THE EMPLOYMENT SITUATION

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before the

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THE DECEMBER EMPLOYMENT SITUATION
Friday, January 10, 1997

CONGRESS OF THE UNITED STATES,
JOINT ECONOMIC COMMITTEE,
WASHINGTON, D.C.

The Committee met, pursuant to notice, at 9:30 a.m., in Room 1334, Longworth House Office Building, the Honorable Jim Saxton, Chairman of the Committee, presiding.

Present: Representatives Saxton, Hinchey, and Maloney, and Senator Robb.

Staff Present: Christopher Frenze, Juanita Morgan, Mary Hewitt, Meredith Aber, Andrew Quinlan, Bill Spriggs, Roni Singleton, and Amy Pardo.

OPENING STATEMENT OF REPRESENTATIVE JIM SAXTON, CHAIRMAN

Representative Saxton. Good morning. It is a pleasure to be here this morning and to be able to welcome Commissioner Abraham before the Joint Economic Committee (JEC) once again. The Bureau of Labor Statistics (BLS) is one of the most objective, professional, and respected statistical agencies, I was going to say in the country, but I think I want to say in the world.

I want to thank the BLS for maintaining its high standards of objectivity and for its assistance in the work of this Committee over the years I have been here and, of course, many years before that. We have forged a great relationship that will continue to be strengthened this year and in the years ahead.

I am pleased to announce that yesterday the Speaker of the House designated me as the Chairman of the Joint Economic Committee for the 105th Congress, the first Republican House Member to hold this position in over 40 years. It is a responsibility I take very seriously and look forward to working with the Joint Economic Committee Members from both sides of the aisle over the next two years. I am confident that together with the Ranking Minority Member, Senator Bingaman, we will be able to move the Committee forward.

I would like to welcome Mrs. Maloney and Senator Robb here this morning as well, and I would like to say that I am hopeful that other Members will be appearing as we move through this hearing.

The employment-data relation this morning shows that the unemployment rate was unchanged, while payroll employment posted a solid increase of 262,000. The December payroll employment increase should be viewed in the context of a very modest rise in the previous month. Despite an increase in employment for the month of December, manufacturing employment over the 12 months of 1996 actually declined by 94,000.

Turning to another issue among the important economic statistics provided by the BLS is the Consumer Price Index (CPI). The CPI is a fairly old statistic. In fact, I am told that it was first adopted during World War I in order to provide for salary increases among workers in Naval shipyards. A committee headed by George Stigler reported to the JEC, in 1961, its findings on issues related to the Index involving substitution, quality changes, updating market baskets, treatment of new products and other issues.

More recently, the Boskin Commission report reviewed many of the same issues, and this report sparked considerable controversy. I think it is fair to say that there is a consensus that, although the CPI may overstate inflation, the extent of this overstatement is at least debatable. It is also worthwhile to note that Congress rightly or wrongly chose to index a variety of Federal benefits and tax provisions after the Stigler Committee issued its report in 1961.

There would seem to be ample reason for Congress to examine this issue carefully before making any hasty decisions with regard to it. After all, the policy decisions made with regard to the CPI would affect many millions of Americans over time.

According to the recent JEC analysis, which we published late last year, about 40 percent of the direct effects of the legislated reductions in the CPI would comprise tax increases on a variety of middle class taxpayers, while the remainder, 60 percent, would fall on entitlement beneficiaries. Congress should consider whether this mix of policy and deficit reduction achieves the desired results in the best way.

Finally, I would like to say that I look forward to working with my Joint Economic Committee colleagues on both sides of the aisle and with officials from the BLS and other agencies over the next two years.

At this time I would like to invite any other opening statements. [The prepared statement of Representative Saxton appears in the Submissions for the Record.]

OPENING STATEMENT OF
REPRESENTATIVE CAROLYN MALONEY

Representative Maloney. Thank you very much, Mr. Chairman. I congratulate you on your employment hearing and I look forward to working with you and the other Members of the Committee in a bipartisan spirit.

Since the last meeting of this Committee, the economy has continued to grow stronger. An expanded economy is the best way to offer opportunities to America's citizens. *The Wall Street Journal* just completed its closely followed "Semiannual Look Ahead" and its survey of "57 Prominent Economists." The consensus is for another year of, and I quote: "An expanding economy with low inflation."

Today, we will receive job growth numbers for the month of December. We already know that our economy grew at, roughly, over 2 percent rate for the past year. This expanding economy has already produced over 10 million new jobs, held unemployment down between 5.2 and 5.6 percent, and kept inflation low, averaging 3.6 percent in 1996.

This strong growth is reflected in many ways, new business and corporations are running at record highs, the highest level since World War II; job-creating exports have increased by one-third; mortgage rates are at their lowest levels in 30 years; and the level of home ownership is at a 15-year high.

Alan Greenspan has consistently cited President Clinton's 1993 deficit package as, and I quote, "an unquestioned factor in contributing to the improvement in economic activity that occurred thereafter," unquote. The lower deficit and fiscal discipline has helped to lower inflation, create new jobs and higher wages.

In this month's Bureau of Labor Statistics' report, they reported record adult female employment at 57.3 percent, the highest female employment-to-population ratios ever. Another significant accomplishment is a record low black-adult unemployment level, we have had 31 straight months of below 10 percent since June of 1994.

I am pleased that in the last Congress we passed two bills that will make a difference to millions and millions of Americans. The Kennedy-Kassenbaum bill will give millions of Americans access to health care, and the minimum wage bill not only increases the minimum wage, but also helps small businesses invest more in their businesses that helps both the employers and their employees.

I look forward to this new Congress for expanding opportunities for millions of American and hopefully an expanding economy.

I thank you.

I yield back my time.

Representative Saxton. Senator Robb.

OPENING STATEMENT OF SENATOR CHARLES ROBB

Senator Robb. Mr. Chairman, I thank you. I welcome your opening statement as well as your chairmanship of this Committee during the next Congress.

I am here at the request of the new Ranking Member, Senator Jeff Bingaman, who was unable to be in Washington today. He asked me if I could sit in for him, and I am very happy to do that.

I won't repeat all the statistics that Congresswoman Maloney just reiterated, but I think it is important that the report remains positive, and I hope that that will continue, and I have a couple of questions, particularly as it relates to CPI, but I will wait until the appropriate point in the program.

I look forward to working with you.

Representative Saxton. Thank you.

We will turn to Dr. Abraham's comments.

STATEMENT OF THE
HONORABLE KATHARINE G. ABRAHAM, COMMISSIONER, BUREAU OF LABOR STATISTICS
ACCOMPANIED BY KENNETH V. DALTON, ASSOCIATE COMMISSIONER FOR PRICES AND LIVING CONDITIONS; AND PHIL RONES, CHIEF, DIVISION OF FORCE LABOR STATISTICS

Ms. Abraham. Thank you, Mr. Chairman and Members of the Committee. I appreciate the opportunity to be here this morning and comment on the labor market data we have to release.

Nonfarm payroll employment increased by 262,000 in December, with the gains widespread across the major industries. Average hourly earnings rose six cents over the month, following a nine-cent gain in November. The unemployment rate was unchanged in December at 5.3 percent.

The services industry added 112,000 jobs in December; between May and November, monthly job growth in services averaged 81,000. Health services added 16,000 jobs; and computer and data processing services, which grew by a robust 11 percent over the year, added 15,000 jobs.

In amusement and recreation services, employment was up by 12,000 in December and by 87,000 through the year as a whole. Employment in help supply services increased by 12,000 in December, following a decline of 30,000 in November and little change in September and October. Even with this recent weakness, this industry, help supply, was one of the largest job gainers over the year.

Retail trade employment increased by 48,000 in December. This increase was about the same as the average monthly gain for all of 1996, although month-to-month changes were erratic during the year. This volatility was, to a large degree, tied to swings in employment in eating and drinking places.

Employment in miscellaneous retail establishments, such as drugstores, gift shops, and catalog retailers, rose by 15,000 in December; job gains in this diverse industry have totaled 77,000 since May. Jobs were added over the month both in furniture and home furnishings stores and in building and garden supply stores. These industries were among the fastest growing in 1996.

Turning to the goods-producing sector, the construction industry added 23,000 jobs for the second straight month in December, boosted in part by milder-than-usual weather across most of the country. Employment in construction was strong in 1996, rising by 287,000, more than two and one-half times the 1995 increase.

Manufacturing added 19,000 jobs in December, following no change in November and a gain of 13,000 in October. Despite this modest resurgence, the industry ended 1996 with, as you noted, 94,000 fewer jobs than at year-end 1995. The over-the-year declines were concentrated in three nondurable goods industries: Apparel, which lost 61,000 jobs; food products, which lost 22,000; and textiles, which lost 22,000.

In durable goods manufacturing, employment in aircraft and parts increased by 5,000 in December and has risen by 28,000 since June. Instruments and related products also experienced job gains over the month. Employment in electronic equipment declined by 4,000 in December. This industry has lost 14,000 jobs since its most recent peak in July, after being one of the few manufacturing industries to experience steady job growth during 1995 and early 1996.

Government employment increased by 31,000 in December, even as declines in employment continued at the Federal level. Most of the seasonally-adjusted increase in December resulted from the change in employment pattern for election workers this year; fewer than normal were reported on payrolls in November, so fewer were subsequently let go.

Average hourly earnings of production or nonsupervisory workers in the private sector rose six cents in December, reaching $12.05 per hour. This follows an even larger gain of nine cents per hour in November. Over the year, average hourly earnings rose by 44 cents, or 3.8 percent. This compares with increases of 3.2 percent in 1995 and 2.7 percent in 1994.

Average weekly hours of production or nonsupervisory workers rose one-third hour in December to 34.8 hours. Month-to-month changes in weekly hours have varied widely in 1996. Average hours in manufacturing also rose one-third hours in December, reaching 42.0 hours. Factory overtime rose .2 to 4.7 hours. In 1996, these factory workweek measures recouped most of the losses they had sustained in 1995 and have returned to near-record levels.

Turning now to our survey of households, the unemployment rate was unchanged in December at 5.3 percent. Unemployment rates for the major demographic groups showed little or no change. The total civilian employment level also was little changed over the month, although it increased by 2.8 million over the year. The number of persons at work part time for economic reasons increased by 355,000 in December, reversing a similar decline in November.

Before concluding, I should perhaps note that this is the month in which we update our seasonal adjustment factors and make annual revisions to previously published seasonally adjusted household survey estimates to reflect an additional year's information on seasonal

variations in labor market activity. All the seasonally adjusted data in today's news reflect these revisions.

In summary, nonfarm payroll employment continued to expand in December, and unemployment was unchanged. Average hourly earnings showed a sizeable increase for the second straight month. For all of 1996, payroll employment rose by 2.6 million, compared with an increase of 2.2 million in 1995. The unemployment rate edged down somewhat in the second half of 1996 and, at 5.3 percent, was three-tenths of a percentage point lower in December than it had been a year earlier.

My colleagues, Mr. Dalton, who is the Associate Commissioner for Prices and Living Conditions, and Phil Rones, who is the Chief of our Division of Labor Force Statistics, and I, of course, will be happy to answer any questions you might wish to depose.

[The prepared statement of Commissioner Abraham appears in the Submissions for the Record.]

Representative Saxton. Thank you very much.

I am curious. There seems to be a mixed bag here as we compare December numbers with annual numbers. I believe that you said manufacturing jobs actually decreased 94,000 for the year 1996? Is that correct?

Ms. Abraham. That is correct.

Representative Saxton. And if manufacturing jobs decreased and the unemployment rate remained relatively steady throughout the year, then it would mean that job increases that occurred must have occurred in other sectors of the economy Is that correct?

Ms. Abraham. It is correct that we saw declines in manufacturing employment that were more than offset by increases elsewhere in the economy.

Representative Saxton. This would be in the service sector, basically?

Ms. Abraham. Well, there were sizeable increases in, as I noted, construction employment over the year; construction employment was up by 287,000. But taking a look down at where are the biggest increases in employment, looking from December of 1995 to December of 1996, the biggest gainers in absolute terms, in addition to special trade contractors, which is the biggest hunk of construction, business services grew by 363,000; help services were a big gainer with 265,000; local government education was up; engineering and management services

was up; eating and drinking places were up. So those are the six largest gainers in terms of, roughly, our two-digit industries, all of which added more than 100,000 jobs over the year.

Representative Saxton. Dr. Abraham, what proportion of job growth was in the service-producing sector?

Ms. Abraham. I don't know if that is a figure that I have readily at hand.

Representative Saxton. Let me ask this while you are looking for those numbers. The discussion about job growth over the last several years has included a discussion about part-time employment, and that more and more people appear for economic reasons — as you, I believe, suggested in your statement — more and more people find it necessary or advantageous to have more than a single job.

The numbers that you recited earlier relating to job growth for the month of December, obviously, take into account those part-time jobs. How are part-time jobs calculated and reported in your statement?

In other words, if a person has gained a second job or even a third job, are those numbers reported as part of the job growth numbers?

Ms. Abraham. Just to answer the question you had posed previously, 93 percent of the job growth over the year occurred in the service-producing sector.

But with respect to the question you have just posed, we, as you know, have two different surveys, the household survey and the payroll employment survey. When we talk about job growth and look at how the number of jobs added on net is broken out by industry and so on, we are referring to data from the payroll survey, which we think are the best for tracking that. Those are jobs, not employed people. So if there is a person who holds two separate jobs, that would get counted twice in the payroll survey.

We have from the household survey a little bit of information on what has happened to the proportion of the work force that holds more than one job; that currently stands at 6.4 percent of employed persons who hold more than one job. That may be two part-time jobs, it may be a full-time job and a part-time job, in a few cases it is even two full-time jobs. That compared to 6.2 percent a year earlier.

Representative Saxton. So for the current year the percentage was—

Ms. Abraham. Well, for December of 1996, it was 6.4 percent. The annual average figure we could calculate.

Representative Saxton. Let me just ask, can you reach a conclusion on any kind of a trend that is occurring with regard to multiple jobs?

Ms. Abraham. This is something that we used to ask about only at relatively infrequent intervals. Beginning in January of 1994, we started asking about this every month, so that is the only period over which we have continuous data. The numbers are—have been—a little bit higher over the past quarter than they were in the prior two years.

Over the past quarter, October, November, and December, the proportion of the work force holding more than one job has averaged 6.5 percent, compared with an average of 6.2 percent for the last quarter of 1995 and an average of slightly over 6 percent in the last quarter of 1994. These numbers are also a little bit higher than numbers we observed during the late 1970s, for example, when the figure, if I am remembering it correctly, was more like 5 percent. I can get you the exact figure, I don't have it. (The Bureau of Labor Statistics response: In 1977, the rate was 5.0 percent, in 1978, 4.8 percent, and in 1979, 4.9 percent.)

Representative Saxton. Okay, thank you.

Let me just ask a question about the Consumer Price Index. The Boskin report made a rather startling suggestion, and that was, of course, that we somehow regulate a reduction to the Consumer Price Index. Would you comment on the practical effects of that?

First let me ask you, does the Bureau of Labor Statistics compute the CPI?

Ms. Abraham. That is correct. We have had that responsibility for some time.

Representative Saxton. Now, it is the Congress, however, which has chosen to use the CPI for a variety of purposes. Is that correct?

Ms. Abraham. Absolutely. Our job, as you well know, is to provide information, and it is the prerogative and responsibility of the Congress to determine whether and how to use it.

Representative Saxton. The Congress has chosen to adopt the CPI as an instrument to adjust such things as taxes and benefits.

Ms. Abraham. That is correct. We actually produce, at this point, two separate CPIs, one for the all urban consumers population and one for urban wage and clerical workers, and both of those are used.

The Boskin report, as I understand it, has suggested, then, that Congress use its prerogative to adjust the CPI for purposes of adjusting a variety of Federal programs?

Ms. Abraham. The Boskin report has done a number of things: The report contains a set of recommendations for us with regard to ways that we might improve the measure that we are producing, which we of course are taking a very careful look at. The report also does suggest that the Congress may wish to look at this.

Representative Saxton. As—

Ms. Abraham. As to how the measure is used.

Representative Saxton. Has Congress historically—or maybe that is not the right word—has Congress from time to time made legislative adjustments in the CPI itself or the method that you use to compute the CPI?

Ms. Abraham. No. I am very happy to say that Congress has not done that. The production of that statistic is and has always been viewed as a technical matter, and I am confident that will continue.

Representative Saxton. Now, if Congress adopted the suggestions or the recommendations in the Boskin report, we would then be treading on new territory that we have not entered upon before?

Ms. Abraham. Well, yes and no, I think. It has always been, as I indicated, Congress' responsibility to decide whether and how statistics that we and other statistical agencies produce are going to be used, and so in that sense, deciding that the statistic would be used one way rather than another, would not be breaking new ground. I do not know of any cases in which Congress has previously decided to index something to the CPI minus X.

Do you know of any such case?

Mr. Dalton. No, I don't. I know that at various times there have been, for example, in Civil Service Retirement at one time there was a stipulation that prices had to go up by at least 3 percent before any adjustment was made. Though Congress has, in various legislation, used different escalators, not necessarily fully proportional ones.

Representative Saxton. The Boskin report suggests that the CPI is overstated somewhere between .007 of a percent and one point—what was the higher number?

Ms. Abraham. I believe it was 1.6 percent.

Representative Saxton. Somewhere between .007 of a percent and 1.6; .007 to 2 percent, I am told, in the interim report? So there is some question about what the real number is, if there is in fact an overstatement within what that real number is.

Ms. Abraham. The report indicated that there was some range of uncertainty in the Commission members' minds.

Representative Saxton. Do you know, then, why or how the recommendation was made that the reduction ought to be 1.1 percent.

Ms. Abraham. The 1.1 percent, as I understand it, was what the Commission members, in their best judgment, believed was the most likely number. Actually, that statement is not quite accurate. I think the Commission members would say that they believe that that is still a conservative number. I am not the best person to speak for the Commission.

Representative Saxton. Well, let me ask Mr. Dalton.

Obviously, you are very intimately involved in CPI matters. Can you suggest to us, or give us a couple of examples? If we were to move forward and adopt the Boskin recommendation, tell us, and I know that this has been discussed in other quarters, but tell us, in your best judgement, what effect it would have on Social Security and what effect it might have on our Federal tax policy?

Mr. Dalton. No, I don't think I could answer that specific question. I would like to point out, though, that I believe the Boskin Commission has not made a specific recommendation about how much Congress ought to either change the Social Security escalator provision or change the CPI. I think that is accurate, so they have said that there are some overestimation issues that can be reliably estimated, more or less reliably, and that there are several issues, principally having to do with changes in quality and new goods, that very little is known about, and that their estimates are essentially informed conjecture, and they are not recommending either to the Congress or to the BLS that we take that estimate as an objective assessment of what the overestimate might be.

Representative Saxton. You certainly agree that would have an effect on a variety of Federal programs in the form of tax increases or benefit reductions, if we were to proceed?

Mr. Dalton. Well, yes, in the following way: We know, for example, and I believe it is based upon the CBO study, that a 1 percent change in the CPI triggers about $8 billion worth of either tax reductions

or spending increases. So clearly changing the CPI has very large fiscal impacts, or changing the way the CPI is used would have very large fiscal impacts.

Representative Saxton. And, of course, Congress would have the prerogative of adopting a variety of changes in a variety of Federal laws; certainly Congress wouldn't have to have an across-the-board change in the CPI. We could, if we chose, adopt a variety of changes in specific Federal programs that use the CPI. Is that correct?

Ms. Abraham. Sure. As I was trying to say earlier, Congress is free to use the information that we are providing in whatever way Congress deems appropriate.

