Another way to stimulate capital formation would be to lower tax rates on corporate profits. 10/ In general, however, a corporate tax rate cut is thought to be a less effective investment incentive than accelerated depreciation, because a rate cut lowers taxes on the returns to existing as well as to new capital investments. But it would help to make the tax system more neutral: a cut in corporate tax rates would reduce both the existing distortion between corporate and noncorporate investment and the bias in favor of corporate debt financing over corporate equity financing. A corporate tax rate reduction, however, would not be especially effective in dealing with the impact of inflation on capital consumption costs, since effective tax rates would continue to vary with inflation.

A novel approach to the problem of adjusting depreciation deductions for inflation is the First Year Capital Recovery System proposed by Alan J. Auerbach and Dale W. Jorgenson. 11/ Under this plan, businesses would be given the entire depreciation deduction for each asset in the year it is purchased. The amount of the deduction would be reduced or discounted, however, to reflect the fact that the deductions in the earlier years of an asset's life are more valuable to the taxpayer than those taken in later years. The total deduction in the first year would thus

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10/ The Tax Restructuring Act of 1980, H.R. 7015, included a proposal to lower the maximum corporate tax rate to 36 percent.

11/ Alan J. Auerbach and Dale W. Jorgenson, The First Year Capital Recovery System, Hearings of the Subcommittee on Taxation and Debt Management of the Senate Finance Committee (October 22, 1979).

be less than the sum of the deductions that would be taken over a number of years under the present system. This system of discounting also would provide different first-year deductions for assets with different useful lives, with longer-lived assets receiving smaller first-year deductions. The First Year System, as proposed, would replace both the current depreciation system and the investment tax credit.

An advantage of this approach is that it results in effective tax rates that are equal for assets that differ in durability. Also, effective tax rates would not depend on the rate of inflation. Thus, it would reduce the biases of the current tax structure, and would make the allocation of capital more productive.

A major drawback of the First Year Capital Recovery System is that for several years it would have a large impact on the budget deficit because it "front loads" all deductions for an investment into the first year. 12/ If this proposal were phased in over a five-year period, however, its short-run cost would be less than that of the Simplified Cost Recovery System, but still would exceed the cost of indexing depreciation allowances (see Table 16). 13/ In the long run, the First Year System would produce revenue gains, while indexing and the Simplified Cost Recovery System both would continue to produce large losses, even after 10 years.

12/ Another disadvantage is that, because this proposal calls for repeal of the investment tax credit, it could discourage equipment investment in some cases.

13/ In response to a phase-in, however, businessmen might postpone some investment to take advantage of larger tax benefits.

TABLE 16. IMPACT ON TAX REVENUES OF ALTERNATIVE DEPRECIATION PROPOSALS (In billions of dollars)

Year	First Year Capital Recovery System		Senate Finance Committee (H.R. 5289)	Indexation a/
	No Phase-In	5-Year Phase-In		
1981	-35.6	-5.8	-10.1	0
1982	-25.9	-13.0	-23.0	-1.1
1983	-17.1	-17.5	-26.1	-3.0
1984	-9.2	-20.4	-26.3	-5.9
1985	-2.8	-24.7	-26.3	-10.4
1986	1.3	-14.2	-27.0	-13.7
1987	13.4	-4.3	-27.3	-18.4
1988	17.5	3.7	-27.8	-24.4
1989	24.0	11.2	-26.3	-31.6
1990	32.0	19.6	-30.3	-39.8

NOTE: Because these projections were prepared at different times and with slightly different assumptions in some cases, the figures should be regarded as general comparisons rather than exact estimates.

SOURCES: Jane G. Gravelle, The First Year Capital Recovery System: Revenue Estimates for Alternative Phase-In Schemes, Congressional Research Service (May 8, 1980), p. 7, Table 1; and Depreciation Policy Options, Congressional Research Service, Report No. 80-182E (October 10, 1980), Table 3.

a/ These estimates assume a prospective inflation rate of 8 percent.

