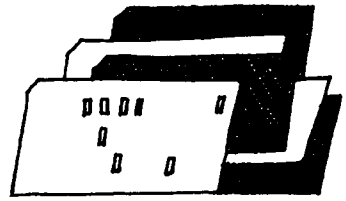
Research Summaries



Hours at work increase relative to hours paid

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The ratio of hours at work to hours paid in nonagricultural establishments increased slightly in 1983, according to the latest Bureau of Labor Statistics' survey of hours at work completed for production and nonsupervisory workers. (See table 1.) Output per hour (labor productivity) of all persons in nonfarm businesses increased 3.5 percent during 1983 based on hours paid.[1] When this measure is adjusted for the change in the ratio of hours at work to hours paid, it shows an annual increase of 3.1 percent.[2]

Initiated by BLS in 1982, the Hours at Work Study now contains annual and quarterly data for the 1981–83 period. The ratio of hours at work to hours paid measures the time workers are actually on the job site or at the workplace compared with the hours for which they are paid. Paid hours include the paid leave time employees use: this comprises vacation time, sick leave, holidays, and other personal leave. Hours at work include rest periods and coffee breaks. For workers who received, say, 2 weeks of paid vacation, no paid sick leave, and 10 paid holidays the hours at work to hours paid ratio would be .923.

The purpose of the survey is to compare differences in the trends and cyclical movements of total hours of labor input based on both an *hours at work* definition and an *hours paid* definition. The hours at work definition is more appropriate for measuring labor input as a factor of production and hence, more appropriate for inclusion in a measure of productivity change. On the one hand, the hours at work definition is often inaccurate if the data are collected based on a survey week (as in the case of the measures from the Current Establishment Statistics (CES) Survey), because holidays and other paid leave time may not be evenly distributed over the month. Hours paid measures, on the other hand, which are not as sensitive to the survey week, provide more consistent measures when the data are collected in this manner.

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Nonagricultural establishments

During 1983, the ratio of hours at work to hours paid in nonagricultural establishments increased from .926 to .930 (table 1). This increase reflects two different effects. One is the increase in overall employment (from 68.9 million in 1982 to 69.4 million in 1983) which generally means a larger proportion of junior employees who do not receive as much paid leave time.[3] Consequently, the average hours at work as a percent of all hours paid per employee rose.

The other effect—what is called a composition change—resulted from employment increasing faster in those industries which have higher than average ratios of hours at work to hours paid. From 1982 to 1983 there was a shift from employment in manufacturing to nonmanufacturing. In manufacturing, which has a ratio of .914, employment actually decreased in 1983 by about 300,000 workers, while for nonmanufacturing industries, with a ratio of .936, employment increased by about 800,000 workers.

Table 2 presents the quarterly changes in the ratio of hours at work to hours paid. While these ratios are of interest with respect to productivity measures, quarter-to-quarter changes are highly sensitive to seasonal patterns and therefore require seasonal adjustment. At present, as there are only 3 years of data, it is not possible to compute seasonal factors for the ratios.

Manufacturing

In manufacturing establishments, the ratio of hours at work to hours paid increased from .909 in 1982 to .914 in 1983. However, the 1981 level was .912; thus, the 1983 level was only slightly higher than the pre-1982 recession level. There was a similar pattern for both durable and nondurable manufacturing establishments. In durable manufacturing establishments, the ratio was .905 in 1982 and .911 in 1983; it was .907 in 1981. In nondurable manufacturing establishments, the 1983 ratio was .918, compared with .916 in 1982; it was .920 in 1981.

The largest absolute increase in the ratio of hours at work to hours paid among manufacturing industries in 1983 occurred in primary metals, which rose from .879 to .901. The largest absolute decrease was in instruments, which declined from .904 to .886. Of the 29 industry divisions in the survey, 11 experienced decreases in the ratio of hours

Table 1. Ratio of hours at work to hours paid for production and nonsupervisory employees, by industry, 1981–83