I might add, if Members of the Committee would be interested, we have brought some packages of information detailing in a somewhat more technical fashion our reaction to the Boskin Commission's report and some related materials which I would be happy to produce.

Representative Saxton. So you have produced an internal analysis of the Boskin report. Is that correct?

Ms. Abraham. We are still looking at some of the recommendations. It is a long document, 100 pages long, so there are things we are still continuing --

Representative Saxton. Is that part of the package you just made reference to?

Ms. Abraham. The report itself?

Representative Saxton. No, your analysis of the report.

Ms. Abraham. Yes, our analysis, our initial reaction to the report with respect to its most immediate recommendations are contained in this package.

Representative Saxton. That is fine. If you would leave that with us, we would like to make that part of the record.

[BLS material related to Boskin's report appears in Submissions for the Record.]

Ms. Abraham. Great.

Representative Saxton. Thank you very much.

Mrs. Maloney.

Representative Maloney. I would like to defer to the senior Senator from the great State of Virginia.

Senator Robb. I thank Congresswoman Maloney for deferring to the senior Senator from the great State of Virginia. He is not here.

But I would be pleased to follow up, if I may, Mr. Chairman, particularly on the question of the CPI.

Many of the other statistics that are released are of interest to numbers crunchers, but the CPI has a direct impact on many citizens and many programs, particularly as Congress chooses to use that Index to adjust programs that are within the purview of Congress and I think you have accurately stated that point.

Maybe it would be helpful just to state what the CPI is intended to reflect. I think most end-users or consumers believe that it is an attempt to figure out what the cost of living, or the change in the buying power of the consumer would be, as brought about by all the various changes in the prices of individual goods and services, measured by a market basket of products. I think most Members of Congress interpret this to mean that in order to give the consumer the same degree of buying power, how much additional resources would the consumer need to keep some essential parity.

Now, maybe just at the outset, Dr. Abraham, you might want to comment on what the CPI is intended to be and what in the judgment, at least of the Bureau of Labor Statistics, it is useful to use it for, as a threshold question?

Ms. Abraham. Okay, let me try to answer that question briefly, without getting bogged down too much in the way of technical detail.

The CPI, as you indicated, is a measure that tracks the cost of purchasing a fixed market basket of goods and services. Maybe I should say a little bit about what our objective here is, or rather what the principles that guide us in producing this measure are; clearly, the CPI is used in a lot of contexts as a proxy for the change in the cost of living.

What is happening to the price of purchasing a fixed market basket of goods and services is not quite the same thing as what is happening to the cost-of-living. One reason for that is that when the relative prices of different kinds of things change, if the price of one thing goes up and the price of another thing goes down, people adjust their consumption habits accordingly.

Senator Robb. Dr. Abraham, I would ask you to explain that, because it is one of the contentions of the Boskin Commission that the CPI does not adequately reflect substitution, where a particular product happens to increase in price to the point where a substitute is sought for it, that somehow the CPI doesn't adequately reflect that change.

Would you give us some indication of how the current CPI, or current Index is adjusted to reflect that change and how you might differ from the Boskin Commission's suggestion that it does not adequately reflect the substitution?

Ms. Abraham. Actually, on that point, I would agree with the Boskin Commission, that if what you want is a measure of the change in the cost of living, and if you knew how to do it and had a technically feasible way of producing it, that you would want a measure that took account of the kinds of substitution in their consumption bundle that consumers make in response to relative prices changing.

Senator Robb. Well, how about with respect to the other principle suggestion made in the Boskin Commission report, that when a price of a particular product increases, that the CPI adjustment doesn't necessarily reflect an increase in quality, which gives the consumer more value for a higher price. If you could explain both how the BLS addresses that question and how you might differ from the Boskin Commission in their concern that the increases in quality and price are not adequately compensated.

Ms. Abraham. Let me just add one thing on the substitution effect, lest I am unclear about where I agree and disagree with the findings in the report. I agree with the Commission in principle, that if you could produce it that you would want a measure that took substitution into account. We may have some minor disagreements about the magnitude of the effect.

But I think these issues that you have now turned to—how we, in producing the CPI, take account of changes in the quality of the goods and services that consumers are purchasing—is a much more difficult issue from a technical point of view. We do have procedures in place in producing the CPI to try to account for changes in quality. Those procedures make a big difference to the numbers that we report.

We analyzed a subset of the CPI market basket—commodities and services account for about 70 percent of the total index During 1995, the most recent year for which we have information, prior to the application of our procedures designed to take quality change into account, that portion of the Index went up by 4.7 percent. After the application of our procedures it, as reported, went up by only 2.2 percent. So we are doing things that make a big difference in the price change that we are reporting.

Are we getting quality adjustments exactly right? Probably not. Almost certainly not.

There are components of the Index that account for about half of the bias estimate reported by the Boskin Commission where I would readily acknowledge we have real difficulties. Measuring change in the quality of medical care is a really difficult thing. I am sure we are not getting that exactly right. Dealing with the new variety of electronic goods is very difficult.

Clearly we have issues in the quality measurement area; I can't say, because I don't know how to measure these things, whether their specific numbers are right or wrong.

Senator Robb. My time has expired.

Mr. Chairman, could I ask one additional question?

First of all, I understand you are in the process of revising the data that you use to come to the ultimate figure, and you are in the process of revising the types of sources of change that you use to come up with the report. Could you be a little bit more specific about the kinds of changes that you are going through in order to prepare that report and when that change might be reflected in a new Consumer Price Index that would be available for Congress to use or not use as they felt was appropriate?

Ms. Abraham. We make changes to the CPI on an ongoing basis. We made some changes back in 1995, we made some changing earlier this year. Effective with the data for this month, we are improving the way we construct the hospital price component of the Index.

The big thing that we currently have in the works is the introduction of an updated market basket as part of our, roughly, every 10-year revision. The current weights in the Index reflect consumption patterns from the period 1982 to 1984, and we will be updating that so that the market basket reflects patterns 1993 to 1995.

That would go into effect in January of 1998.

Senator Robb. But with the changes that you are proposing in that area, would you think that your Index would more accurately track the conclusions of the Boskin Commission or would you still be at some variance from the Boskin Commission?

Ms. Abraham. That change in and of itself will probably slow the rate of growth of the CPI from about .1 to .2 percent each year. We can't be sure until we have done it. That change does not address this substitution bias issue. It gives us a more recent market basket, it doesn't

correct the substitution problem, and I think that even in the Boskin Commission's estimation, substitution bias was only .4 of the 1.1 percent.

A big hunk of what the Boskin group was talking about was this quality, new goods, into kinds of stores sort of problem, and I think that we are only going to be able to address that piece by piece, over an extended period of time. The report did not contain recommendations for us that were things we could implement to fix the problem.

It was an estimate of bias, not a set of recommendations for how we fix the problem. And I have to say that I think it is going to be a very long time, indeed, if ever, before we have, in our production of this Index, addressed all of these issues to everyone's satisfaction. Some of these problems, at least at this point, are intractable.

Senator Robb. But if Congress is the end-user of this particular product, and others may use it as well, is Congress relying on an effective gauge of the changes? If it is our intention not to provide an unintended windfall, depending on whether you are looking at the payments that we make through entitlement programs or changes in the tax bracket, would Congress be better, in your judgment, to rely on an unadjusted number from the Bureau of Labor Statistics, or should it accept the fact that these numbers may not truly reflect precisely what Congress is attempting to incorporate in terms of the change of the effect on the taxpayer or the recipient of entitlement services?

Ms. Abraham. That is not really a question that I can answer. We are producing the best overall Consumer Price Index we know how to produce. There are issues with it. We can be as clear as we possibly can about what those are, but what you do with it is not something I can —

Senator Robb. Let me ask a question, Mr. Chairman, and this will be my last question.

Is there some additional information that the Bureau of Labor Statistics could provide to the Congress to let Congress know when it is using the CPI for a particular purpose, whether that best tracks the actual changes to the taxpayer or the recipient of entitlement services in trying to eliminate the inflationary factor. It is our responsibility as to how we use any changes in the CPI that the Bureau of Labor Statistics comes up with—but can you better inform us as to when it is an accurate gauge of the change in the precise sector that we are attempting to influence?

Ms. Abraham. Well, that is an interesting question. The CPI is designed to track the change in the cost of purchasing a fixed

consumption bundle, where the bundle is defined based on the consumption patterns of all urban residents. So it is not designed to track the consumption pattern of any specific group. So that is an issue that one presumably might want to think about.

We can provide to the Congress, sticking with the overall CPI, estimates of the magnitude of the substitution bias in the CPI as a proxy for the change in the cost of living. There is probably some additional information about that that we may be able to provide in the future.

With respect to the bulk of the 1.1 percent bias identified by the Boskin group, however, we have very little information to provide; .7 of the 1.1 percent relates to things where the Commission didn't have the CPI contrasted with some alternative measure that they believed was better. It is more bits and pieces of evidence that they have compiled and judgments that they have made. It is not things that have been measured, and we have therefore, I am sorry to say, have little additional information to give you in helping you make your decision.

Senator Robb. Mr. Chairman, You have been most generous with your time, and I thank you. There are obviously additional questions in this area, but I will wait until my turn returns.

Representative Saxton. Thank you, Senator.

Mr. Hinchey.

OPENING STATEMENT OF REPRESENTATIVE
MAURICE D. HINCHEY

Representative Hinchey. Thank you, Mr. Chairman.

Good morning, and thank you very much for your report. I would like to see if I can understand more clearly what the numbers mean, both for the short term and the long term.

Yesterday, for example, we saw a major increase in the Producer Price Index (PPI). It was a pretty substantial jump.

Ms. Abraham. Due mostly to increases in energy costs.

Representative Hinchey. I am sorry?

Ms. Abraham. Due mostly to increases in energy costs.

Representative Hinchey. Yes, that was the point that I was hoping you would substantiate, that that is due mostly to the most volatile aspects of the economy, energy costs primarily and then secondly, food, which also tends to be linked in some way to energy costs and also somewhat volatile.

So you do not, then, see in this jump in the Consumer Price Index, any dramatic shift in the overall rate of change in the economy? We seem to be growing continually at a modest but steady pace. Do you see any indications of slowdown in economic growth?

Ms. Abraham. Well, I can really only refer to the statistics that we have in front of us.

Representative Hinchey. Yes.

Ms. Abraham. In terms of employment, the pace of growth of employment over the past year was slightly ahead of where it had been the year before; a little faster in the last quarter of 1996 than earlier in the year.

Representative Hinchey. Are there any indications of the economy heating up dramatically beyond this jump in the Producer Price Index? Do you see any overwhelming indications of inflationary pressures in the economy?

Ms. Abraham. I guess with respect to the Producer Price Index, I am somewhat more inclined to focus on what is happening to the so-called "core rate," the producer prices excluding prices for food and energy items, which last month was up by just .1 percent.

I don't know if you would want to add to that in terms of the PPI and the CPI?

Mr. Dalton. Well, the same core rate, as it is called, is actually finished goods, excluding food and energy, in 1996 rose .006 percent, and that compares with an increase of 2.6 percent last year. So there is a noticeable deceleration in that component.

The same to a lesser degree is true of the so-called core rate in the CPI, which through the first 11 months of 1996 rose 2.7 percent, and that compares with an increase in 1995 of 3 percent.

Representative Hinchey. Okay, I see.

Ms. Abraham. A series that people do often look at is the average hourly earning series for production and nonsupervisory workers. It has risen 3.8 percent over the year, compared to 3.2 the year before, 2.7 the year before that. That series is watched because it is something we have every month.

We do have, however, a better measure of what is happening to labor costs, which is our Employment Cost Index. That, unfortunately, only comes out quarterly, and we don't yet have the fourth quarter number.

Through the third quarter, it was not showing the same kind of acceleration that the average hourly earnings number was.

Representative Hinchey. Do you have any notion of why we saw that large jump in energy prices?

Ms. Abraham. I will defer to my colleague, Mr. Dalton.

I don't know if you have any thoughts on that?

Mr. Dalton. No, I don't really.

Ms. Abraham. I don't know.

Mr. Dalton. I don't really know. I could only repeat what I have read in the newspapers, and I am not sure if that is an accurate assessment of reality.

Representative Hinchey. All right. Let me ask you a question with regard to long term, then.

Beginning in the early 1980s, we saw in our national economy the beginnings of a continual drop in manufacturing jobs and also slippage in hourly average wages. Now, if I interpret your recent numbers correctly, that trend seems, at least in this recent report, to have been stopped or perhaps even reversed.

You seem to indicate that there is a growth in manufacturing jobs, say, from January of 1993, until December of 1996, there seems to be an increase in manufacturing jobs, and there also, over that same period of time, seems to be an increase, slight increase at least, in average hourly wages.

Ms. Abraham. Just looking at manufacturing employment first, taking the period from, say, I don't know, December.

Representative Hinchey. Say, from January 1993 until your most recent report.

Ms. Abraham. Yes, employment in manufacturing was up a bit on net by about 164,000, though that certainly hasn't been the result of steady increases. Employment had been falling from about March of 1995 onwards. So it has not been a picture of steady improvement.

Representative Hinchey. No, but you can say looking at the change between January of 1993 and this most recent report, there seems to be, if I interpret the numbers correctly, an increase in manufacturing jobs over that period.

Ms. Abraham. On net, manufacturing employment is up over that period, by about 164,000.

Representative Hinchey. Right, and with regard to average hourly wages in that same period, what we saw beginning in the late 1970s, early 1980s, was a decline in average hourly wages over a prolonged period of time. That seems now to have changed. If I have your numbers, real average hourly wages using the constant 1982 dollars that you use, in January of 1993, was about $7.40, and in November of 1996, that was $7.45; is that correct?

Ms. Abraham. That is correct.

Representative Hinchey. Thank you.

Thank you, Mr. Chairman.

Representative Saxton. Mr. Dalton, I would like to return to the matter of the CPI once again, if we may.

Back in December, The *Washington Post* ran an article that was headlined, "CPI Report Coming Under Fire." Part of that article quotes Secretary Rubin as saying, and I think he was speaking for the Administration, or at least for himself, he said that cuts in Federal benefits tied to the CPI will happen unless "the experts come back with a broad-based agreement on how much the CPI may overstate inflation."

Then Michael Boskin replies with this quote with regard to broad-based agreement. He said: "Most of the professional colleagues I have heard from indicated that after thinking about and reading the report, they think the number is too low, while others think it is a little high."

Can you help me understand whether there has been more broad-based agreement than would be indicated by these statements?

Mr. Dalton. No, I don't think so. I don't have any special insight into whether or not there is broad-based agreement. I think I have sort of a knee-jerk reaction to any statements that begin "most economists agree."

Maybe that is saying enough.

Representative Saxton. So your indication, then, probably would confirm that there is not broad-based agreement, and based on the historical—

Mr. Dalton. I don't know whether there is broad-based agreement. I don't know how you would determine that. I think what I do know is that the biggest part of the estimate of upward bias comes from the quality-change issue, new-goods issue and quality change, and the estimate contained in the report is largely conjectural, based on very

limited empirical information. Certainly, it does not provide for BLS a course of action to remedy anything.

Representative Saxton. Is BLS inclined in any way, based on the Boskin report or other information and knowledge that you have, to change in any way the computations that result in the Consumer Price Index from time to time?

Ms. Abraham. We, of course, always welcome new information and new ideas about how we might do things. We had been prior to the issuance of the report, and are continuing in line with the recommendation of the report, to look at a change in the way that we aggregate the prices that we collect to produce the index. I think that the report really has raised our consciousness about the importance of taking steps to get new items into the Index more promptly than has sometimes occurred in the past.

I think the report encourages us in thinking that if we have the resources to do it, that making more use of techniques that make changes in the specific characteristics of the goods and services we are pricing specifically into account would be a good thing. So I think there are some things that we will be looking at that are consistent with the recommendations in the report.

Representative Saxton. The magnitude of the recommendations in the Boskin report I don't think can be overstated. The Boskin report actually makes some projections as to the cumulative effect of a change in the CPI.

Mr. Dalton, can you speak to the cumulative effect of the recommended changes?

In other words, it is not a change that would occur in just one year. As each year passed by, the cumulative effect would become rather dramatic, according to the Boskin report; is that correct?

Ms. Abraham. The effect of the size of the Federal deficit that you are referring to?

Representative Saxton. It would have an effect on the size of the Federal deficit, but it would also have an effect on benefit levels, as well as tax responsibilities on the part of individuals; would it not?

Mr. Dalton. Well, yes, certainly. I guess I am not expert in forecasting or calculating what those impacts might be. I can only retreat I guess to what I said before, and that is that CBO has stated that a 1

percent change in the CPI triggers something on the order of $8 billion net fiscal effect for the Federal Government.

So, yes, if you reduce either the CPI or the benefits and tax rates that are calculated from it by something on the order of 1 percent per year, that will accumulate into large amounts of money fairly rapidly.

Ms. Abraham. That is not something that we really have the charge to look into. We have not constructed estimates of those sorts of things ourselves.

Representative Saxton. The Boskin report actually concludes that within a decade, the amount of revenues collected, for example, in the year 2008, which would be a little more than a decade from the time that they had begun their projections and calculations, that the additional revenues that would be coming into the Federal Government would be something in the neighborhood of $60 to $70 billion higher than they are today, strictly because of the change in the CPI.

Does that sound reasonable to you?

Ms. Abraham. Those are eye-catching estimates. I have no reason to think that they are wrong, but I also don't know whether they are right. That is just not something that we have looked at independently.

Representative Saxton. They likewise suggest that the savings, because of lower benefits paid to Social Security and Railroad Retirement recipients, would be somewhere in the neighborhood of $50 to $60 billion less, primarily because of the adjustment in the CPI.

Does that sound like it is reasonable as well?

Ms. Abraham. Again, we just don't have any independent information to offer.

Representative Saxton. Thank you.

Mrs. Maloney?

Representative Maloney. Thank you.

For budgetary reasons, the Bureau no longer publishes unemployment rates for certain States, including New York State. I would like to know how you have changed the way you produce these numbers, and are these numbers reliable?

Ms. Abraham. It used to be that for each of 11 large States, and New York City and Los Angeles, we calculated unemployment rates directly from data in the Current Population Survey, rather than using the method that we long have used for the other 39 States, which is to

produce unemployment rates using a modeling procedure that makes use of the Current Population Survey data and other information.

The change that we made a little over a year ago was to begin calculating the unemployment rates for the 11 large States, including New York, and also New York City and Los Angeles, using the model-based procedure that we had previously been using for the other States.

This was a cost-cutting move. The main cost that we saved was the cost of collecting data for enough households in each of those 11 States to be able to calculate the unemployment rate estimates directly from the survey.

In New York State in particular, the reduction in the number of households where we collect information was modest. We had been collecting information from 4,088 households. We now collect information from 3,307 households.

It is my understanding that the folks in the New York State office that are responsible for labor market information in the State are quite happy with the new estimates that we are producing. Their major advantage is that they do not jump around as much from month to month as the old estimates did. Because the sample size in the State was not huge, we used to get big jumps in the estimated unemployment rate from one month to the next that were just a result of sampling error, not telling you about anything real.

The new estimates are considerably smoother, and they view that as desirable.

Their drawbacks are that we do not have them on the first Friday of each month when we report the national number.

Representative Maloney. Do you consider them reliable with the cutback in sampling?

Ms. Abraham. Yes, I think that we are happy with the quality of the estimates.