CHAPTER IV. POLICIES TO IMPROVE LABOR QUALITY

Labor productivity is importantly affected by the rate of growth in the quantity of labor and changes in the quality of labor. An increase in the rate of growth in the labor supply tends to reduce productivity growth because it lowers the growth in the amount of capital available per hour or per worker. An improvement in the quality of labor--including skills, health, and work effort--tends to raise productivity. Barriers to skill development, such as discrimination or poverty, tend to lower productivity.

Several recent trends have had important effects on productivity growth. The especially rapid growth in labor supply beginning in the mid-1960s contributed significantly to the slowdown in productivity, although the labor force is expected to grow more slowly in the 1980s. In addition, several factors affected labor quality: The proportion of young and inexperienced workers increased, tending to reduce productivity. On the other hand, workers acquired more years of schooling and this tended to increase productivity (although there is considerable uncertainty as to the importance of this). Although some claim that productivity growth has been hurt by reduced work effort, there is not much quantitative evidence to suggest an erosion of work effort.

The potential role of federal government policy toward labor in increasing productivity appears to be somewhat limited, at least in the near term. In some areas where policy might play a role, such as higher education, development is already far advanced. Occupational training is very important, but here the policy levers are not very direct. The discussion that follows examines policy options that might make a moderate contribution to productivity growth. In sum, it suggests the usefulness of focusing budget resources on training and on helping workers to adjust to economic change. Also, the encouragement of new ways of organizing work and improved cooperation between labor and management might supplement more conventional measures to stimulate productivity.

This chapter is divided into four sections, each of which focuses on an aspect of labor in relation to productivity and considers some possible policy options. The first section reviews

changes in the quantity and demographic composition of labor. Other sections examine education and training; worker mobility and adaptation to economic change; and work effort and work effectiveness.

LABOR FORCE GROWTH AND DEMOGRAPHIC COMPOSITION

Impact on Productivity

Changes in the quantity as well as in the quality of the employed labor force influence the pace of productivity growth. If employment grows rapidly, the rate of growth in the amount of capital per worker tends to slow down, causing productivity growth to slow. In addition, since the official productivity data are not adjusted for quality changes in the labor force, an influx of inexperienced workers or workers with low productivity in general tends to slow measures of productivity growth. 1/

As shown in Table 17, the labor force grew at an increasing rate after 1965. 2/ Total hours worked in the private business sector grew markedly faster in the 1973-1978 period than in the period before 1965. In the future, however, labor force growth is expected to slow--a development that should help to increase productivity growth.

1/ This suggests a need to interpret productivity data with extreme caution. For example, if employment of low-productivity workers increases, this lowers the average productivity of workers. The denominator in calculating the official productivity measure is unadjusted for changes in the mix of employment.

2/ The labor force grew much more rapidly after 1965 because the postwar baby boom reached working age, and also because the labor force participation rates of youths and women increased more rapidly. One factor that may have contributed to increases in labor force participation rates is the productivity slowdown. Additional family members may have been prompted to seek work because of slower growth in real earnings of the primary earner.

TABLE 17. TRENDS IN THE CIVILIAN LABOR FORCE AND IN HOURS WORKED IN THE PRIVATE BUSINESS SECTOR (Average annual growth, in percent)

Period	Civilian Labor Force	Hours Worked in the Private Business Sector
Actual		
1947-1955	1.1	0.4
1955-1965	1.4	0.5
1965-1973	2.2	1.4
1973-1978	2.5	1.5
Projected a/		
1980-1985	1.7	b/
1985-1990	1.1	b/

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics.

a/ Intermediate level of projected growth in the labor force, as described in Paul D. Flaim and Howard N. Fullerton, Jr., "Labor Force Projections to 1990: Three Possible Paths," Monthly Labor Review (December 1978), pp. 25-35.

b/ The BLS projections of hours worked in the private business sector are not presented here because such projections are significantly affected by the business cycle and by numerous assumptions, some of which may no longer be appropriate.