Industry	1981	1982	1981–82 change	1983	1982–83 change
Nonagricultural business	.924	.926	.002	.930	.004
Mining	.937	.925	−.012	.916	−.009
Construction	.978	.982	.004	.980	−.002
Manufacturing	.912	.909	−.003	.914	.005
Durable	.907	.905	−.002	.911	.006
Lumber	.935	.929	−.006	.944	.015
Furniture and fixtures	.941	.931	−.010	.936	.005
Stone, clay, glass	.906	.903	−.003	.910	.007
Primary metals	.891	.879	−.012	.901	.022
Fabricated metals	.919	.912	−.007	.919	.007
Machinery (except electrical)	.900	.906	.006	.902	−.004
Electrical equipment	.906	.899	−.007	.909	.010
Transportation equipment	.893	.898	.005	.908	.010
Instruments	.907	.904	−.003	.886	−.018
Miscellaneous manufacturing	.927	.921	−.006	.919	−.002
Nondurable	.920	.916	−.004	.918	.002
Food and kindred products	.927	.924	−.003	.921	−.003
Tobacco	.892	.853	−.039	.865	.012
Textile mills	.943	.937	−.006	.944	.007
Apparel	.948	.939	−.009	.937	−.002
Paper	.883	.890	.007	.897	.007
Printing and publishing	.905	.915	.010	.919	.004
Chemical	.895	.882	−.013	.886	.004
Petroleum and coal products	.899	.892	−.007	.878	−.014
Rubber and plastic products	.918	.906	−.012	.916	.010
Leather	.931	.930	−.001	.936	.006
Transportation	.875	.871	−.004	.879	.008
Communications	.887	.883	−.004	.881	−.002
Electric, gas, water	.876	.873	−.003	.882	.009
Wholesale trade	.934	.936	.002	.928	−.008
Retail trade	.947	.959	.012	.960	.001
Finance, insurance, real estate	.914	.905	−.009	.901	−.004
Services	.920	.936	.016	.948	.012

Table 2. Ratio of hours at work to hours paid for production and nonsupervisory workers, by quarter and industry, 1982 and 1983

Industry	1982				1983				Change, 1982–83			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
Nonagricultural business	.941	.930	.908	.921	.944	.934	.914	.927	.003	.004	.006	.006
Mining	.947	.919	.904	.923	.933	.905	.911	.913	−.014	−.014	.007	−.010
Construction	.989	.990	.981	.981	.983	.982	.976	.979	−.006	−.008	−.005	−.002
Manufacturing	.934	.912	.888	.900	.936	.919	.898	.908	.002	.007	.010	.008
Durable	.929	.907	.880	.896	.932	.914	.894	.906	.003	.007	.014	.010
Lumber	.955	.931	.914	.928	.957	.936	.937	.940	.002	.005	.023	.012
Furniture and fixtures	.957	.930	.914	.921	.957	.940	.920	.929	.0	.010	.006	.008
Stone, clay, glass	.924	.899	.881	.894	.925	.911	.905	.899	.001	.012	.024	.005
Primary metals	.906	.875	.852	.864	.904	.906	.884	.909	−.002	.031	.032	.045
Fabricated metals	.942	.904	.893	.908	.942	.927	.904	.909	.000	.023	.011	.001
Machinery (except electrical)	.936	.924	.861	.894	.930	.905	.877	.904	−.006	−.019	.016	.010
Electrical equipment	.918	.900	.872	.892	.937	.912	.883	.902	.019	.012	.011	.010
Transportation equipment	.915	.896	.890	.886	.930	.909	.904	.893	.015	.013	.014	.007
Instruments	.928	.918	.867	.894	.908	.904	.870	.890	−.020	−.014	.003	−.004
Miscellaneous manufacturing	.949	.916	.896	.920	.950	.931	.883	.914	.001	.015	−.013	−.006
Nondurable	.941	.920	.900	.904	.941	.924	.904	.912	.0	.004	.004	.008
Food and kindred products	.940	.927	.918	.905	.944	.932	.919	.919	.004	.005	.001	.014
Tobacco	.933	.832	.844	.818	.931	.836	.873	.824	−.002	.004	.029	.006
Textile mills	.967	.936	.918	.929	.970	.948	.922	.937	.003	.012	.004	.008
Apparel	.970	.956	.920	.932	.955	.952	.915	.925	−.015	−.004	−.005	−.007
Paper	.921	.892	.867	.878	.924	.892	.880	.895	.003	.0	.013	.017
Printing and publishing	.938	.924	.901	.906	.938	.930	.904	.913	.0	.006	.003	.007
Chemicals	.907	.881	.862	.877	.910	.888	.870	.880	.003	.007	.008	.003
Petroleum and coal products	.905	.901	.884	.871	.894	.882	.866	.869	−.011	−.019	−.018	−.002
Rubber and plastic products	.937	.909	.886	.888	.941	.916	.898	.913	.004	.007	.012	.025
Leather	.959	.928	.907	.927	.966	.940	.918	.921	.007	.012	.011	−.006
Transportation	.861	.847	.839	.846	.891	.876	.859	.870	.030	.029	.020	.024
Communications	.888	.885	.858	.864	.904	.896	.864	.881	.016	.011	.006	.017
Electric, gas, water	.893	.889	.860	.852	.899	.893	.870	.867	.006	.004	.010	.015
Wholesale trade	.959	.944	.922	.931	.938	.935	.915	.918	−.021	−.009	−.007	−.013
Retail trade	.974	.967	.951	.966	.969	.961	.940	.965	−.005	−.006	−.011	−.001
Finance, insurance, real estate	.915	.910	.870	.901	.926	.913	.869	.898	.011	.003	−.001	−.003
Services	.947	.941	.915	.931	.956	.952	.935	.944	.009	.011	.020	.013