Representative Maloney. You reported today the average hourly earnings rose by six cents in December following a nine-cent rise in the prior month. Some economic policymakers, not in the White House, think the economy is growing too fast, that we are generating too many jobs, and they pointed to the upward trend in real hourly wages for production and nonsupervisory workers.

Since last December, what has been the average monthly increase in the civilian labor force, which I understand is your estimate of the number of people available for work, roughly?

Ms. Abraham. It has been somewhere in the vicinity of 2.-something million, 2.6 million, so about 217,000 a month increase in the size of the civilian labor force.

Representative Maloney. So just to keep up with the growth of our labor force, our economy must produce around 200,000 new jobs each month; is that a correct statement?

Ms. Abraham. Well, of course, the rate at which the labor force increases may be a function as well of employment opportunities, so another way to look at this would be to ask what increase would you need in employment just to hold the share of the working-age population holding jobs constant. That would be a somewhat smaller number.

Representative Maloney. So we have created—

Ms. Abraham. About 140,000, just to hold the employment-to-population ratio constant.

Representative Maloney. We have been, roughly, consistent in doing that; right?

Ms. Abraham. We have been running at a slightly faster pace of employment growth than that, which I am not suggesting is bad.

Representative Maloney. I am not either.

Thank you very much.

Representative Saxton. Senator?

Senator Robb. Thank you, Mr. Chairman.

Could I just finish up with a couple of questions on the CPI, because that is a matter of considerable public interest and focus, and I think the more understanding that we can have on that issue, the better off we are.

Maybe you could give us some indication of the types of users of the Consumer Price Index. Now, I realize that your responsibility is to provide the statistical evidence of change and not to be concerned about who uses it or how they use it. But, nonetheless, you are, I am certain, aware of the broad generic category of users of this product.

We have focused primarily this morning on the Federal Government and the way it uses the Consumer Price Index, both in terms of tax bracketing and in terms of changes in the payments for entitlement programs. But of course, there are many other entities.

Could you just give us some sense of the kinds of institutions or entities that, to the best of your knowledge, rely on your work product?

Ms. Abraham. There are an awful lot of people who make use of the CPI in their decision-making processes. We have already talked about uses within the Federal Government, and there are a lot of programs that one way or another are indexed to the Consumer Price Index.

Senator Robb. How about in terms of labor management negotiations over wages and benefits; do you have some indication of how many contracts are premised on the CPI?

Ms. Abraham. I did hear a figure that was cited by someone at the AFL-CIO recently. It was 20 or 25 percent of collective bargaining agreements, if I am remembering correctly, and I will check the figure for you, that are indexed explicitly using the CPI, though this person also made the point that even in cases where there wasn't an explicit provision saying that wages would go up based in some fashion on the CPI, that the CPI was often viewed as a reference point in negotiations, if you will.

I am certain the same is true of many other employers, that one of the things that they look at, among other things, presumably, in deciding what they are going to do with wages, is what is happening to the Consumer Price Index.

There are other sorts of uses. The CPI is referenced in rental contracts, for example. It may not be the overall CPI, it may be some subcomponent of the CPI. It is sometimes referenced in alimony agreements, child support agreements, that kind of thing.

So there are a whole range of uses involving long-term relationships between parties, where information on the CPI is considered in the process of coming to agreement.

Senator Robb. I think it is important that we do recognize that the Consumer Price Index is used by a lot more entities than simply the Federal Government. As you know, there will be a great deal of debate during the next few months in both the Houses of Congress, because the CPI has such a direct impact on many of the fiscal and budgetary matters that we are considering, I assume, but I would like you to clarify, if you disagree, that any proposal that the Congress should come up with that would have a direct impact on either the revenue picture or the entitlement picture, the preferred approach would be to address it as a change in the programs that are enacted by Congress, rather than an

attempt to make any internal changes in the way the BLS actually computes the Index.

Would that be a fair statement on my part?

Ms. Abraham. Yes, I very much hope that the Bureau of Labor Statistics will be left alone, with advice and scrutiny and so on, to make the best technical decisions about producing the CPI that we can, and that changes in the way that the Index was going to be used would be handled separately.

Senator Robb. I invited your answer on that because I think there are many Members who have not focused specifically on how the change would be made. There may be some concern, particularly by end users other than the government, that the change might be, in effect, prescribed to BLS in terms of how you do your job. Ultimately, it is going to be a political choice, which is what we are here for. Any change that we make, if it were made in such a way that it reflected how we use your product, rather than how you produce your product, it would seem to me it would be perhaps less disconcerting to those who might be tangentially affected. Is that a fair statement?

Ms. Abraham. Even beyond that, I think any precedent that was set that involved the Congress telling a technical agency, such as the Bureau of Labor Statistics, how our data ought to be constructed, would be extremely unfortunate in terms of the credibility that all of our data products have.

Senator Robb. You think it would be appropriate for the Congress, on its own initiative, to determine how it uses your end product?

Dr. Abraham. It is more than appropriate, that is clearly the Congress' responsibility.

Senator Robb. I happen to concur in that judgment.

Thank you.

Mr. Chairman, my time has expired.

Representative Saxton. Thank you, Senator.

Mr. Hinchey?

Representative Hinchey. No questions.

Representative Saxton. I would like to thank you, Dr. Abraham, for being with us again this morning and for doing your best to answer our questions.

I guess I would just like to say, in conclusion, that it seems to me, and I think my colleagues, particularly Senator Robb, would tend to agree

that before we enter upon a course of action that significantly alters either the computation of the CPI or our use of it, that we ought to move very slowly and deliberately to make sure that we don't do something that is going to have unintended effects on either the way the Federal Government administers its programs or the way the private sector intends to, or does use the CPI from time to time in its many facets of economic and other activity.

It seems to me it is a very, very serious issue, one where there is at least a great deal of discussion currently under way in the economic community, and one where a broad consensus certainly has not been achieved, at least at this point.

So I guess it would be fair to say that, at least for my part, I hope that we move slowly and with some caution with regard to this issue.

I thank you once again for being here, Senator Robb.

Senator Robb. Could I just make one request?

Since a number of Members who might have questions, particularly because we have had an opportunity to discuss not only the CPI, but other factors, that the record remain open for any written questions that Members who could not attend the meeting might wish to submit?

Representative Saxton. Certainly. Without objection.

Senator Robb. Thank you.

Representative Saxton. Thank you very much, Dr. Abraham. We look forward to seeing you in a few weeks.

Thank you.

[Whereupon, at 10:50 a.m., the hearing was concluded.]

SUBMISSIONS FOR THE RECORD

PREPARED STATEMENT OF REPRESENTATIVE JIM SAXTON, CHAIRMAN

It is a great pleasure to welcome Commissioner Abraham before the JEC once again. The Bureau of Labor Statistics (BLS) is one of the most objective, professional, and respected statistical agencies in the world. I would like to thank BLS for maintaining its high standards of objectivity, and for its assistance in the work of this committee over many years. We have forged a good relationship that will continue to be strengthened in the years ahead.

I am pleased to announce that yesterday the Speaker designated me chairman of the JEC for the 105th Congress, the first Republican House member to hold this position in over 40 years. It is a responsibility I take very seriously, and I look forward to working with JEC members from both sides over the next two years. I am confident that together with ranking minority member Senator Bingaman, we will be able to move the committee forward. I would also like to welcome the other committee members here this morning.

The employment data released this morning shows that the unemployment rate was unchanged, while payroll employment posted a solid increase of 262,000. The December payroll employment should be viewed in the context of a very modest rise in the previous month. Despite an increase in employment for the month of December, manufacturing employment over the 12 months of 1996 declined by 94, 000.

Turning to another issue, among the important economic statistics provided by the BLS is the consumer price index (CPI). The CPI is a fairly old statistic, and a committee headed by George Stigler reported to the JEC in 1961 its findings on issues related to this index involving substitution, quality changes, updating market baskets, treatment of new products and other issues. More recently, the Boskin commission report reviewed many of these same issues, and this report sparked considerable controversy.

I think it is fair to say that although there is a consensus that the CPI may overstate inflation, the extent of this overstatement is debatable. It is also worthwhile to note that Congress, rightly or wrongly, chose to index a variety of federal benefits and tax provisions after the Stigler committee issued its report in 1961. There would seem to be ample reason for Congress to examine this issue carefully before making hasty policy decisions.

After all, the policy decisions made regarding the CPI would affect many millions of Americans over time. According to a recent JEC analysis, about 40 percent of the direct effects of legislative reductions in the CPI would comprise tax increases on primarily middle class taxpayers, while the remainder would fall on entitlement beneficiaries. Congress should consider whether this mix of policy for deficit reduction achieves the desired result in the best way.

In closing, I would like to say that I look forward to working with my colleagues on both of the aisle, and with the BLS and other agencies, over the next two years.

PREPARED STATEMENT OF KATHERINE G. ABRAHAM

Thank you, Mr. Chairman and Members of the Committee. I appreciate the opportunity to be here this morning and comment on the labor market data we have to release.

Nonfarm payroll employment increased by 262,000 in December, with the gains widespread across the major industries. Average hourly earnings rose six cents over the month, following a nine-cent gain in November. The unemployment rate was unchanged in December at 5.3 percent.

The services industry added 112,000 jobs in December; between May and November, monthly job growth in services averaged 81,000. Health services added 16,000 jobs; and computer and data processing services, which grew by a robust 11 percent over the year, added 15,000 jobs.

In amusement and recreation services, employment was up by 12,000 in December and by 87,000 through the year as a whole. Employment in help supply services increased by 12,000 in December, following a decline of 30,000 in November and little change in September and October. Even with this recent weakness, this industry, help supply, was one of the largest job gainers over the year.

Retail trade employment increased by 48,000 in December. This increase was about the same as the average monthly gain for all of 1996, although month-to-month changes were erratic during the year. This volatility was, to a large degree, tied to swings in employment in eating and drinking places.

Employment in miscellaneous retail establishments, such as drugstores, gift shops, and catalog retailers, rose by 15,000 in December; job gains in this diverse industry have totaled 77,000 since May. Jobs were added over the month both in furniture and home furnishings stores and in building and garden supply stores. These industries were among the fastest growing in 1996.

Turning to the goods-producing sector, the construction industry added 23,000 jobs for the second straight month in December, boosted in part by milder-than-usual weather across most of the country. Employment in construction was strong in 1996, rising by 287,000, more than two and one-half times the 1995 increase.

Manufacturing added 19,000 jobs in December, following no change in November and a gain of 13,000 in October. Despite this modest

resurgence, the industry ended 1996 with, as you noted, 94,000 fewer jobs than at year-end 1995. The over-the-year declines were concentrated in three nondurable goods industries: Apparel, which lost 61,000 jobs; food products, which lost 22,000; and textiles, which lost 22,000.

In durable goods manufacturing, employment in aircraft and parts increased by 5,000 in December and has risen by 28,000 since June. Instruments and related products also experienced job gains over the month. Employment in electronic equipment declined by 4,000 in December. This industry has lost 14,000 jobs since its most recent peak in July, after being one of the few manufacturing industries to experience steady job growth during 1995 and early 1996.

Government employment increased by 31,000 in December, even as declines in employment continued at the Federal level. Most of the seasonally adjusted increase in December resulted from the change in employment pattern for election workers this year; fewer than normal were reported on payrolls in November, so fewer were subsequently let go.

Average hourly earnings of production or nonsupervisory workers in the private sector rose six cents in December, reaching $12.05 per hour. This follows an even larger gain of nine cents per hour in November. Over the year, average hourly earnings rose by 44 cents, or 3.8 percent. This compares with increases of 3.2 percent in 1995 and 2.7 percent in 1994.

Average weekly hours of production or nonsupervisory workers rose one-third hour in December to 34.8 hours. Month-to-month changes in weekly hours have varied widely in 1996. Average hours in manufacturing also rose one-third hours in December, reaching 42.0 hours. Factory overtime rose .2 to 4.7 hours. In 1996, these factory workweek measures recouped most of the losses they had sustained in 1995 and have returned to near-record levels.

Turning now to our survey of households, the unemployment rate was unchanged in December at 5.3 percent. Unemployment rates for the major demographic groups showed little or no change. The total civilian employment level also was little changed over the month, although it increased by 2.8 million over the year. The number of persons at work part time for economic reasons increased by 355,000 in December, reversing a similar decline in November.

Before concluding, I should perhaps note that this is the month in which we update our seasonal adjustment factors and make annual revisions to previously published seasonally adjusted household survey estimates to reflect an additional year's information on seasonal variations in labor market activity. All the seasonally adjusted data in today's news reflect these revisions.

In summary, nonfarm payroll employment continued to expand in December, and unemployment was unchanged. Average hourly earnings showed a sizeable increase for the second straight month. For all of 1996, payroll employment rose by 2.6 million, compared with an increase of 2.2 million in 1995. The unemployment rate edged down somewhat in the second half of 1996 and, at 5.3 percent, was three-tenths of a percentage point lower in December than it had been a year earlier.

My colleagues, Mr. Dalton, who is the Associate Commissioner for Prices and Living Conditions, and Phil Rones, who is the Chief of our Division of Labor Force Statistics, and I, of course, will be happy to answer any questions you might wish to depose.

News

United States Department of Labor

Bureau of Labor Statistics   Washington, D.C. 20212

THE EMPLOYMENT SITUATION: DECEMBER 1996

Nonfarm payroll employment increased in December, and the unemployment rate was unchanged at 5.3 percent, the Bureau of Labor Statistics of the U.S. Department of Labor reported today. The number of payroll jobs rose by 262,000 over the month, with gains occurring among most of the major industry groups. Average hourly earnings rose by 6 cents in December, following a 9 cent rise in the prior month.

Chart 1. Unemployment rate, seasonally adjusted,
Percent   January 1994 - December 1996
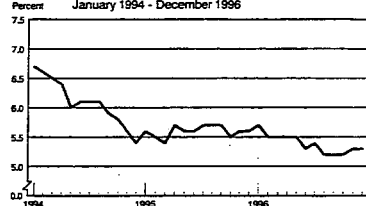
Chart 2. Nonfarm payroll employment, seasonally adjusted,
Millions   January 1994 - December 1996
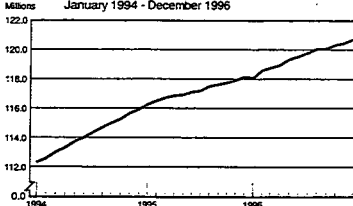
Unemployment (Household Survey Data)

Both the number of unemployed persons, 7.2 million, and the unemployment rate, 5.3 percent, were unchanged in December, although both figures showed modest improvement in 1996. December jobless rates for the major worker groups—adult men (4.4 percent), adult women (4.9 percent), teenagers (16.5 percent), whites (4.6 percent), blacks (10.5 percent), and Hispanics (7.7 percent)—showed little or no change over the month. (See tables A-1 and A-2.)

Total Employment and the Labor Force (Household Survey Data)

Total employment, at 127.9 million in December, was little changed from the November level, but has expanded by 2.8 million over the past year. This gain was split nearly evenly between men and women. The proportion of the population 16 years and over that was employed (the employment-population ratio) was 63.4 percent in December, unchanged over the month but up 0.7 percentage point from a year earlier. (See table A-1.)

Seasonally adjusted household data have been revised to incorporate updated seasonal adjustment factors, which reflect the 1996 experience; data back to January 1994 are subject to revision. The January-December 1996 unemployment rates, as originally published and as revised, appear on page 5, along with additional information on the revisions.

Table A. Major indicators of labor market activity, seasonally adjusted

(Numbers in thousands)

Category	Quarterly averages 1996		Monthly data 1996			Nov.- Dec. change
	III	IV	Oct.	Nov.	Dec.	
HOUSEHOLD DATA			Labor force status			
Civilian labor force............................	134,118	134,830	134,636	134,831	135,022	191
Employment..................................	127,042	127,705	127,617	127,644	127,855	211
Unemployment..............................	7,076	7,124	7,019	7,187	7,167	-20
Not in labor force...............................	66,732	66,627	66,637	66,632	66,614	-18
			Unemployment rates			
All workers...	5.3	5.3	5.2	5.3	5.3	.0
Adult men.......................................	4.5	4.4	4.4	4.4	4.4	.0
Adult women..................................	4.7	4.8	4.7	4.8	4.9	0.1
Teenagers.......................................	16.6	16.6	16.3	16.8	16.5	-.3
White..	4.6	4.6	4.5	4.6	4.6	.0
Black..	10.5	10.6	10.7	10.6	10.5	-.1
Hispanic origin..............................	8.7	8.0	8.2	8.3	7.7	-.6
ESTABLISHMENT DATA			Employment			
Nonfarm employment........................	119,958	p120,483	120,311	p120,438	p120,700	p262
Goods-producing [1]........................	24,273	p24,313	24,284	p24,308	p24,348	p40
Construction.............................	5,438	p5,487	5,464	p5,487	p5,510	p23
Manufacturing...........................	18,266	p18,260	18,254	p18,254	p18,273	p19
Service-producing [1].......................	95,685	p96,170	96,027	p96,130	p96,352	p222
Retail trade..............................	21,682	p21,840	21,803	p21,835	p21,883	p48
Services.....................................	34,529	p34,788	34,709	p34,771	p34,883	p112
Government...............................	19,536	p19,503	19,508	p19,485	p19,516	p31
			Hours of work[2]			
Total private.......................................	34.4	p34.5	34.3	p34.5	p34.8	p0.3
Manufacturing..............................	41.7	p41.8	41.7	p41.7	p42.0	p.3
Overtime....................................	4.5	p4.5	4.4	p4.5	p4.7	p.2
			Earnings[2]			
Average hourly earnings, total private.....................................	$11.86	p$11.98	$11.90	p$11.99	p$12.05	p$0.06
Average weekly earnings, total private.....................................	408.50	p413.72	408.17	p413.66	p419.34	p5.68

[1] Includes other industries, not shown separately.
[2] Data relate to private production or nonsupervisory workers.
p = preliminary.
NOTE: Household data have been revised based on the experience through December 1996.

The number of persons employed part time for economic reasons rose by 355,000 in December to 4.3 million, after a decline of similar magnitude in November. The size of this group held at or near 4.3 million for most of 1996. (See table A-3.)

About 8.2 million persons (not seasonally adjusted) held more than one job in December. These multiple jobholders comprised 6.4 percent of all employed persons, up slightly from a year earlier. (See table A-9.)

Both the civilian labor force and the labor force participation rate were essentially unchanged over the month, though both measures have risen over the past year. The labor force grew by 2.6 million in 1996, with women accounting for three-fifths of the increase. The labor force participation rate rose by 0.6 percentage point over the year, to 67.0 percent in December. (See table A-1.)

Persons Not in the Labor Force (Household Survey Data)

About 1.5 million persons (not seasonally adjusted) were marginally attached to the labor force in December—that is, they wanted and were available for work and had looked for jobs sometime in the prior year. These persons were not classified as unemployed because they were not currently looking for work when surveyed in December. The total number of marginally attached workers was down slightly over the year. (See table A-9.)

The number of discouraged workers—a subset of marginally attached workers who were not currently looking for jobs specifically because they believed no jobs were available for them or there were none for which they would qualify—was 334,000 in December, also down slightly from a year earlier.

Industry Payroll Employment (Establishment Survey Data)

Total nonfarm payroll employment increased by 262,000 in December to 120.7 million, after seasonal adjustment, and rose by 2.6 million over the year. The private sector added 231,000 jobs in December. (See table B-1.) Private sector job growth during the fourth quarter averaged 218,000 per month, well above the third-quarter average of 147,000.