Rapid increases in the number of inexperienced workers are thought to have contributed to the slowdown in productivity growth since 1965. In particular, youths between the ages of 16 and 24 increased from 21.5 percent of the labor force in 1970 to 24.3 percent in 1977 (see Table 18). In general, youths are less productive and earn lower wages than more experienced workers.

The female proportion of the labor force also has been increasing, but it is not clear what this means for productivity,

TABLE 18. LABOR FORCE DISTRIBUTION, BY SEX AND AGE, 1970-1990 (In percent)

Sex, Age	1970	1977	1985 a/	1990 a/
Men, ages 16 and over	61.9	59.0	55.8	54.6
16 to 24	11.7	13.2	11.0	9.3
25 to 54	38.7	36.7	37.0	38.4
55 and over	11.2	9.1	7.7	6.8
Women, ages 16 and over	38.1	41.0	44.2	45.5
16 to 24	9.8	11.1	10.6	9.4
25 to 54	22.0	24.3	28.7	31.6
55 and over	6.3	5.6	4.9	4.5

SOURCE: Flaim and Fullerton, "Labor Force Projections to 1990: Three Possible Paths," p. 31.

a/ U.S. Department of Labor, Bureau of Labor Statistics, "intermediate growth" projections.

particularly in the longer run. In earlier years, an influx of female workers probably had some depressing effect on productivity to the extent that they were less experienced than men. But the experience differential should diminish in the future. The share of youths in the labor force is expected to decline in the coming decade because the size of the population ages 16 to 24 will be falling. The share of women in the labor force is expected to continue to rise, although at a reduced rate compared with the 1965 to 1978 period.

The wage rates of women and youths are considerably below those of adult males. Some analysts assume that such differences in wage rates reflect differences in labor productivity based on experience. Also, to a significant extent, youth participation in the labor force is on a part-time basis. But the differences in wage rates may reflect labor market discrimination rather than differences in productivity, particularly in the case of women.

According to one study, changes in the age-sex composition of the employed labor force reduced total factor productivity growth

by an average of 0.4 percentage points from 1966 to 1973, and 0.2 percentage points from 1973 to 1978. Over the 1980 to 1990 period, this study projected that demographic shifts would have a slightly positive influence on productivity growth (0.1 percentage point annually). 3/

Policy Options

Government policies may have some limited effect on the growth and demographic composition of the labor force. Changes in immigration policies could have an impact on the growth and composition of the labor supply. 4/ Government tax and income transfer programs also affect the growth and composition of the labor force. For example, studies of labor supply suggest that lowering tax rates at the margin might increase the labor supply of married women. Transfer programs such as the welfare system and the Social Security system might be restructured to encourage more work. 5/ That would contribute to higher productivity broadly

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3/ John W. Kendrick, "Productivity Trends and the Recent Slowdown: Historical Perspective, Causal Factors, and Policy Options," in William Fellner, ed., Contemporary Economic Problems (American Enterprise Institute, 1979), p. 33.

4/ Census Bureau data suggest that legal net immigration accounted for approximately one-fifth of total population growth during the late 1970s. The contribution of illegal immigration to population and labor force growth is unknown, but probably not insignificant. See U.S. Bureau of the Census, Projections of the Population of the United States: 1977 to 2050, Current Population Reports, Series P-25, No. 704 (1977), p. 22.

5/ Several features of the Social Security system may diminish the quality mix of the labor force by encouraging early retirement of skilled workers. First, earnings before retirement are subject to both income and Social Security taxes, but Social Security benefits are not taxed. Second, persons receiving Social Security retirement benefits may be discouraged from working because their net (after tax and after transfer) wage may be quite low. Third, the particular way that the Social Security system is indexed for inflation encourages early retirement, when the Consumer Price Index rises more rapidly than average wage rates.