Table 3. Output per hour for nonfarm business and manufacturing based on hours paid and hours at work, 1983[1]

Industry	Percent change from same quarter a year ago								Percent change	
	I		II		III		IV		1982–83	
	Hours paid	Hours at work	Hours paid	Hours at work	Hours paid	Hours at work	Hours paid	Hours at work	Hours paid	Hours at work
Nonfarm business	1.8	1.5	4.3	3.8	3.9	3.2	3.9	3.3	3.5	3.1
Manufacturing	3.4	3.2	4.3	3.6	4.3	3.2	4.9	4.0	4.3	3.8
Durable	4.7	4.4	5.7	4.9	5.5	3.8	6.1	5.1	5.6	4.9
Nondurable	1.4	1.5	2.2	1.8	2.7	2.3	3.3	2.4	2.4	2.1

[1]Changes in ratio of hours at work to hours paid are based on survey of production and nonsupervisory employees. Adjustment is applied to all the hours of all persons which includes supervisors, nonproduction workers, and proprietors.

of work to hours paid; 18 had increases between 1982 and 1983 as opposed to 21 decreases and 8 increases from 1981 to 1982. Again these changes mostly reflect the cyclical nature of different industries caused by employers responding to the changing economic conditions.

Productivity measures

As previously noted, the annual change in output per hour (labor productivity) in nonfarm business between 1982 and 1983 was 3.5 percent by using the hours paid method and 3.3 percent based on hours at work. (See table 3.) Similarly, for manufacturing, productivity based on hours paid increased 4.3 percent from 1982 to 1983; after adjusting for the change in hours at work to hours paid, the increase in output per hour at work was 3.8 percent. These comparisons indicate that seemingly small changes in the ratio translate into significant adjustments in productivity growth rates.

As mentioned earlier, it is not possible to adjust quarterly changes in output per hour for the changes in the ratio of hours at work to hours paid because there are no seasonal factors presently available. However, changes from the same quarter a year ago will not be affected by seasonal fluctuations unless there is a change in seasonal patterns. Table 3 shows there are differences between output per hour based on hours paid and hours at work compared with the same quarter a year ago. This is so for nonfarm business, total manufacturing, and durable and nondurable goods manufacturing. The largest percent changes were generally in the third quarter and the smallest were in the first quarter. The largest single quarterly difference was for durable manufacturing in the third quarter of 1983, when the hours at work labor productivity measure was 1.7 percentage points lower than the hours paid measure. The smallest difference was for nondurable manufacturing in the first quarter. □

FOOTNOTES

[1]The difference between nonfarm and nonagricultural establishments is that the latter does not include agricultural services.

[2]The adjustment to the BLS measure of multifactor productivity would be smaller. The annual growth rate in multifactor productivity resulting from the change in the ratio of hours at work to hours paid is equal to the percentage share of labor compensation in output (about 65 percent) times the change in the ratio.

[3]Similarly, during a recession junior employees are usually the first to be laid off and consequently the ratio of hours at work to hours paid goes up. See Kent Kunze "A new BLS survey measures the ratio of hours worked to hours paid," *Monthly Labor Review*, June 1984, pp. 3–7.

Occupational earnings and benefits in making nonelectrical machinery

Occupational earnings in nonelectrical machinery manufacturing industries varied considerably among 23 metropolitan areas surveyed by the Bureau of Labor Statistics in November 1983.[1] This was due, in part, to the diversity of skills required to manufacture a variety of products, ranging from hedge trimmers and meat grinders to large, complex engines, turbines, construction equipment, and oil drilling rigs. Occupations selected as representative of production jobs in these industries accounted for one-half of the 252,900 production and related workers covered by the study.

Among the jobs surveyed, tool and die makers usually had the highest hourly earnings in an area. Average pay in this occupation ranged from $10.40 an hour in Atlanta to $14.38 in Los Angeles–Long Beach, but typically was between $11 and $13 an hour. In 6 of the 11 areas that could be compared, workers producing tools and dies for internal use (those employed in other than jobbing shops) averaged more than workers producing tools and dies for sale (those employed in jobbing shops). The differential was usually 5 percent or less.

Machine-tool operators on production work were the largest occupational group studied. They performed their work on conventional equipment or numerically controlled (N/C) machines, which use coded instructions to direct the machine through a sequence of operations. Conventional operators were classified into three groups for wage study purposes. Operators who set up their own machines and perform a variety of operations to close tolerances (class A) averaged from $8.39 per hour in Atlanta to $13.24 in San Francisco–Oakland. Average earnings for the intermediate group of operators (class B) ranged from $7.31 in Atlanta to $11.37 in Milwaukee; and for operators who do routine and repetitive work but do not set up machines (class C),