Employment in the services industry increased by 112,000 in December, the largest gain since May. Increases occurred in nearly all components of the industry. Business services added 45,000 jobs, following a small loss in November. Computer services employment continued its rapid rise. Help supply added 12,000 jobs in December, following a net decline over the prior 3 months. Elsewhere in services, job gains continued in health services, engineering and management services, and amusement and recreation.

Retail trade employment rose by 48,000 in December. Much of the gain was in eating and drinking places, where estimated growth has been inconsistent during the year. In December, employment continued to rise in furniture and home furnishings stores and building supplies retailers, each of which added workers at a brisk pace in 1996. Following strong seasonal hiring in October, employment in general merchandise stores declined in November and December, after seasonal adjustment. Wholesale trade showed sluggish job growth for the second straight month.

Employment in transportation and public utilities edged up by 5,000 in December, as strength in air transportation more than offset declines in trucking, communications, and public utilities. Finance, insurance, and real estate employment rose by 17,000 in December, continuing its relatively strong growth trend. Gains were concentrated in finance, particularly in nondepository institutions, security brokerages, and holding and other investment offices.

Manufacturing added 19,000 jobs in December. Over-the-month job growth was widespread, with notable increases occurring in aircraft and in food and kindred products. From September through December, factory employment increased by 32,000. Despite this gain, 94,000 factory jobs were lost in 1996, as steep declines in nondurable goods industries were only partially offset by gains in durables.

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Aided by unusually mild weather across most of the country during the December reference period, employment in the construction industry rose by 23,000 in December. Over the year, construction employment increased by 287,000, more than 2-1/2 times the rise in the prior year.

Government employment rose by 31,000 in December, after seasonal adjustment. Most of the increase was in the noneducation component of local government, reversing a decrease in the prior month. Fewer poll workers had been reported in November than expected by the seasonal factors, so that there were fewer to dismiss following the elections. Since federal government employment reached its most recent peak in May 1992, job losses have totaled 322,000 (not counting the Postal Service, which has added workers).

Weekly Hours (Establishment Survey Data)

The average workweek for production or nonsupervisory workers on private nonfarm payrolls increased by 0.3 hour in December to 34.8 hours, seasonally adjusted. The manufacturing workweek also rose by 0.3 hour to 42.0 hours and factory overtime, at 4.7 hours, was up by 0.2 hour. Both the manufacturing workweek and overtime hours were at their highest levels since early 1995. (See table B-2.)

The index of aggregate weekly hours of private production or nonsupervisory workers on nonfarm payrolls rose by 0.9 percent, seasonally adjusted, to 139.2 (1982=100) in December. The manufacturing index increased by 0.8 percent to 106.9. (See table B-5.)

Hourly and Weekly Earnings (Establishment Survey Data)

Average hourly earnings of private production or nonsupervisory workers on nonfarm payrolls rose 6 cents in December to $12.05, seasonally adjusted, following an increase of 9 cents in the prior month. Average weekly earnings increased by 1.4 percent in December to $419.34. Over the past year, average hourly earnings rose by 3.8 percent, while average weekly earnings increased by 5.3 percent. (See table B-3.)

The Employment Situation for January 1997 is scheduled to be released on Friday, February 7, at 8:30 A.M. (EST).

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Revision of Seasonally Adjusted Household Survey Data

At the end of each calendar year, BLS routinely updates the seasonal adjustment factors for the labor force series derived from the Current Population Survey (also referred to as the household survey) to incorporate the experience of that year. This year, seasonally adjusted data for January 1994-December 1996 are subject to revision. (Seasonally adjusted establishment data will be revised in June, concurrently with the introduction of annual benchmark adjustments.)

Table B summarizes the effects of the revisions on the overall unemployment rate since January 1996. Rates for 7 months were revised, in each case by 0.1 percentage point. Revised seasonally adjusted data for major labor force series, also since January 1996, appear in table C.

The January 1997 issue of *Employment and Earnings* will contain the new seasonal adjustment factors for major series for the January-June 1997 period. The publication also will contain a description of the current seasonal adjustment methodology and revised data for the most recent 13 months or calendar quarters for all regularly published tables containing seasonally adjusted household survey data. Historical seasonally adjusted monthly and quarterly data also are available on the Internet. Internet users can access these data from the ftp://stats.bls.gov/pub/special.requests/lf directory.

Table B. Seasonally adjusted unemployment rates and change due to revision, January-December 1996

Month and year	As first computed	As revised	Change
1996			
January..................................	5.8	5.7	-0.1
February................................	5.5	5.5	.0
March.....................................	5.6	5.5	-.1
April.......................................	5.4	5.5	.1
May..	5.6	5.5	-.1
June..	5.3	5.3	.0
July..	5.4	5.4	.0
August....................................	5.1	5.2	.1
September..............................	5.2	5.2	.0
October...................................	5.2	5.2	.0
November...............................	5.4	5.3	-.1
December...............................	[1]5.4	5.3	-.1

[1] Not published.

Planned Changes in the Household Survey Data

Effective with the release of data for January 1997, revisions will be introduced into the population controls used for the household survey. These revisions reflect primarily new information on the magnitude and demographic characteristics of net immigration, and will result in an upward shift in the estimated civilian noninstitutional population 16 years and over for January 1997. The changes will add approximately 470,000 on top of trend growth between December and January. The bulk of the adjustment will occur among Hispanics and the "other races" category. The changes and their effect on the estimates of labor force change and composition will be described in an article slated to appear in the February 1997 issue of *Employment and Earnings*.

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Table C. Employment status of the civilian population by sex and age

(Numbers in thousands)

Employment status, sex, and age	1995 Dec	1996 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
TOTAL													
Civilian noninstitutional population[1]	199,508	199,634	199,772	199,921	200,101	200,278	200,459	200,641	200,847	201,060	201,273	201,463	201,636
Civilian labor force	132,422	132,899	133,070	133,464	133,427	133,759	133,709	134,165	133,898	134,291	134,636	134,831	135,022
Participation rate	66.4	66.6	66.6	66.8	66.7	66.8	66.7	66.9	66.7	66.8	66.9	66.9	67.0
Employed	125,068	125,311	125,706	126,062	126,125	126,428	126,590	126,889	126,988	127,248	127,617	127,644	127,855
Employment-population ratio	62.7	62.8	62.9	63.1	63.0	63.1	63.2	63.2	63.2	63.3	63.4	63.4	63.4
Unemployed	7,354	7,588	7,364	7,402	7,302	7,331	7,119	7,276	6,910	7,043	7,019	7,187	7,167
Unemployment rate	5.6	5.7	5.5	5.5	5.5	5.5	5.3	5.4	5.2	5.2	5.2	5.3	5.3
Men, 20 years and over													
Civilian noninstitutional population[1]	88,172	88,223	88,296	88,356	88,440	88,530	88,570	88,614	88,650	88,733	88,840	88,971	89,040
Civilian labor force	67,303	67,556	67,688	67,886	67,829	67,996	68,088	68,222	68,044	68,056	68,273	68,391	68,369
Participation rate	76.3	76.6	76.7	76.8	76.7	76.8	76.9	77.0	76.8	76.8	76.8	76.9	76.8
Employed	63,997	64,258	64,416	64,562	64,573	64,788	64,933	65,071	65,165	64,978	65,299	65,349	65,367
Employment-population ratio	72.6	72.8	73.0	73.1	73.0	73.2	73.3	73.4	73.5	73.2	73.5	73.4	73.4
Agriculture	2,257	2,382	2,371	2,376	2,310	2,342	2,318	2,366	2,347	2,366	2,400	2,355	2,356
Nonagricultural industries	61,740	61,876	62,045	62,186	62,263	62,446	62,615	62,705	62,818	62,612	62,899	62,994	63,011
Unemployed	3,306	3,298	3,272	3,324	3,256	3,208	3,155	3,151	2,879	3,078	2,974	3,042	3,002
Unemployment rate	4.9	4.9	4.8	4.9	4.8	4.7	4.6	4.6	4.2	4.5	4.4	4.4	4.4
Women, 20 years and over													
Civilian noninstitutional population[1]	96,633	96,717	96,757	96,798	96,856	96,925	96,999	97,064	97,146	97,226	97,290	97,366	97,457
Civilian labor force	57,334	57,594	57,618	57,803	57,817	57,885	57,909	58,139	58,230	58,349	58,432	58,574	58,728
Participation rate	59.3	59.5	59.5	59.7	59.7	59.7	59.7	59.9	59.9	60.0	60.1	60.2	60.3
Employed	54,680	54,684	54,845	55,054	55,075	55,067	55,196	55,315	55,498	55,644	55,681	55,753	55,871
Employment-population ratio	56.6	56.5	56.7	56.9	56.9	56.8	56.9	57.0	57.1	57.2	57.2	57.3	57.3
Agriculture	831	849	845	842	842	831	835	847	826	844	800	786	772
Nonagricultural industries	53,849	53,835	54,000	54,212	54,233	54,236	54,361	54,468	54,672	54,800	54,881	54,967	55,099
Unemployed	2,654	2,910	2,773	2,749	2,742	2,818	2,713	2,824	2,732	2,705	2,751	2,821	2,857
Unemployment rate	4.6	5.1	4.8	4.8	4.7	4.9	4.7	4.9	4.7	4.6	4.7	4.8	4.9
Both sexes, 16 to 19 years													
Civilian noninstitutional population[1]	14,703	14,694	14,719	14,757	14,805	14,823	14,890	14,963	15,051	15,101	15,143	15,126	15,139
Civilian labor force	7,785	7,749	7,764	7,775	7,781	7,878	7,712	7,804	7,624	7,886	7,931	7,866	7,925
Participation rate	52.9	52.7	52.7	52.7	52.6	53.1	51.8	52.2	50.7	52.2	52.4	52.0	52.3
Employed	6,391	6,369	6,445	6,446	6,477	6,573	6,461	6,503	6,325	6,626	6,637	6,542	6,617
Employment-population ratio	43.5	43.3	43.8	43.7	43.7	44.3	43.4	43.5	42.0	43.9	43.8	43.3	43.7
Agriculture	256	257	283	252	260	301	255	257	245	270	250	213	298
Nonagricultural industries	6,135	6,102	6,162	6,194	6,217	6,272	6,206	6,246	6,080	6,356	6,387	6,329	6,319
Unemployed	1,394	1,380	1,319	1,329	1,304	1,305	1,251	1,301	1,299	1,260	1,294	1,324	1,308
Unemployment rate	17.9	17.8	17.0	17.1	16.8	16.6	16.2	16.7	17.0	16.0	16.3	16.8	16.5

[1] The population figures are not adjusted for seasonal variation.   December 1996.
NOTE: Seasonally adjusted data have been revised based on the experience through

Explanatory Note

This news release presents statistics from two major surveys, the Current Population Survey (household survey) and the Current Employment Statistics survey (establishment survey). The household survey provides the information on the labor force, employment, and unemployment that appears in the A tables, marked HOUSEHOLD DATA. It is a sample survey of about 50,000 households conducted by the Bureau of the Census for the Bureau of Labor Statistics (BLS).

The establishment survey provides the information on the employment, hours, and earnings of workers on nonfarm payrolls that appears in the B tables, marked ESTABLISHMENT DATA. This information is collected from payroll records by BLS in cooperation with State agencies. In June 1996, the sample included about 390,000 establishments employing over 47 million people.

For both surveys, the data for a given month relate to a particular week or pay period. In the household survey, the reference week is generally the calendar week that contains the 12th day of the month. In the establishment survey, the reference period is the pay period including the 12th, which may or may not correspond directly to the calendar week.

Coverage, definitions, and differences between surveys

Household survey. The sample is selected to reflect the entire civilian noninstitutional population. Based on responses to a series of questions on work and job search activities, each person 16 years and over in a sample household is classified as employed, unemployed, or not in the labor force.

People are classified as *employed* if they did any work at all as paid employees during the reference week; worked in their own business, profession, or on their own farm; or worked without pay at least 15 hours in a family business or farm. People are also counted as employed if they were temporarily absent from their jobs because of illness, bad weather, vacation, labor-management disputes, or personal reasons.

People are classified as *unemployed* if they meet all of the following criteria: They had no employment during the reference week; they were available for work at that time; and they made specific efforts to find employment sometime during the 4-week period ending with the reference week. Persons laid off from a job and expecting recall need not be looking for work to be counted as unemployed. The unemployment data derived from the household survey in no way depend upon the eligibility for or receipt of unemployment insurance benefits.

The *civilian labor force* is the sum of employed and unemployed persons. Those not classified as employed or unemployed are *not in the labor force*. The *unemployment rate* is the number unemployed as a percent of the labor force. The *labor force participation rate* is the labor force as a percent of the population, and the *employment-population ratio* is the employed as a percent of the population.

Establishment survey. The sample establishments are drawn from private nonfarm businesses such as factories, offices, and stores, as well as Federal, State, and local government entities. *Employees on nonfarm payrolls* are those who received pay for any part of the reference pay period, including persons on paid leave. Persons are counted in each

job they hold. *Hours and earnings* data are for private businesses and relate only to production workers in the goods-producing sector and nonsupervisory workers in the service-producing sector.

Differences in employment estimates. The numerous conceptual and methodological differences between the household and establishment surveys result in important distinctions in the employment estimates derived from the surveys. Among these are:

• The household survey includes agricultural workers, the self-employed, unpaid family workers, and private household workers among the employed. These groups are excluded from the establishment survey.

• The household survey includes people on unpaid leave among the employed. The establishment survey does not.

• The household survey is limited to workers 16 years of age and older. The establishment survey is not limited by age.

• The household survey has no duplication of individuals, because individuals are counted only once, even if they hold more than one job. In the establishment survey, employees working at more than one job and thus appearing on more than one payroll would be counted separately for each appearance.

Other differences between the two surveys are described in "Comparing Employment Estimates from Household and Payroll Surveys," which may be obtained from BLS upon request.

Seasonal adjustment

Over the course of a year, the size of the nation's labor force and the levels of employment and unemployment undergo sharp fluctuations due to such seasonal events as changes in weather, reduced or expanded production, harvests, major holidays, and the opening and closing of schools. The effect of such seasonal variation can be very large; seasonal fluctuations may account for as much as 95 percent of the month-to-month changes in unemployment.

Because these seasonal events follow a more or less regular pattern each year, their influence on statistical trends can be eliminated by adjusting the statistics from month to month. These adjustments make nonseasonal developments, such as declines in economic activity or increases in the participation of women in the labor force, easier to spot. For example, the large number of youth entering the labor force each June is likely to obscure any other changes that have taken place relative to May, making it difficult to determine if the level of economic activity has risen or declined. However, because the effect of students finishing school in previous years is known, the statistics for the current year can be adjusted to allow for a comparable change. Insofar as the seasonal adjustment is made correctly, the adjusted figure provides a more useful tool with which to analyze changes in economic activity.

In both the household and establishment surveys, most seasonally adjusted series are independently adjusted. However, the adjusted series for many major estimates, such as total payroll employment, employment in most major industry divisions, total employment, and unemployment are computed by aggregating independently adjusted component series. For example, total unemployment is derived by summing the adjusted series for four major age-sex components; this

differs from the unemployment estimate that would be obtained by directly adjusting the total or by combining the duration, reasons, or more detailed age categories.

The numerical factors used to make the seasonal adjustments are recalculated twice a year. For the household survey, the factors are calculated for the January-June period and again for the July-December period. For the establishment survey, updated factors for seasonal adjustment are calculated for the May-October period and introduced along with new benchmarks, and again for the November-April period. In both surveys, revisions to historical data are made once a year.

Reliability of the estimates

Statistics based on the household and establishment surveys are subject to both sampling and nonsampling error. When a sample rather than the entire population is surveyed, there is a chance that the sample estimates may differ from the "true" population values they represent. The exact difference, or *sampling error*, varies depending on the particular sample selected, and this variability is measured by the standard error of the estimate. There is about a 90-percent chance, or level of confidence, that an estimate based on a sample will differ by no more than 1.6 standard errors from the "true" population value because of sampling error. BLS analyses are generally conducted at the 90-percent level of confidence.

For example, the confidence interval for the monthly change in total employment from the household survey is on the order of plus or minus 376,000. Suppose the estimate of total employment increases by 100,000 from one month to the next. The 90-percent confidence interval on the monthly change would range from -276,000 to 476,000 (100,000 +/- 376,000). These figures do not mean that the sample results are off by these magnitudes, but rather that there is about a 90-percent chance that the "true" over-the-month change lies within this interval. Since this range includes values of less than zero, we could not say with confidence that employment had, in fact, increased. If, however, the reported employment rise was half a million, then all of the values within the 90-percent confidence interval would be greater than zero. In this case, it is likely (at least a 90-percent chance) that an employment rise had, in fact, occurred. The 90-percent confidence interval for the monthly change in unemployment is +/- 258,000, and for the monthly change in the unemployment rate it is +/- .21 percentage point.

In general, estimates involving many individuals or establishments have lower standard errors (relative to the size of the estimate) than estimates which are based on a small number of observations. The precision of estimates is also improved when the data are cumulated over time such as for quarterly and annual averages. The seasonal adjustment process can also improve the stability of the monthly estimates.

The household and establishment surveys are also affected by *nonsampling error*. Nonsampling errors can occur for many reasons, including the failure to sample a segment of the population, inability to obtain information for all respondents in the sample, inability or unwillingness of respondents to provide correct information on a timely basis, mistakes made by respondents, and errors made in the collection or processing of the data.

For example, in the establishment survey, estimates for the most recent 2 months are based on substantially incomplete returns; for this reason, these estimates are labeled preliminary in the tables. It is only after two successive revisions to a monthly estimate, when nearly all sample reports have been received, that the estimate is considered final.

Another major source of nonsampling error in the establishment survey is the inability to capture, on a timely basis, employment generated by new firms. To correct for this systematic underestimation of employment growth (and other sources of error), a process known as bias adjustment is included in the survey's estimating procedures, whereby a specified number of jobs is added to the monthly sample-based change. The size of the monthly bias adjustment is based largely on past relationships between the sample-based estimates of employment and the total counts of employment described below.

The sample-based estimates from the establishment survey are adjusted once a year (on a lagged basis) to universe counts of payroll employment obtained from administrative records of the unemployment insurance program. The difference between the March sample-based employment estimates and the March universe counts is known as a benchmark revision, and serves as a rough proxy for total survey error. The new benchmarks also incorporate changes in the classification of industries. Over the past decade, the benchmark revision for total nonfarm employment has averaged 0.2 percent, ranging from zero to 0.6 percent.

Additional statistics and other information

More comprehensive statistics are contained in *Employment and Earnings*, published each month by BLS. It is available for $13.00 per issue or $35.00 per year from the U.S. Government Printing Office, Washington, DC 20402. All orders must be prepaid by sending a check or money order payable to the Superintendent of Documents, or by charging to Mastercard or Visa.

Employment and Earnings also provides measures of sampling error for the household survey data published in this release. For unemployment and other labor force categories, these measures appear in tables 1-B through 1-H of its "Explanatory Notes." Measures of the reliability of the data drawn from the establishment survey and the actual amounts of revision due to benchmark adjustments are provided in tables 2-B through 2-G of that publication.

Information in this release will be made available to sensory impaired individuals upon request. Voice phone: 202-606-STAT; TDD phone: 202-606-5897; TDD message referral phone: 1-800-326-2577.

Table A-1. Employment status of the civilian population by sex and age

(Numbers in thousands)

Employment status, sex, and age	Not seasonally adjusted			Seasonally adjusted[1]					
	Dec. 1995	Nov. 1996	Dec. 1996	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996	Dec. 1996
TOTAL									
Civilian noninstitutional population	199,508	201,463	201,636	199,508	200,847	201,060	201,273	201,463	201,636
Civilian labor force	132,006	134,973	134,583	132,422	133,898	134,291	134,636	134,831	135,022
Participation rate	66.2	67.0	66.7	66.4	66.7	66.8	66.9	66.9	67.0
Employed	125,136	128,157	127,903	125,068	126,988	127,248	127,617	127,644	127,855
Employment-population ratio	62.7	63.6	63.4	62.7	63.2	63.3	63.4	63.4	63.4
Agriculture	3,072	3,253	3,131	3,344	3,418	3,480	3,450	3,354	3,426
Nonagricultural industries	122,064	124,904	124,772	121,724	123,570	123,768	124,167	124,290	124,429
Unemployed	6,872	6,816	6,680	7,354	6,910	7,043	7,019	7,187	7,167
Unemployment rate	5.2	5.0	5.0	5.6	5.2	5.2	5.2	5.3	5.3
Not in labor force	67,500	66,489	67,053	67,086	66,949	66,770	66,637	66,632	66,614
Men, 16 years and over									
Civilian noninstitutional population	95,661	96,654	96,742	95,661	96,335	96,447	96,556	96,654	96,742
Civilian labor force	70,936	72,119	71,959	71,363	71,961	72,087	72,363	72,362	72,414
Participation rate	74.2	74.6	74.4	74.7	74.7	74.7	74.9	74.9	74.9
Employed	67,049	68,565	68,434	67,290	68,368	68,304	68,647	68,589	68,707
Employment-population ratio	70.1	70.9	70.7	70.3	70.8	70.8	71.1	71.0	71.0
Unemployed	3,887	3,555	3,525	4,073	3,593	3,783	3,716	3,773	3,707
Unemployment rate	5.5	4.9	4.9	5.7	5.0	5.2	5.1	5.2	5.1
Men, 20 years and over									
Civilian noninstitutional population	88,172	88,971	89,040	88,172	88,650	88,733	88,840	88,971	89,040
Civilian labor force	67,164	68,375	68,227	67,303	68,044	68,056	68,273	68,391	68,369
Participation rate	76.2	76.9	76.6	76.3	76.8	76.7	76.8	76.9	76.8
Employed	63,961	65,502	65,326	63,997	65,165	64,978	65,299	65,349	65,367
Employment-population ratio	72.5	73.6	73.4	72.6	73.5	73.2	73.5	73.4	73.4
Agriculture	2,121	2,324	2,213	2,257	2,347	2,366	2,400	2,355	2,356
Nonagricultural industries	61,840	63,178	63,112	61,740	62,818	62,612	62,899	62,994	63,011
Unemployed	3,203	2,874	2,901	3,306	2,879	3,078	2,974	3,042	3,002
Unemployment rate	4.8	4.2	4.3	4.9	4.2	4.5	4.4	4.4	4.4
Women, 16 years and over									
Civilian noninstitutional population	103,847	104,809	104,894	103,847	104,512	104,614	104,717	104,809	104,894
Civilian labor force	61,072	62,854	62,624	61,059	61,937	62,204	62,273	62,469	62,608
Participation rate	58.8	60.0	59.7	58.8	59.3	59.5	59.5	59.6	59.7
Employed	58,087	59,593	59,469	57,778	58,620	58,944	58,970	59,055	59,148
Employment-population ratio	55.9	56.9	56.7	55.6	56.1	56.3	56.3	56.3	56.4
Unemployed	2,986	3,261	3,156	3,281	3,317	3,260	3,303	3,414	3,460
Unemployment rate	4.9	5.2	5.0	5.4	5.4	5.2	5.3	5.5	5.5
Women, 20 years and over									
Civilian noninstitutional population	96,633	97,366	97,457	96,633	97,146	97,226	97,290	97,366	97,457
Civilian labor force	57,506	59,100	58,893	57,334	58,230	58,349	58,432	58,574	58,728
Participation rate	59.5	60.7	60.4	59.3	59.9	60.0	60.1	60.2	60.3
Employed	55,049	56,395	56,253	54,680	55,498	55,644	55,681	55,753	55,871
Employment-population ratio	57.0	57.9	57.7	56.6	57.1	57.2	57.2	57.3	57.3
Agriculture	771	760	715	831	826	844	800	786	772
Nonagricultural industries	54,278	55,635	55,538	53,849	54,672	54,800	54,881	54,967	55,099
Unemployed	2,456	2,705	2,640	2,654	2,732	2,705	2,751	2,821	2,857
Unemployment rate	4.3	4.6	4.5	4.6	4.7	4.6	4.7	4.8	4.9
Both sexes, 16 to 19 years									
Civilian noninstitutional population	14,703	15,126	15,139	14,703	15,051	15,101	15,143	15,126	15,139
Civilian labor force	7,338	7,498	7,463	7,785	7,624	7,886	7,931	7,866	7,925
Participation rate	49.9	49.6	49.3	52.9	50.7	52.2	52.4	52.0	52.3
Employed	6,125	6,261	6,324	6,391	6,325	6,626	6,637	6,542	6,617
Employment-population ratio	41.7	41.4	41.8	43.5	42.0	43.9	43.8	43.3	43.7
Agriculture	180	169	203	256	245	270	250	213	298
Nonagricultural industries	5,946	6,092	6,121	6,135	6,080	6,356	6,387	6,329	6,319
Unemployed	1,213	1,237	1,139	1,394	1,299	1,260	1,294	1,324	1,308
Unemployment rate	16.5	16.5	15.3	17.9	17.0	16.0	16.3	16.8	16.5

[1] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.

NOTE: Seasonally adjusted data have been revised based on the experience through December 1996.

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Table A-2. Employment status of the civilian population by race, sex, age, and Hispanic origin

(Numbers in thousands)

Employment status, race, sex, age, and Hispanic origin	Not seasonally adjusted			Seasonally adjusted[1]					
	Dec. 1995	Nov. 1996	Dec. 1996	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996	Dec. 1996
WHITE									
Civilian noninstitutional population	167,545	168,924	169,044	167,545	168,489	168,639	168,788	168,924	169,044
Civilian labor force	111,616	113,881	113,573	112,025	112,904	113,334	113,625	113,816	113,991
Participation rate	66.6	67.4	67.2	66.9	67.0	67.2	67.3	67.4	67.4
Employed	106,490	108,900	108,686	106,525	107,853	108,217	108,527	108,570	108,734
Employment-population ratio	63.6	64.5	64.3	63.6	64.0	64.2	64.3	64.3	64.3
Unemployed	5,126	4,981	4,887	5,500	5,051	5,117	5,098	5,246	5,257
Unemployment rate	4.6	4.4	4.3	4.9	4.5	4.5	4.5	4.6	4.6
Men, 20 years and over									
Civilian labor force	57,675	58,546	58,510	57,795	58,347	58,343	58,539	58,549	58,623
Participation rate	76.7	77.3	77.2	76.9	77.3	77.2	77.4	77.3	77.4
Employed	55,256	56,410	56,302	55,311	56,143	56,042	56,294	56,276	56,356
Employment-population ratio	73.5	74.5	74.3	73.6	74.4	74.2	74.4	74.3	74.4
Unemployed	2,419	2,136	2,208	2,484	2,204	2,301	2,245	2,273	2,267
Unemployment rate	4.2	3.6	3.8	4.3	3.8	3.9	3.8	3.9	3.9
Women, 20 years and over									
Civilian labor force	47,764	48,981	48,740	47,696	48,162	48,314	48,380	48,558	48,686
Participation rate	59.1	60.3	60.0	59.0	59.4	59.5	59.6	59.8	59.9
Employed	45,934	47,029	46,860	45,684	46,232	46,394	46,439	46,530	46,614
Employment-population ratio	56.9	57.9	57.6	56.5	57.0	57.2	57.2	57.3	57.3
Unemployed	1,829	1,952	1,880	2,012	1,930	1,920	1,941	2,028	2,072
Unemployment rate	3.8	4.0	3.9	4.2	4.0	4.0	4.0	4.2	4.3
Both sexes, 16 to 19 years									
Civilian labor force	6,177	6,354	6,323	6,534	6,534	6,677	6,706	6,709	6,682
Participation rate	53.2	53.0	52.7	56.3	53.8	56.0	56.1	56.0	55.6
Employed	5,300	5,461	5,524	5,530	5,478	5,781	5,794	5,764	5,764
Employment-population ratio	45.7	45.6	46.0	47.7	46.1	48.5	48.5	48.1	48.0
Unemployed	878	893	800	1,004	917	896	912	945	918
Unemployment rate	14.2	14.0	12.6	15.4	14.3	13.4	13.6	14.1	13.7
Men	15.4	15.6	14.0	16.1	15.7	14.8	15.4	15.5	14.8
Women	13.0	12.4	11.3	14.6	12.9	11.9	11.6	12.6	12.6
BLACK									
Civilian noninstitutional population	23,419	23,762	23,794	23,419	23,650	23,690	23,728	23,762	23,794
Civilian labor force	14,888	15,298	15,254	14,943	15,297	15,184	15,276	15,290	15,306
Participation rate	63.6	64.4	64.1	63.8	64.7	64.1	64.4	64.3	64.3
Employed	13,489	13,772	13,782	13,413	13,699	13,566	13,647	13,673	13,693
Employment-population ratio	57.6	58.0	57.9	57.3	57.9	57.3	57.5	57.5	57.5
Unemployed	1,399	1,526	1,472	1,530	1,598	1,618	1,629	1,617	1,613
Unemployment rate	9.4	10.0	9.6	10.2	10.4	10.7	10.7	10.6	10.5
Men, 20 years and over									
Civilian labor force	6,681	6,916	6,808	6,713	6,874	6,834	6,838	6,899	6,833
Participation rate	71.5	72.9	71.7	71.8	73.0	72.6	72.4	72.7	72.0
Employed	6,080	6,294	6,261	6,057	6,301	6,174	6,199	6,264	6,235
Employment-population ratio	65.1	66.3	65.9	64.8	66.9	65.6	65.6	66.0	65.7
Unemployed	602	622	547	656	573	660	639	635	598
Unemployment rate	9.0	9.0	8.0	9.8	8.3	9.7	9.3	9.2	8.6
Women, 20 years and over									
Civilian labor force	7,327	7,537	7,581	7,287	7,477	7,435	7,487	7,499	7,544
Participation rate	62.3	63.4	63.6	62.0	63.1	62.7	63.0	63.0	63.3
Employed	6,815	6,910	6,935	6,742	6,802	6,788	6,822	6,833	6,851
Employment-population ratio	58.0	58.1	58.2	57.4	57.4	57.2	57.4	57.4	57.5
Unemployed	512	627	646	545	675	647	665	666	693
Unemployment rate	7.0	8.3	8.5	7.5	9.0	8.7	8.9	8.9	9.2
Both sexes, 16 to 19 years									
Civilian labor force	880	845	864	943	946	915	951	892	929
Participation rate	38.0	35.5	36.2	40.7	39.6	38.0	39.6	37.5	38.9
Employed	594	569	585	614	596	604	626	576	607
Employment-population ratio	25.7	23.9	24.5	26.5	25.0	25.1	26.1	24.2	25.4
Unemployed	286	276	279	329	350	311	325	316	322
Unemployment rate	32.5	32.7	32.3	34.9	37.0	34.0	34.2	35.4	34.7
Men	37.7	37.5	37.6	38.9	38.2	37.2	36.5	41.2	38.6
Women	27.5	28.3	27.8	31.0	35.8	30.9	31.9	30.0	31.2

See footnotes at end of table.

Table A-2. Employment status of the civilian population by race, sex, age, and Hispanic origin — Continued

(Numbers in thousands)

Employment status, race, sex, age, and Hispanic origin	Not seasonally adjusted			Seasonally adjusted[1]					
	Dec. 1995	Nov. 1996	Dec. 1996	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996	Dec. 1996
HISPANIC ORIGIN									
Civilian noninstitutional population	18,889	19,454	19,505	18,889	19,292	19,346	19,398	19,454	19,505
Civilian labor force	12,374	13,248	13,151	12,390	12,864	12,871	12,989	13,182	13,150
Participation rate	65.5	68.1	67.4	65.6	66.7	66.5	67.0	67.8	67.4
Employed	11,267	12,183	12,216	11,204	11,736	11,801	11,928	12,094	12,141
Employment-population ratio	59.6	62.6	62.6	59.3	60.8	61.0	61.5	62.2	62.2
Unemployed	1,108	1,065	935	1,186	1,128	1,070	1,061	1,088	1,009
Unemployment rate	9.0	8.0	7.1	9.6	8.8	8.3	8.2	8.3	7.7

[1] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.
NOTE: Detail for the above race and Hispanic-origin groups will not sum to totals because data for the "other races" group are not presented and Hispanics are included in both the white and black population groups. Seasonally adjusted data have been revised based on the experience through December 1996.

Table A-3. Selected employment indicators

(In thousands)

Category	Not seasonally adjusted			Seasonally adjusted					
	Dec. 1995	Nov. 1996	Dec. 1996	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996	Dec. 1996
CHARACTERISTIC									
Total employed, 16 years and over	125,136	128,157	127,903	125,068	126,988	127,248	127,617	127,644	127,855
Married men, spouse present	42,129	42,681	42,628	42,082	42,588	42,330	42,617	42,631	42,607
Married women, spouse present	32,366	32,867	32,913	32,071	32,665	32,679	32,537	32,509	32,631
Women who maintain families	7,209	7,498	7,443	7,271	7,338	7,420	7,392	7,444	7,500
OCCUPATION									
Managerial and professional specialty	35,856	37,509	37,411	35,680	36,605	36,759	36,917	37,177	37,234
Technical, sales, and administrative support	37,474	37,962	38,208	37,152	37,818	37,812	37,951	37,821	37,902
Service occupations	16,730	17,298	17,089	16,884	17,343	17,435	17,295	17,408	17,271
Precision production, craft, and repair	13,484	13,644	13,595	13,467	13,660	13,681	13,587	13,508	13,574
Operators, fabricators, and laborers	18,328	18,476	18,435	18,226	18,031	18,069	18,235	18,259	18,310
Farming, forestry, and fishing	3,264	3,268	3,164	3,614	3,515	3,557	3,565	3,445	3,496
CLASS OF WORKER									
Agriculture:									
Wage and salary workers	1,618	1,757	1,712	1,778	1,814	1,834	1,813	1,829	1,878
Self-employed workers	1,422	1,435	1,369	1,535	1,525	1,557	1,560	1,464	1,475
Unpaid family workers	32	61	50	42	64	91	71	68	68
Nonagricultural industries:									
Wage and salary workers	113,084	115,737	115,515	112,742	114,539	114,765	115,018	115,133	115,212
Government	18,274	18,456	18,331	18,206	18,265	18,092	18,132	18,270	18,266
Private industries	94,810	97,282	97,184	94,536	96,274	96,673	96,886	96,863	96,946
Private households	973	953	951	964	973	981	992	956	934
Other industries	93,838	96,329	96,233	93,572	95,301	95,692	95,894	95,907	96,012
Self-employed workers	8,883	9,035	9,120	8,881	8,896	8,811	8,967	9,023	9,109
Unpaid family workers	97	132	137	105	122	129	137	140	149
PERSONS AT WORK PART TIME									
All industries:									
Part time for economic reasons	4,410	3,860	4,352	4,411	4,339	4,302	4,286	3,983	4,338
Slack work or business conditions	2,609	2,052	2,470	2,492	2,437	2,398	2,258	2,107	2,353
Could only find part-time work	1,485	1,499	1,548	1,589	1,596	1,617	1,683	1,559	1,653
Part time for noneconomic reasons	18,477	19,398	18,898	17,408	18,184	17,823	17,754	17,957	17,868
Nonagricultural industries:									
Part time for economic reasons	4,218	3,700	4,140	4,258	4,182	4,130	4,118	3,815	4,182
Slack work or business conditions	2,491	1,959	2,313	2,394	2,310	2,284	2,147	2,001	2,214
Could only find part-time work	1,464	1,480	1,526	1,560	1,588	1,580	1,647	1,543	1,622
Part time for noneconomic reasons	17,882	18,751	18,307	16,775	17,555	17,204	17,123	17,313	17,237

NOTE: Persons at work excludes employed persons who were absent from their jobs during the entire reference week for reasons such as vacation, illness, or industrial dispute. Part time for noneconomic reasons excludes persons who usually work full time but worked only 1 to 34 hours during the reference week for reasons such as holidays, illness, and bad weather. Seasonally adjusted data have been revised based on the experience through December 1996.

Table A-4. Selected unemployment indicators, seasonally adjusted

Category	Number of unemployed persons (in thousands)			Unemployment rates[1]					
	Dec. 1995	Nov. 1996	Dec. 1996	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996	Dec. 1996
CHARACTERISTIC									
Total, 16 years and over	7,354	7,187	7,167	5.6	5.2	5.2	5.2	5.3	5.3
Men, 20 years and over	3,306	3,042	3,002	4.9	4.2	4.5	4.4	4.4	4.4
Women, 20 years and over	2,654	2,821	2,857	4.6	4.7	4.6	4.7	4.8	4.9
Both sexes, 16 to 19 years	1,394	1,324	1,308	17.9	17.0	16.0	16.3	16.8	16.5
Married men, spouse present	1,370	1,327	1,306	3.2	2.9	3.0	3.0	3.0	3.0
Married women, spouse present	1,239	1,227	1,261	3.7	3.4	3.4	3.5	3.8	3.7
Women who maintain families	531	715	686	6.8	8.5	8.3	8.5	8.8	8.4
Full-time workers	5,919	5,800	5,754	5.5	5.0	5.1	5.1	5.3	5.2
Part-time workers	1,442	1,384	1,425	5.9	5.9	5.6	5.6	5.6	5.8
OCCUPATION[2]									
Managerial and professional specialty	899	868	899	2.5	2.2	2.3	2.2	2.3	2.4
Technical, sales, and administrative support	1,719	1,800	1,837	4.4	4.4	4.5	4.5	4.5	4.6
Precision production, craft, and repair	829	811	770	5.8	5.3	5.4	5.5	5.7	5.4
Operators, fabricators, and laborers	1,676	1,524	1,505	8.4	8.0	7.5	7.7	7.7	7.6
Farming, forestry, and fishing	296	288	293	7.6	6.4	7.1	7.0	7.7	7.7
INDUSTRY									
Nonagricultural private wage and salary workers	5,830	5,595	5,538	5.8	5.4	5.3	5.3	5.5	5.4
Goods-producing industries	1,832	1,717	1,699	6.5	5.7	5.8	5.8	6.1	5.9
Mining	43	28	44	6.9	4.5	5.1	5.8	4.9	7.6
Construction	733	689	633	11.3	9.1	9.3	9.6	10.3	9.4
Manufacturing	1,056	1,000	1,022	5.0	4.7	4.4	4.7	4.7	4.8
Durable goods	548	563	594	4.4	4.0	4.2	4.4	4.5	4.7
Nondurable goods	508	437	428	5.8	5.8	4.7	5.1	5.1	5.0
Service-producing industries	3,998	3,878	3,839	5.5	5.2	5.2	5.1	5.2	5.2
Transportation and public utilities	335	250	282	4.8	4.1	4.1	4.4	3.5	4.0
Wholesale and retail trade	1,700	1,654	1,597	6.5	6.3	6.2	6.2	6.3	6.2
Finance, insurance, and real estate	215	211	230	2.9	2.5	3.0	2.9	2.9	3.1
Services	1,748	1,763	1,730	5.5	5.2	5.3	5.0	5.3	5.2
Government workers	509	533	572	2.7	2.8	3.0	2.9	2.8	3.0
Agricultural wage and salary workers	249	224	216	12.3	7.8	10.8	10.8	10.9	10.3

[1] Unemployment as a percent of the civilian labor force.
[2] Seasonally adjusted unemployment data for service occupations are not available because the seasonal component, which is small relative to the trend-cycle and irregular components, cannot be separated with sufficient precision.
NOTE: Data have been revised based on the experience through December 1996.

Table A-5. Duration of unemployment

(Numbers in thousands)

Duration	Not seasonally adjusted			Seasonally adjusted					
	Dec. 1995	Nov. 1996	Dec. 1996	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996	Dec. 1996
NUMBER OF UNEMPLOYED									
Less than 5 weeks	2,327	2,721	2,313	2,683	2,534	2,522	2,556	2,819	2,671
5 to 14 weeks	2,405	2,109	2,406	2,368	2,199	2,245	2,265	2,252	2,357
15 weeks and over	2,140	1,986	1,962	2,140	2,273	2,277	2,294	2,184	2,179
15 to 26 weeks	1,014	907	883	1,120	1,003	1,040	1,062	1,018	976
27 weeks and over	1,126	1,079	1,079	1,247	1,270	1,237	1,232	1,166	1,203
Average (mean) duration, in weeks	18.2	15.8	15.6	18.4	17.2	16.9	16.7	16.0	15.8
Median duration, in weeks	8.2	7.3	7.7	8.2	8.5	8.6	8.3	7.7	7.8
PERCENT DISTRIBUTION									
Total unemployed	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 5 weeks	33.9	39.9	34.6	36.2	36.2	35.8	35.9	38.9	37.1
5 to 14 weeks	35.0	30.9	36.0	31.9	31.4	31.9	31.8	31.0	32.7
15 weeks and over	31.1	29.1	29.4	31.9	32.4	32.3	32.2	30.1	30.2
15 to 26 weeks	14.8	13.3	13.2	15.1	14.3	14.8	14.9	14.0	13.5
27 weeks and over	16.4	15.8	16.1	16.8	18.1	17.6	17.3	16.1	16.7

NOTE: Seasonally adjusted data have been revised based on the experience through December 1996.

Table A-6. Reason for unemployment

(Numbers in thousands)

Reason	Not seasonally adjusted			Seasonally adjusted					
	Dec. 1995	Nov. 1996	Dec. 1996	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996	Dec. 1996
NUMBER OF UNEMPLOYED									
Job losers and persons who completed temporary jobs	3,533	3,126	3,230	3,512	3,095	3,236	3,171	3,261	3,221
On temporary layoff	1,090	871	1,045	1,024	931	989	957	994	987
Not on temporary layoff	2,443	2,255	2,184	2,488	2,164	2,247	2,214	2,267	2,234
Permanent job losers	1,716	1,549	1,514	(1)	(1)	(1)	(1)	(1)	(1)
Persons who completed temporary jobs	727	706	670	(1)	(1)	(1)	(1)	(1)	(1)
Job leavers	795	838	771	879	775	800	797	825	845
Reentrants	2,098	2,370	2,189	2,443	2,467	2,441	2,489	2,523	2,556
New entrants	448	482	491	587	552	559	577	586	626
PERCENT DISTRIBUTION									
Total unemployed	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Job losers and persons who completed temporary jobs	51.4	45.9	48.3	47.3	44.9	46.0	45.1	45.3	44.4
On temporary layoff	15.9	12.8	15.8	13.8	13.5	14.1	13.6	13.8	13.6
Not on temporary layoff	35.6	33.1	32.7	33.5	31.4	31.9	31.5	31.5	30.8
Job leavers	11.6	12.3	11.5	11.8	11.2	11.4	11.3	11.5	11.7
Reentrants	30.5	34.8	32.8	32.9	35.8	34.7	35.4	35.1	35.3
New entrants	6.5	7.1	7.3	7.9	8.0	7.9	8.2	8.1	8.6
UNEMPLOYED AS A PERCENT OF THE CIVILIAN LABOR FORCE									
Job losers and persons who completed temporary jobs	2.7	2.3	2.4	2.7	2.3	2.4	2.4	2.4	2.4
Job leavers	.6	.6	.6	.6	.6	.6	.6	.6	.6
Reentrants	1.6	1.8	1.6	1.8	1.8	1.8	1.8	1.9	1.9
New entrants	.3	.4	.4	.4	.4	.4	.4	.4	.5

[1] Not available.

NOTE: Seasonally adjusted data have been revised based on the experience through December 1996.

Table A-7. Range of alternative measures of labor underutilization

(Percent)

Measure	Not seasonally adjusted			Seasonally adjusted					
	Dec. 1995	Nov. 1996	Dec. 1996	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996	Dec. 1996
U-1 Persons unemployed 15 weeks or longer, as a percent of the civilian labor force	1.6	1.5	1.5	1.8	1.7	1.7	1.7	1.6	1.6
U-2 Job losers and persons who completed temporary jobs, as a percent of the civilian labor force	2.7	2.3	2.4	2.7	2.3	2.4	2.4	2.4	2.4
U-3 Total unemployed, as a percent of the civilian labor force (official unemployment rate)	5.2	5.0	5.0	5.6	5.2	5.2	5.2	5.3	5.3
U-4 Total unemployed plus discouraged workers, as a percent of the civilian labor force plus discouraged workers	5.5	5.3	5.2	(1)	(1)	(1)	(1)	(1)	(1)
U-5 Total unemployed, plus discouraged workers, plus all other marginally attached workers, as a percent of the civilian labor force plus all marginally attached workers	6.4	6.1	6.0	(1)	(1)	(1)	(1)	(1)	(1)
U-6 Total unemployed, plus all marginally attached workers, plus total employed part time for economic reasons, as a percent of the civilian labor force plus all marginally attached workers	9.7	8.9	9.2	(1)	(1)	(1)	(1)	(1)	(1)

[1] Not available.

NOTE: This range of alternative measures of labor underutilization replaces the U1-U7 range published in table A-7 of this release prior to 1994. Marginally attached workers are persons who currently are neither working nor looking for work but indicate that they want and are available for a job and have looked for work sometime in the recent past. Discouraged workers, a subset of the marginally attached, have given a job-market related reason for not currently looking for a job. Persons employed part time for economic reasons are those who want and are available for full-time work but have had to settle for a part-time schedule. For further information, see "BLS introduces new range of alternative unemployment measures," in the October 1995 issue of the Monthly Labor Review. Seasonally adjusted data have been revised based on the experience through December 1996.

Table A-8. Unemployed persons by sex and age, seasonally adjusted

Age and sex	Number of unemployed persons (in thousands)			Unemployment rates[1]					
	Dec. 1995	Nov. 1996	Dec. 1996	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996	Dec. 1996
Total, 16 years and over	7,354	7,187	7,187	5.6	5.2	5.2	5.2	5.3	5.3
16 to 24 years	2,628	2,531	2,526	12.4	11.7	11.5	11.7	11.9	11.9
16 to 19 years	1,394	1,324	1,308	17.9	17.0	16.0	16.3	16.8	16.5
16 to 17 years	659	555	641	20.5	18.9	17.6	18.0	17.0	19.3
18 to 19 years	742	788	677	16.2	15.7	14.7	15.3	17.0	14.7
20 to 24 years	1,232	1,207	1,218	9.2	8.8	8.9	8.9	9.0	9.1
25 years and over	4,784	4,630	4,696	4.3	4.0	4.1	4.0	4.1	4.1
25 to 54 years	4,214	4,131	4,147	4.4	4.1	4.2	4.2	4.2	4.2
55 years and over	553	493	542	3.5	3.2	3.3	3.2	3.1	3.3
Men, 16 years and over	4,073	3,773	3,707	5.7	5.0	5.2	5.1	5.2	5.1
16 to 24 years	1,466	1,378	1,366	13.0	12.0	12.1	12.3	12.5	12.3
16 to 19 years	767	731	705	18.9	18.2	17.5	18.1	18.4	17.4
16 to 17 years	354	309	343	21.3	21.5	19.2	19.6	18.9	20.6
18 to 19 years	413	448	364	17.2	18.1	18.2	17.1	19.0	15.4
20 to 24 years	699	647	661	9.7	8.4	9.0	8.9	9.2	9.3
25 years and over	2,610	2,390	2,337	4.3	3.8	4.0	3.8	3.9	3.8
25 to 54 years	2,305	2,098	2,032	4.5	3.9	4.2	4.0	4.0	3.9
55 years and over	295	283	303	3.4	3.2	3.3	3.0	3.1	3.4
Women, 16 years and over	3,281	3,414	3,480	5.4	5.4	5.2	5.3	5.5	5.5
16 to 24 years	1,160	1,153	1,160	11.7	11.5	10.9	11.0	11.3	11.4
16 to 19 years	627	593	603	16.8	15.8	14.4	14.4	15.2	15.5
16 to 17 years	305	246	298	19.8	18.3	16.0	18.2	15.1	18.1
18 to 19 years	329	340	313	15.2	15.2	13.1	13.4	15.0	14.0
20 to 24 years	533	560	557	8.6	8.9	8.7	8.9	8.9	8.9
25 years and over	2,174	2,240	2,359	4.2	4.2	4.2	4.2	4.3	4.5
25 to 54 years	1,909	2,033	2,115	4.3	4.3	4.2	4.4	4.5	4.7
55 years and over	258	210	239	3.7	3.0	3.4	3.4	3.0	3.3

[1] Unemployment as a percent of the civilian labor force.

NOTE: Data have been revised based on the experience through December 1996.

Table A-9. Persons not in the labor force and multiple jobholders by sex, not seasonally adjusted

(Numbers in thousands)

Category	Total		Men		Women	
	Dec. 1995	Dec. 1996	Dec. 1995	Dec. 1996	Dec. 1995	Dec. 1996
NOT IN THE LABOR FORCE						
Total not in the labor force	67,500	67,053	24,725	24,783	42,775	42,270
Persons who currently want a job	5,466	4,746	2,318	2,045	3,147	2,702
Searched for work and available to work now[1]	1,619	1,463	809	707	811	756
Reason not currently looking:						
Discouragement over job prospects[2]	425	334	261	199	164	135
Reasons other than discouragement[3]	1,194	1,128	547	508	647	620
MULTIPLE JOBHOLDERS						
Total multiple jobholders[4]	7,700	8,219	3,965	4,293	3,735	3,926
Percent of total employed	6.2	6.4	5.9	6.3	6.4	6.6
Primary job full time, secondary job part time	4,295	4,505	2,466	2,672	1,829	1,833
Primary and secondary jobs both part time	1,741	1,892	514	572	1,227	1,320
Primary and secondary jobs both full time	234	209	156	138	78	70
Hours vary on primary or secondary job	1,403	1,569	809	882	594	687

[1] Data refer to persons who have searched for work during the prior 12 months and were available to take a job during the reference week.
[2] Includes thinks no work available, could not find work, lacks schooling or training, employer thinks too young or old, and other types of discrimination.
[3] Includes those who did not actively look for work in the prior 4 weeks for such reasons as child-care and transportation problems, as well as a small number for which reason for nonparticipation was not determined.
[4] Includes persons who work part time on their primary job and full time on their secondary job(s), not shown separately.

Table B-1. Employees on nonfarm payrolls by industry

(In thousands)

Industry	Not seasonally adjusted				Seasonally adjusted					
	Dec. 1995	Oct. 1996	Nov. 1996P	Dec. 1996P	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996P	Dec. 1996P
Total	118,936	121,242	121,526	121,501	118,136	120,052	120,050	120,311	120,438	120,700
Total private	99,226	101,454	101,553	101,620	98,789	100,446	100,531	100,803	100,953	101,184
Goods-producing	24,090	24,648	24,506	24,274	24,160	24,298	24,257	24,284	24,308	24,348
Mining	570	572	572	565	570	570	567	566	567	565
Metal mining	50.2	51.6	52.0	51.6	51	52	52	53	53	52
Coal mining	102.4	97.9	97.7	96.6	102	99	98	98	97	97
Oil and gas extraction	313.2	310.9	312.0	310.3	310	311	309	308	309	307
Nonmetallic minerals, except fuels	103.9	111.3	109.8	106.4	107	108	108	108	108	109
Construction	5,131	5,733	5,630	5,415	5,223	5,437	5,449	5,464	5,487	5,510
General building contractors	1,198.2	1,271.7	1,260.6	1,240.9	1,202	1,232	1,233	1,233	1,238	1,245
Heavy construction, except building	705.4	842.1	796.7	719.7	750	770	765	765	763	765
Special trade contractors	3,227.7	3,619.4	3,572.3	3,454.7	3,271	3,435	3,451	3,466	3,486	3,500
Manufacturing	18,389	18,343	18,304	18,294	18,367	18,291	18,241	18,254	18,254	18,273
Production workers	12,722	12,686	12,645	12,633	12,708	12,626	12,591	12,606	12,605	12,617
Durable goods	10,695	10,715	10,719	10,734	10,667	10,711	10,675	10,684	10,690	10,708
Production workers	7,332	7,342	7,341	7,353	7,309	7,339	7,307	7,318	7,321	7,330
Lumber and wood products	762.0	777.9	773.6	770.2	763	769	766	769	770	771
Furniture and fixtures	508.3	501.9	503.8	505.5	506	499	500	499	501	503
Stone, clay, and glass products	528.1	546.8	542.0	533.5	534	536	537	538	537	539
Primary metal industries	711.8	702.7	703.9	704.5	709	706	706	702	702	702
Blast furnaces and basic steel products ...	241.6	233.8	234.4	234.5	240	237	237	234	234	233
Fabricated metal products ...	1,446.5	1,462.9	1,465.6	1,466.1	1,441	1,456	1,456	1,459	1,461	1,460
Industrial machinery and equipment	2,086.7	2,080.2	2,083.6	2,093.4	2,084	2,089	2,082	2,088	2,087	2,090
Computer and office equipment	357.1	359.2	360.2	360.8	357	359	359	360	360	360
Electronic and other electrical equipment	1,651.6	1,650.2	1,650.7	1,648.7	1,645	1,654	1,649	1,648	1,646	1,642
Electronic components and accessories ..	606.4	610.5	610.4	612.0	605	615	613	611	611	611
Transportation equipment	1,780.0	1,768.7	1,775.2	1,793.5	1,764	1,784	1,764	1,764	1,772	1,781
Motor vehicles and equipment	975.4	951.2	950.8	962.7	959	967	955	950	951	953
Aircraft and parts	447.2	464.3	471.1	475.8	446	454	455	463	469	474
Instruments and related products ...	830.4	832.4	831.4	833.4	831	833	831	833	830	834
Miscellaneous manufacturing	389.6	390.8	389.0	385.2	390	385	384	384	384	386
Nondurable goods	7,694	7,628	7,585	7,560	7,700	7,580	7,566	7,570	7,564	7,565
Production workers	5,390	5,344	5,304	5,280	5,399	5,287	5,284	5,288	5,284	5,287
Food and kindred products	1,659.3	1,682.6	1,651.9	1,638.4	1,674	1,641	1,639	1,641	1,648	1,652
Tobacco products	44.0	43.2	42.8	43.3	41	39	40	41	42	41
Textile mill products	648.1	633.8	630.8	628.8	649	633	631	633	628	629
Apparel and other textile products ...	880.4	840.9	832.3	819.0	883	837	835	834	827	822
Paper and allied products	685.4	673.9	675.3	675.8	685	673	674	674	675	675
Printing and publishing	1,545.6	1,527.0	1,531.1	1,534.2	1,535	1,527	1,527	1,528	1,525	1,523
Chemicals and allied products	1,024.1	1,016.9	1,014.6	1,016.0	1,025	1,021	1,017	1,017	1,017	1,017
Petroleum and coal products	137.8	140.0	138.4	135.4	140	139	139	138	138	138
Rubber and misc. plastics products ...	969.0	974.8	974.1	975.2	967	976	971	971	974	974
Leather and leather products	100.7	94.5	93.3	94.2	101	94	93	93	92	94
Service-producing	94,846	96,594	97,020	97,227	93,976	95,754	95,793	96,027	96,130	96,352
Transportation and public utilities	6,310	6,387	6,403	6,425	6,249	6,342	6,337	6,338	6,355	6,360
Transportation	4,040	4,103	4,112	4,141	3,977	4,056	4,052	4,059	4,065	4,077
Railroad transportation	235.7	232.4	232.4	230.7	237	230	230	231	231	231
Local and interurban passenger transit	451.5	477.4	476.8	479.8	436	463	458	458	460	463
Trucking and warehousing	1,927.7	1,901.7	1,902.6	1,916.3	1,874	1,882	1,877	1,877	1,872	1,866
Water transportation	168.8	171.7	169.5	167.4	172	173	171	172	173	171
Transportation by air	819.2	858.2	867.5	882.8	820	850	855	859	866	882
Pipelines, except natural gas	14.4	13.8	13.8	13.9	14	14	14	14	14	14
Transportation services	422.5	447.4	449.1	449.6	424	444	447	448	449	450
Communications and public utilities	2,270	2,284	2,291	2,284	2,272	2,286	2,285	2,279	2,290	2,283
Communications	1,362.1	1,397.8	1,404.9	1,400.5	1,362	1,398	1,398	1,393	1,403	1,398
Electric, gas, and sanitary services	907.9	885.8	885.6	883.3	910	888	887	886	887	885
Wholesale trade	6,499	6,661	6,661	6,661	6,498	6,603	6,619	6,643	6,648	6,657
Durable goods	3,801	3,881	3,887	3,893	3,802	3,871	3,877	3,885	3,889	3,893
Nondurable goods	2,698	2,780	2,774	2,768	2,696	2,732	2,742	2,758	2,759	2,764

See footnotes at end of table.

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Table B-1. Employees on nonfarm payrolls by industry -- Continued

(In thousands)

Industry	Not seasonally adjusted				Seasonally adjusted					
	Dec. 1995	Oct. 1996	Nov. 1996P	Dec. 1996P	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996P	Dec. 1996P
Retail trade	21,923	21,837	22,183	22,487	21,334	21,672	21,702	21,803	21,835	21,883
Building materials and garden supplies	871.2	937.6	934.1	932.9	882	923	930	936	940	945
General merchandise stores	2,956.9	2,811.7	2,978.0	3,036.5	2,674	2,745	2,737	2,765	2,763	2,748
Department stores	2,593.4	2,487.3	2,626.8	2,666.0	2,348	2,422	2,415	2,442	2,437	2,421
Food stores	3,461.1	3,457.0	3,487.4	3,519.3	3,402	3,442	3,440	3,454	3,454	3,457
Automotive dealers and service stations	2,208.2	2,309.1	2,304.6	2,301.9	2,220	2,291	2,297	2,303	2,308	2,314
New and used car dealers	1,005.4	1,044.4	1,042.9	1,042.0	1,008	1,037	1,039	1,041	1,042	1,045
Apparel and accessory stores	1,206.8	1,101.2	1,154.2	1,201.6	1,106	1,098	1,100	1,108	1,105	1,101
Furniture and home furnishings stores	984.0	999.5	1,029.7	1,058.4	945	989	991	998	1,006	1,017
Eating and drinking places	7,389.0	7,484.4	7,462.8	7,501.7	7,441	7,489	7,504	7,517	7,528	7,555
Miscellaneous retail establishments	2,845.6	2,736.6	2,832.1	2,934.2	2,664	2,695	2,703	2,722	2,731	2,746
Finance, insurance, and real estate	6,866	7,007	7,016	7,034	6,887	6,999	7,009	7,026	7,036	7,053
Finance	3,265	3,342	3,356	3,372	3,266	3,339	3,341	3,355	3,361	3,372
Depository institutions	2,020.3	2,027.1	2,031.8	2,036.5	2,020	2,028	2,029	2,035	2,035	2,036
Commercial banks	1,466.1	1,472.2	1,477.3	1,482.4	1,465	1,471	1,474	1,478	1,479	1,481
Savings institutions	267.1	259.1	257.8	256.5	267	265	261	260	258	257
Nondepository institutions	484.5	523.0	528.6	535.0	484	519	522	526	530	534
Mortgage bankers and brokers	215.9	235.1	237.8	241.9	(1)	(1)	(1)	(1)	(1)	(1)
Security and commodity brokers	526.8	548.1	551.0	554.1	528	548	547	549	552	555
Holding and other investment offices	233.6	244.1	244.2	246.2	234	244	243	245	244	247
Insurance	2,247	2,258	2,259	2,264	2,251	2,259	2,265	2,263	2,263	2,267
Insurance carriers	1,542.6	1,547.5	1,546.9	1,550.3	1,546	1,551	1,554	1,551	1,550	1,553
Insurance agents, brokers, and service	704.4	710.6	711.9	713.7	705	708	711	712	713	714
Real estate	1,354	1,407	1,401	1,398	1,370	1,401	1,403	1,408	1,412	1,414
Services[2]	33,538	34,914	34,784	34,739	33,661	34,532	34,607	34,709	34,771	34,883
Agricultural services	543.7	644.6	622.7	570.9	591	619	617	621	627	620
Hotels and other lodging places	1,580.3	1,691.0	1,629.4	1,626.0	1,648	1,684	1,686	1,690	1,692	1,698
Personal services	1,152.7	1,155.5	1,157.4	1,173.4	1,167	1,179	1,182	1,184	1,185	1,189
Business services	7,024.6	7,449.4	7,397.8	7,385.8	6,963	7,269	7,267	7,292	7,281	7,326
Services to buildings	888.8	892.9	886.4	880.3	892	893	891	894	885	884
Personnel supply services	2,596.7	2,836.6	2,770.6	2,741.6	2,534	2,696	2,691	2,697	2,670	2,685
Help supply services	2,285.2	2,521.7	2,453.2	2,422.6	2,239	2,393	2,387	2,391	2,361	2,373
Computer and data processing services	1,139.3	1,236.1	1,253.2	1,269.7	1,137	1,218	1,226	1,239	1,252	1,267
Auto repair, services, and parking	1,041.3	1,117.3	1,118.8	1,127.5	1,047	1,105	1,108	1,117	1,121	1,132
Miscellaneous repair services	357.8	368.0	368.9	369.4	359	366	367	366	371	371
Motion pictures	508.3	522.2	525.4	536.9	508	524	539	536	529	535
Amusement and recreation services	1,319.2	1,485.4	1,393.3	1,394.4	1,473	1,515	1,522	1,534	1,548	1,560
Health services	9,425.8	9,640.8	9,669.5	9,691.0	9,412	9,591	9,621	9,642	9,661	9,677
Offices and clinics of medical doctors	1,641.4	1,689.6	1,693.5	1,704.9	1,635	1,681	1,686	1,689	1,692	1,699
Nursing and personal care facilities	1,719.0	1,755.6	1,762.3	1,764.0	1,715	1,749	1,751	1,754	1,757	1,761
Hospitals	3,818.0	3,866.1	3,873.3	3,881.6	3,818	3,849	3,863	3,869	3,875	3,882
Home health care services	651.3	663.9	666.6	663.8	650	658	661	663	664	662
Legal services	922.4	932.7	939.4	941.3	924	935	934	937	941	943
Educational services	2,085.5	2,148.4	2,182.8	2,135.5	1,976	2,014	2,005	2,015	2,025	2,026
Social services	2,372.9	2,420.1	2,430.9	2,430.8	2,360	2,392	2,410	2,416	2,420	2,421
Child day care services	581.1	594.0	595.4	593.5	567	577	575	580	579	579
Residential care	648.8	670.1	673.8	674.6	649	672	672	673	675	675
Museums and botanical and zoological gardens	79.1	86.5	83.4	84.1	82	85	85	85	86	87
Membership organizations	2,124.7	2,140.8	2,142.2	2,143.5	2,136	2,154	2,150	2,151	2,153	2,155
Engineering and management services	2,807.5	2,918.5	2,928.7	2,934.7	2,821	2,906	2,921	2,930	2,938	2,950
Engineering and architectural services	822.4	857.3	860.1	857.8	825	848	853	854	859	861
Management and public relations	861.0	923.5	929.3	933.2	865	907	917	922	931	937
Services, nec	45.0	46.0	45.9	46.2	(3)	(3)	(3)	(3)	(3)	(3)
Government	19,710	19,788	19,973	19,881	19,347	19,606	19,519	19,508	19,485	19,516
Federal	2,819	2,716	2,718	2,749	2,790	2,739	2,739	2,731	2,732	2,720
Federal, except Postal Service	1,924.3	1,866.8	1,857.8	1,848.7	1,939	1,888	1,883	1,878	1,872	1,864
State	4,722	4,756	4,781	4,732	4,634	4,674	4,658	4,640	4,638	4,648
Education	2,052.4	2,088.3	2,122.0	2,078.1	1,939	1,984	1,975	1,960	1,958	1,967
Other State government	2,669.2	2,667.8	2,658.8	2,654.3	2,695	2,690	2,683	2,680	2,680	2,681
Local	12,169	12,316	12,474	12,400	11,923	12,193	12,122	12,137	12,115	12,148
Education	6,984.6	7,043.3	7,155.3	7,143.8	6,649	6,862	6,787	6,794	6,796	6,801
Other local government	5,184.7	5,272.8	5,318.3	5,255.8	5,274	5,331	5,335	5,343	5,319	5,347

[1] This series is not suitable for seasonal adjustment because it has very little seasonal and irregular movement. Thus, the not seasonally adjusted series can be used for analysis of cyclical and long-term trends.

[2] Includes other industries, not shown separately.

[3] This series is not published seasonally adjusted because the seasonal component, which is small relative to the trend-cycle and irregular components, cannot be separated with sufficient precision.

P = preliminary.

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Table B-2. Average weekly hours of production or nonsupervisory workers[1] on private nonfarm payrolls by industry

Industry	Not seasonally adjusted				Seasonally adjusted					
	Dec. 1995	Oct. 1996	Nov. 1996p	Dec. 1996p	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996p	Dec. 1996p
Total private	34.5	34.5	34.5	34.9	34.3	34.4	34.7	34.3	34.5	34.8
Goods-producing	41.2	41.5	41.4	41.8	40.6	41.1	41.0	41.0	41.0	41.3
Mining	45.0	45.9	45.4	46.4	44.7	44.8	45.4	45.4	44.7	46.1
Construction	38.1	39.9	38.7	38.5	38.5	38.7	38.6	38.8	38.8	38.8
Manufacturing	42.0	41.9	42.1	42.8	41.2	41.7	41.7	41.7	41.7	42.0
Overtime hours	4.7	4.7	4.8	5.1	4.2	4.5	4.5	4.4	4.5	4.7
Durable goods	42.8	42.6	42.8	43.6	41.9	42.5	42.5	42.4	42.4	42.7
Overtime hours	5.1	4.9	5.1	5.5	4.5	4.8	4.8	4.7	4.7	4.9
Lumber and wood products	40.4	41.4	41.1	41.2	40.1	40.9	40.9	40.9	41.1	41.0
Furniture and fixtures	40.7	40.2	40.4	41.4	39.4	39.5	39.5	39.5	39.8	40.1
Stone, clay, and glass products	42.6	44.0	43.4	43.2	42.9	43.2	43.2	43.3	43.1	43.5
Primary metal industries	44.4	44.4	44.5	45.0	43.7	44.5	44.5	44.4	44.1	44.3
Blast furnaces and basic steel products ...	44.6	44.4	45.2	44.9	44.2	44.2	44.4	44.6	44.8	44.4
Fabricated metal products	43.2	42.7	42.9	43.8	42.0	42.5	42.4	42.4	42.3	42.7
Industrial machinery and equipment	44.1	42.9	43.2	44.4	42.9	42.8	43.0	42.9	42.9	43.2
Electronic and other electrical equipment	42.3	41.7	42.1	42.9	41.2	41.7	41.6	41.5	41.4	41.8
Transportation equipment	43.9	44.2	44.5	45.6	42.7	44.7	44.3	43.9	44.1	44.6
Motor vehicles and equipment	45.5	45.0	45.1	46.6	43.8	46.4	45.2	44.7	44.5	45.2
Instruments and related products	42.1	41.7	42.1	42.9	41.2	41.7	41.9	41.7	41.7	41.9
Miscellaneous manufacturing	40.1	40.3	40.6	41.0	39.5	39.8	39.8	39.8	39.9	40.5
Nondurable goods	40.8	40.9	41.2	41.7	40.2	40.6	40.7	40.6	40.7	41.0
Overtime hours	4.1	4.4	4.4	4.6	3.9	4.0	4.1	4.1	4.1	4.4
Food and kindred products	41.3	41.6	41.8	42.1	40.6	40.6	41.0	41.1	41.2	41.5
Tobacco products	39.1	41.2	41.2	42.4	38.7	39.8	40.3	39.9	40.6	42.1
Textile mill products	40.6	41.1	41.6	41.9	40.3	40.9	40.9	40.9	41.3	41.6
Apparel and other textile products	37.3	37.6	37.6	38.1	36.8	37.4	37.3	37.4	37.3	37.6
Paper and allied products	43.7	43.7	44.1	44.6	42.9	43.3	43.5	43.4	43.6	43.8
Printing and publishing	38.5	38.4	38.7	38.9	37.8	38.4	38.3	38.2	38.2	38.3
Chemicals and allied products	43.9	43.2	43.7	44.3	43.1	43.3	43.1	43.2	43.3	43.5
Petroleum and coal products	43.2	43.6	44.0	44.4	(2)	(2)	(2)	(2)	(2)	(2)
Rubber and misc. plastics products	42.2	41.6	41.6	42.7	41.6	41.7	41.6	41.5	41.2	41.9
Leather and leather products	38.1	39.0	39.5	39.5	37.7	38.9	38.8	38.4	39.2	39.1
Service-producing	32.7	32.6	32.6	33.1	32.6	32.6	33.0	32.6	32.8	33.0
Transportation and public utilities	39.6	39.8	39.9	40.1	39.6	39.7	40.1	39.6	39.9	40.1
Wholesale trade	38.3	38.3	38.3	38.7	38.2	38.3	38.5	38.1	38.3	38.6
Retail trade	29.0	28.7	28.6	29.2	28.7	28.8	28.9	28.7	28.9	28.8
Finance, insurance, and real estate	35.7	35.7	35.8	36.8	(2)	(2)	(2)	(2)	(2)	(2)
Services	32.3	32.4	32.4	32.7	(2)	(2)	(2)	(2)	(2)	(2)

[1] Data relate to production workers in mining and manufacturing; construction workers in construction; and nonsupervisory workers in transportation and public utilities; wholesale and retail trade; finance, insurance, and real estate; and services. These groups account for approximately four-fifths of the total employees on private nonfarm payrolls.

[2] These series are not published seasonally adjusted because the seasonal component, which is small relative to the trend-cycle and irregular components, cannot be separated with sufficient precision.

p = preliminary.

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Table B-3. Average hourly and weekly earnings of production or nonsupervisory workers[1] on private nonfarm payrolls by industry

Industry	Average hourly earnings				Average weekly earnings			
	Dec. 1995	Oct. 1996	Nov. 1996P	Dec. 1996P	Dec. 1995	Oct. 1996	Nov. 1996P	Dec. 1996P
Total private	$11.61	$11.96	$12.00	$12.07	$400.55	$412.62	$414.00	$421.24
Seasonally adjusted	11.61	11.90	11.99	12.05	398.22	408.17	413.66	419.34
Goods-producing	13.22	13.62	13.63	13.73	544.66	565.23	564.28	573.91
Mining	15.54	15.54	15.66	15.86	699.30	713.29	710.96	735.90
Construction	15.13	15.73	15.59	15.64	576.45	627.63	603.33	602.14
Manufacturing	12.60	12.84	12.92	13.09	529.20	538.00	543.93	560.25
Durable goods	13.14	13.42	13.49	13.66	562.39	571.69	577.37	595.58
Lumber and wood products	10.29	10.56	10.57	10.65	415.72	437.18	434.43	438.78
Furniture and fixtures	10.00	10.28	10.28	10.42	407.00	413.26	415.31	431.39
Stone, clay, and glass products	12.53	12.91	12.93	12.93	533.78	568.04	561.16	558.58
Primary metal industries	14.70	15.10	15.20	15.21	652.68	670.44	676.40	684.45
Blast furnaces and basic steel products	17.35	17.99	18.12	18.13	773.81	798.76	819.02	814.04
Fabricated metal products	12.39	12.52	12.60	12.77	535.25	534.60	540.54	559.33
Industrial machinery and equipment	13.47	13.71	13.81	14.02	594.03	588.16	596.59	622.49
Electronic and other electrical equipment	11.93	12.32	12.34	12.53	504.64	513.74	519.51	537.54
Transportation equipment	16.92	17.30	17.37	17.60	742.79	764.66	772.97	802.56
Motor vehicles and equipment	17.60	17.81	17.92	18.18	800.80	801.45	808.19	847.19
Instruments and related products	12.89	13.26	13.31	13.39	542.67	552.94	560.35	574.43
Miscellaneous manufacturing	10.28	10.48	10.54	10.59	412.23	422.34	427.92	434.19
Nondurable goods	11.84	12.01	12.11	12.26	483.07	491.21	498.93	511.24
Food and kindred products	11.18	11.18	11.40	11.53	461.73	465.09	476.52	485.41
Tobacco products	17.84	17.99	18.91	18.84	697.54	741.19	779.09	798.82
Textile mill products	9.57	9.72	9.76	9.91	388.54	399.49	406.02	415.23
Apparel and other textile products	7.82	8.02	8.01	8.14	291.69	301.55	301.18	310.13
Paper and allied products	14.51	14.75	14.85	15.03	634.09	644.58	654.89	670.34
Printing and publishing	12.49	12.80	12.81	12.94	480.87	491.52	495.75	503.37
Chemicals and allied products	16.06	16.32	16.40	16.44	705.03	705.02	716.68	728.29
Petroleum and coal products	19.43	19.32	19.53	20.42	839.38	842.35	859.32	906.65
Rubber and misc. plastics products	11.15	11.27	11.32	11.47	470.53	468.83	470.91	489.77
Leather and leather products	8.34	8.72	8.73	8.86	317.75	340.08	344.84	349.97
Service-producing	11.08	11.39	11.45	11.52	362.32	371.31	373.27	381.31
Transportation and public utilities	14.44	14.54	14.61	14.61	571.82	578.69	582.94	585.86
Wholesale trade	12.61	12.91	13.04	13.17	482.96	494.45	499.43	509.68
Retail trade	7.80	8.11	8.13	8.14	226.20	232.76	232.52	237.69
Finance, insurance, and real estate	12.57	12.88	12.97	13.07	448.75	459.82	464.33	480.98
Services	11.66	11.94	12.03	12.18	376.62	386.86	389.77	398.29

[1] See footnote 1, table B-2.
P = preliminary.
NOTE: Average hourly and weekly earnings for durable goods, industrial machinery and equipment, electronic and other electrical equipment, and transportation equipment from March 1995 forward may differ slightly from those previously published because of corrections to the estimates for some component industries.

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Table B-4. Average hourly earnings of production or nonsupervisory workers[1] on private nonfarm payrolls by industry, seasonally adjusted

Industry	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996P	Dec. 1996P	Percent change from: Nov. 1996- Dec. 1996
Total private:							
Current dollars	$11.61	$11.87	$11.91	$11.90	$11.99	$12.05	0.5
Constant (1982) dollars[2]	7.44	7.45	7.45	7.42	7.45	N.A.	(3)
Goods-producing	13.19	13.56	13.56	13.57	13.62	13.70	.6
Mining	15.51	15.63	15.67	15.65	15.76	15.82	.4
Construction	15.15	15.49	15.53	15.55	15.55	15.67	.8
Manufacturing	12.51	12.89	12.87	12.88	12.93	13.01	.6
Excluding overtime[4]	11.89	12.22	12.21	12.21	12.26	12.31	.4
Service-producing	11.08	11.30	11.36	11.35	11.45	11.51	.5
Transportation and public utilities	14.39	14.61	14.58	14.50	14.58	14.56	-.1
Wholesale trade	12.60	12.88	12.99	12.91	13.06	13.16	.8
Retail trade	7.81	8.01	8.01	8.09	8.13	8.15	.2
Finance, insurance, and real estate	12.55	12.85	12.92	12.86	13.01	13.05	.3
Services	11.57	11.82	11.89	11.90	12.00	12.08	.7

[1] See footnote 1, table B-2.
[2] The Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) is used to deflate this series.
[3] Change was .4 percent from October 1996 to November 1996, the latest month available.
[4] Derived by assuming that overtime hours are paid at the rate of time and one-half.
N.A. = not available.
P = preliminary.

Table B-5. Indexes of aggregate weekly hours of production or nonsupervisory workers[1] on private nonfarm payrolls by industry

(1982=100)

Industry	Not seasonally adjusted				Seasonally adjusted					
	Dec. 1995	Oct. 1996	Nov. 1996P	Dec. 1996P	Dec. 1995	Aug. 1996	Sept. 1996	Oct. 1996	Nov. 1996P	Dec. 1996P
Total private	135.4	138.8	138.7	140.5	134.3	136.9	138.0	137.1	138.0	139.2
Goods-producing	109.7	114.0	112.7	112.5	108.8	110.6	110.3	110.5	110.6	111.6
Mining	53.6	56.1	55.6	56.0	53.2	54.3	54.7	54.7	53.9	55.6
Construction	136.4	163.0	154.6	146.3	141.2	148.0	147.9	149.0	149.8	150.8
Manufacturing	107.7	107.2	107.4	109.0	105.6	106.3	105.9	105.9	106.0	106.9
Durable goods	109.6	109.2	109.7	111.9	106.8	108.9	108.3	108.2	108.3	109.3
Lumber and wood products	133.6	140.6	138.5	138.3	132.9	136.9	136.2	137.1	138.0	137.9
Furniture and fixtures	128.5	125.7	126.4	130.1	123.6	122.9	122.9	122.6	123.6	125.1
Stone, clay, and glass products	105.4	113.8	110.8	108.3	107.6	109.2	109.2	109.9	108.9	110.4
Primary metal industries	93.2	92.2	92.7	93.9	91.3	92.9	92.6	92.4	91.6	92.0
Blast furnaces and basic steel products ...	74.1	71.8	73.1	72.6	72.6	72.6	72.5	72.5	73.2	71.7
Fabricated metal products	116.6	116.9	117.6	120.0	112.8	115.8	115.3	115.5	115.4	116.4
Industrial machinery and equipment	106.3	102.5	103.4	107.0	103.3	102.8	102.7	102.8	102.9	103.8
Electronic and other electrical equipment	110.7	108.1	109.2	110.6	107.4	108.7	108.0	107.4	106.9	107.4
Transportation equipment	122.1	122.1	123.4	128.1	117.6	125.0	122.3	121.4	122.7	124.4
Motor vehicles and equipment	169.2	162.5	163.2	171.0	160.2	172.9	164.5	161.8	161.1	164.1
Instruments and related products	74.4	73.7	74.3	76.0	72.6	73.5	74.0	73.6	73.5	74.2
Miscellaneous manufacturing	103.7	104.7	105.1	104.6	102.6	101.1	101.1	101.1	101.4	103.7
Nondurable goods	105.2	104.5	104.3	105.1	103.8	102.6	102.6	102.7	102.8	103.7
Food and kindred products	113.6	117.6	115.4	115.0	113.1	110.6	111.8	112.4	113.1	114.6
Tobacco products	66.2	69.9	68.5	72.7	61.3	57.2	61.9	63.2	68.4	66.7
Textile mill products	92.4	91.9	92.5	93.1	91.8	91.1	90.9	91.3	91.5	92.5
Apparel and other textile products	79.2	76.1	75.3	75.1	78.3	75.3	74.9	74.8	74.1	74.2
Paper and allied products	110.6	109.5	110.5	112.1	108.6	107.9	108.8	108.8	109.3	110.0
Printing and publishing	126.0	123.3	124.9	125.6	122.7	123.6	123.0	122.8	122.7	122.4
Chemicals and allied products	103.4	99.2	100.1	101.3	101.6	99.8	99.2	99.2	99.3	99.7
Petroleum and coal products	71.8	76.3	75.6	74.3	74.3	75.8	75.1	73.4	74.8	77.2
Rubber and misc. plastics products	143.8	142.6	142.6	146.5	141.7	142.8	142.1	141.5	140.9	143.3
Leather and leather products	45.8	43.8	43.5	44.2	45.8	43.0	42.9	42.5	42.8	43.8
Service-producing	146.9	150.0	150.4	153.1	145.7	148.7	150.4	149.0	150.2	151.6
Transportation and public utilities	128.5	131.1	131.6	132.7	127.0	129.4	130.8	129.2	130.4	131.2
Wholesale trade	123.3	126.5	126.4	127.7	123.1	125.3	126.3	125.4	126.2	127.3
Retail trade	138.2	135.6	137.7	142.7	132.5	135.0	135.7	135.5	136.4	136.3
Finance, insurance, and real estate	123.5	125.9	126.3	130.5	124.1	126.3	129.6	125.0	127.6	131.1
Services	172.0	179.6	178.7	180.2	173.4	177.5	179.8	178.2	179.4	181.6

[1] See footnote 1, table B-2.

P = preliminary.

ESTABLISHMENT DATA

Table B-6. Diffusion indexes of employment change, seasonally adjusted

(Percent)

Time span	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Private nonfarm payrolls, 356 industries[1]												
Over 1-month span:												
1992	43.7	43.7	50.0	57.3	55.5	50.1	52.2	49.0	52.1	56.3	53.2	57.4
1993	60.0	60.8	51.3	58.6	61.7	55.2	57.7	57.0	61.8	59.7	61.8	59.6
1994	58.8	62.1	66.0	64.2	60.3	63.5	61.5	62.1	60.8	61.5	63.1	63.9
1995	63.2	59.3	54.9	54.6	51.4	55.1	54.1	57.4	51.8	54.8	56.3	59.4
1996	52.4	63.2	60.0	52.4	62.2	57.4	55.8	57.3	52.7	63.1	P56.9	P60.3
Over 3-month span:												
1992	39.7	41.9	49.7	57.0	58.4	55.8	50.6	50.1	52.8	54.4	57.6	61.2
1993	63.8	61.2	61.1	59.8	63.1	62.9	59.7	63.1	64.5	67.1	64.6	63.5
1994	67.1	69.5	70.4	68.7	66.4	66.0	68.5	69.5	65.3	65.6	68.0	67.8
1995	66.6	63.2	56.9	53.4	54.2	52.9	56.6	53.8	54.2	54.6	58.3	57.0
1996	60.7	61.8	61.2	60.0	61.0	63.8	60.3	56.7	60.8	P59.6	P65.6	
Over 6-month span:												
1992	43.3	46.8	47.5	52.5	54.9	56.7	53.8	52.2	55.5	57.6	63.9	61.9
1993	63.3	65.2	63.8	64.2	62.4	65.9	65.7	63.9	66.3	67.3	70.6	69.5
1994	70.8	71.6	69.0	69.8	69.5	69.5	69.2	69.0	69.2	68.5	69.1	66.6
1995	66.3	60.8	58.7	54.4	53.5	54.1	53.1	56.3	55.9	54.1	56.2	61.8
1996	60.3	62.9	63.8	63.8	62.6	59.0	65.2	P62.6	P62.6			
Over 12-month span:												
1992	47.2	42.3	42.7	44.1	48.0	52.5	55.8	60.7	59.7	61.4	62.9	62.9
1993	64.9	63.9	64.0	65.4	67.0	67.6	67.6	67.0	70.2	69.5	69.2	70.1
1994	70.2	71.6	71.8	71.8	72.1	71.8	71.5	72.1	70.1	69.4	65.7	65.0
1995	62.6	60.8	60.1	61.2	58.1	57.7	54.5	58.7	58.6	57.3	59.4	59.8
1996	61.0	61.7	61.5	61.1	P62.6	P65.2						
Manufacturing payrolls, 139 industries[1]												
Over 1-month span:												
1992	37.4	39.9	43.9	56.8	50.0	48.9	52.2	44.6	47.5	47.8	51.4	54.7
1993	52.5	56.5	50.7	45.7	54.0	45.7	49.3	49.3	59.4	53.2	53.6	55.0
1994	56.5	60.1	59.7	58.6	53.2	57.9	57.6	53.6	55.8	54.7	57.2	59.4
1995	56.8	55.0	46.0	45.3	39.2	40.3	45.0	45.0	42.4	45.3	46.4	47.5
1996	42.1	48.2	48.2	39.6	53.2	49.6	43.9	50.0	44.6	54.3	P46.8	P52.9
Over 3-month span:												
1992	29.9	33.5	43.9	49.6	55.4	53.2	46.8	47.8	45.7	47.5	51.1	54.7
1993	60.8	58.3	53.2	47.8	48.9	54.0	50.4	58.3	57.6	59.7	54.7	57.6
1994	63.7	64.4	66.2	60.8	56.1	56.8	60.8	58.6	54.0	56.1	60.1	60.8
1995	60.4	51.8	43.5	34.9	33.1	32.0	33.1	35.6	38.8	39.6	40.6	38.8
1996	38.8	39.9	37.8	43.2	45.3	47.5	45.7	40.6	50.7	P46.0	P52.2	
Over 6-month span:												
1992	32.4	34.9	39.9	46.8	52.2	54.3	48.2	47.8	51.1	51.1	56.8	56.5
1993	56.5	59.0	56.8	55.4	50.7	57.9	59.4	56.5	57.8	58.6	64.4	60.8
1994	62.2	64.4	60.4	61.5	59.0	56.8	56.5	57.2	60.1	55.8	59.7	55.8
1995	55.4	45.0	38.5	33.5	27.7	28.8	28.8	30.6	33.5	33.1	34.2	38.8
1996	32.0	37.4	37.1	38.1	42.4	37.8	48.6	P43.5	P45.0			
Over 12-month span:												
1992	42.4	36.7	36.3	36.0	39.6	45.7	50.0	55.8	57.9	56.8	58.3	56.5
1993	56.8	57.9	55.8	58.6	57.2	57.6	58.6	59.0	61.2	59.7	60.1	57.6
1994	57.9	58.6	60.8	60.8	60.8	63.3	59.4	60.1	57.2	55.8	49.6	47.5
1995	42.1	40.3	39.9	40.6	34.5	31.7	25.9	28.8	28.1	24.1	27.0	29.1
1996	33.1	33.1	33.8	35.6	P36.3	P41.7						

[1] Based on seasonally adjusted data for 1-, 3-, and 6-month spans and unadjusted data for the 12-month span. Data are centered within the span.

P = preliminary.

NOTE: Figures are the percent of industries with employment increasing plus one-half of the industries with unchanged employment, where 50 percent indicates an equal balance between industries with increasing and decreasing employment.

**BRIEFING ON THE BLS REACTION TO THE FINAL REPORT OF THE
ADVISORY COMMISSION TO STUDY THE CONSUMER PRICE INDEX
December 19, 1996**

Recommendation Concerning the Objective of the CPI

- The Commission recommends that the Bureau of Labor Statistics (BLS) adopt
  production of a cost-of-living index as its objective in measuring consumer prices
  (Recommendation i from the Executive Summary).

    - The BLS already operates within a cost-of-living framework in producing
      the Consumer Price Index (CPI) and will continue to do so. As is stated in
      the BLS Handbook of Methods, this framework guides operational
      decisions about the construction of the CPI. We would expect to adopt
      changes to the CPI that moved it closer to being a COLI, provided there
      were not compelling associated disadvantages, in terms of timeliness,
      understandability, reproducibility, objectivity or variance, for example.

    - It should be recognized that the CPI is limited in scope. In economic
      theory, there are many alternative cost of living indexes. Any COLI
      reflects the ability of consumers to substitute among goods and services as
      relative prices change. But a COLI can be defined either net or gross of
      income taxes, including or excluding changes in services provided by
      governments, or even including or excluding changes in the natural
      environment. The CPI excludes income taxes and the services paid for
      through taxes, and it excludes the effects of AIDS and other environmental
      factors mentioned in the Commission's Report. Saying that the BLS
      operates within a cost-of-living framework in producing the CPI does not
      carry any implication regarding the appropriate scope of the index.

Recommendations Concerning the Formulas Used to Construct the CPI

- Construction of the CPI Subindexes

    - The Commission recommends adoption of the geometric mean formula
      below the stratum level, arguing that it more accurately reflects consumer
      substitution (Recommendation v). The Commission's estimate, drawn
      from BLS research, is that this step would slow the rate of growth in the
      CPI by 0.25 percent per year.

- BLS is about to begin producing a monthly experimental geometric mean index for users to see and evaluate.

  - In some strata, assuming a high degree of substitutability seems reasonable (e.g., bananas, or cakes, cupcakes and cookies).

  - There are other strata, however, in which the assumption about substitutability embedded in the geometric mean formula seems less obviously appropriate (e.g., prescription drugs, or physicians' services).

  - A complete list of the CPI item strata and a brief description of the geometric mean issue (with a list of examples of likely high-substitution and lower-substitution strata) have been included in your briefing package.

- Following a period of evaluation, the BLS will make a decision regarding adoption of the geometric mean formula in producing the CPI. Any such adoption most likely would not apply to all strata.

- Aggregation of the CPI Subindexes

  - Superlative measures use special formulas and current expenditure data. Under certain assumptions about, for example, market equilibrium, they accurately measure changes in the cost of living by taking account of how consumers are actually substituting in response to relative price change. Recent BLS research cited by the Commission indicates that superlative measures constructed to account for cross-strata substitution have risen by about 0.15 percent per year less rapidly than the CPI.

  - These superlative indexes cannot be produced in real time precisely because they require current expenditure data, which is impossible to collect and process on a monthly turnaround.

  - The Commission proposes that the BLS replace the formula currently used to aggregate the component subindexes to form the overall CPI with a geometric mean formula using annually-updated expenditure weights (Recommendation iii). Such a measure would not be a true superlative index. The Commission's apparent intent is to suggest a measure that could be produced each month on a timely basis and would more closely approximate, at least empirically, the movements of a true superlative.

  - The specific measure proposed almost certainly would understate the true change in the cost of living.

- 3 -

- • People often assume that substitution bias would be solved by updating the CPI expenditure weights more often. This is not the case, either theoretically or empirically.

- • More frequent weight updates might well be desirable in their own right, though annual weight updating could create its own problems (under certain circumstances, it could lead to a bias called chain drift).

- • Our initital reaction to the idea of adopting an ad hoc formula to correct for substitution bias in the CPI is negative. We would strongly prefer to devote our energies to producing a true superlative index, necessarily an after-the-fact measure but something we could comfortably defend as an accurate cost-of-living index.

- • The Commission also recommends production of an annual supplemental measure that would use a superlative formula (Recommendation iv). It would be published with a lag and subject to revision as new data become available.

  - • Such a measure probably would be similar to several experimental superlative indexes that we have been publishing since 1993 (using Fisher and Tornquist formulas, chained and fixed-base weights).

  - • We are receptive to the spirit of this recommendation.

Quality, New Goods and New Kinds of Outlets

- • Nearly two-thirds (0.7 percent per year) of the 1.1 percent per year overall bias in the CPI as estimated by the Commission comes from alleged deficiencies in the treatment of changes in the quality of goods and services and the emergence of new goods (0.6 percent) and the emergence of new kinds of outlets (0.1 percent).

- • Impact of Actual Adjustments Made for Quality Changes

  - • Some seem to have the impression that the BLS makes no adjustments for quality changes in computing the CPI. This is not a correct impression.

  - • The latest estimates of the impact of quality adjustments on the CPI cover the year 1995 and measure the effect of all such adjustments made in the routine compilation of the goods and services portion of the index (approximately 70 percent of the total index, with shelter the principal exclusion). During 1995, more than half of the price change reported for goods and services items was adjusted out: the price increase in this part of the index was 4.7 percent over the year before quality adjustment versus 2.2 percent over the year after the quality adjustments applied to produce the official index.

- This does NOT mean that the methods used in constructing the CPI capture quality change perfectly, only that the quality adjustment procedures currently in place have a profound impact on reported price change.

The Advisory Commission's Quality/New Goods Bias Estimates

- Hard empirical evidence regarding the magnitude of biases from these sources is extremely limited. The Commission's estimates of these biases rely heavily on the members' best judgment as to the value to consumers of various marketplace developments, as opposed to a comparison of the CPI against any alternative measure that the Commission suggests the BLS might implement. (As one of the Commission members has commented, the numbers are "squishy")

- Some examples of conjectured impact of quality change or new goods on the accuracy of the CPI follow (all estimated biases are upward; the Commission looks at 27 categories of the CPI and finds no examples of current downward bias):

  - Food. "How much would a consumer pay to have the privilege of choosing from the variety of items available (today) ... instead of ... the much more limited variety available 30 years ago? A conservative estimate of the value of extra variety and convenience might be 10 percent for food consumed at home other than produce, 20 percent for produce where the increased variety in winter (as well as summer farmers' markets) has been so notable, and 5 percent for alcoholic beverages where imported beer, microbreweries, and a greatly improved distribution of imported wines from all over the world have improved the standard of living. Increased variety and convenience in food away from home ... can also be credited with a 10 percent premium." (pp. 41-42 of the Report) The conjectured bias in this area arises not because of any alleged failure to measure prices accurately or to measure quality change successfully, but rather because the CPI does not account for an increase in the variety of products available.

  - House furnishings other than appliances: "Regarding housefurnishings other than appliances and video-audio products, there is no available research to provide guidance... There have been many new products in this area, including furniture and fabrics that are much less susceptible to damage by stains and childrens' accidents than was previously possible. This cateogry also includes soap and cleaning products, where substantial

progress has been made. We view a bias rate of ... 10 percent over the past 30 years as conservative." (p. 50)

- New and used cars: The Commission begins by noting that there has been a significant increase in the average annual increase in the age of cars on the road. All of this increase is assumed to be due to increased durability of cars. In addition, it is assumed that the CPI incorporates no adjustments for changes in durability. Given these assumptions, the Commission estimates that increased durability has imparted a 0.59 percent annual upward bias in the CPI over the recent past. No adjustment is made for the decreased incidence of defects as measured by the J.D. Power survey; the Commission thus believes its estimate to be conservative. (pp. 52-56) As noted by the Commission itself, some might question whether all of the increase in the average age of cars on the road reflects an increase in durability. In addition, it is clearly wrong to assume that the CPI does nothing to take increased durability into account. Your briefing materials contain a list of some durability-related quality adjustments to auto prices made in the CPI since 1992.

- Apparel: The Commission compares the CPI to an index constructed using data on items from Sears catalogs that remain unchanged from one year to the next. The CPI went up 1.92 percent per year faster than the Sears index over the recent past. This figure is divided roughly in half to arrive at the Commission's estimate of a 1.0 percent per year bias since 1985 in the apparel component of the CPI. (pp. 50-51) No one would suggest that the CPI be constructed using data from a single retail catalog. In addition, given the importance of fashion in the apparel market, prices for items that remain unchanged from one year to the next may well show less increase than prices for other apparel items.

- High-tech consumer goods (pp. 48-49) and medical care (pp. 57-59): These are areas where we agree there are important limitations to our quality-adjustment procedures. Improvements in those procedures are planned. Even after these previously-announced changes have been implemented, however, issues will remain that it may never be possible to resolve fully.

- In general, the Commission's discussion of quality/new goods biases does not include explicit recommendations regarding the adoption of procedures to correct the problems it believes exist.

- Progress on the Quality Adjustment Front

  - As many have said before, dealing with the quality adjustment issue is the "house-to-house combat" of constructing price change measures.

  - Although it is not clear that we will ever find satisfactory means of dealing completely with quality change, we do believe further progress can be made and will continue to work toward this end.

  - Activities that could be undertaken in support of this effort in the reasonably near term, resources permitting, include:

    - Use of hedonics for some additional components of the index.

    - Adoption of more aggressive procedures for identifying new goods and incorporating them more promptly into the samples of items priced.

- Expansion of resampling efforts might allow the BLS to capture the emergence of new outlets more quickly. Comparison of the prices charged by different retail outlets is complicated by the fact that different outlets offer different shopping environments. Research on the factors affecting consumers' choices about where to shop ultimately may be helpful in devising appropriate procedures for making such comparisons.

Conclusion

- The issues identified in the Commission's Report are not new problems. BLS has been aware of the measurement issues concerning the CPI and, over the years, has made efforts to study and advise users of the data about them.

- At the same time, we welcome new information and are confident that public debate will contribute to the development of new and improved methods for constructing the CPI.

- There are a variety of longer-run research activities that the Commission recommends. These include recommendations that we investigate pricing of vehicle services using leasing data; direct pricing of health insurance policies; increased price collection on weekends; and a set of sample design issues. We will pursue all of these issues as aggressively as time and resources permit.

Research Issues Related to the Geometric Mean Formula for Elementary Indexes

The possibility of using the geometric mean formula to calculate the elementary (i.e., the lowest level of aggregation or the within-stratum level) indexes in the U.S. CPI was first raised by BLS researchers in the December 1993 issue of the *Monthly Labor Review*. Since then BLS researchers have continued to conduct research and have written a number of papers, but not all issues related to the geometric mean formula have been resolved. This note will briefly discuss the conceptual and empirical issues that arise in comparing the geometric mean formula to the CPI's current modified Laspeyres formula.

What does the geometric mean formula do?

The modified Laspeyres formula currently used by the CPI estimates the price each month of a fixed basket of goods and services. In contrast, the geometric mean estimates the price of a varying basket of goods and services. If all prices within the basket increase by the same amount, say 5 percent, then both the modified Laspeyres and the geometric mean will show the index increasing by 5 percent. The two formulas will give different results, however, if prices of items within the basket increase by different proportions.

For example, suppose that the sample market basket for lettuce in Boston consists of two items, a pound of iceberg lettuce and a pound of Romaine lettuce. If the price of iceberg lettuce increases from $1.00 to $1.50, while the price of Romaine lettuce remains equal to $1.00, then the price of the fixed market basket increases from $2.00 to $2.50, an increase of 25%. That is the price increase that would be reported by the current CPI formula.

The geometric mean formula, however, assumes that the market basket varies in a specific manner with the change in relative price between iceberg lettuce and Romaine lettuce. In particular, the geometric mean formula assumes that the quantities of the two types of lettuce that are purchased adjust so that relative expenditures on the two items remain constant. In our example, the market basket shifts to include roughly 20% more of the Romaine lettuce (now relatively less expensive) and 20% less of the iceberg lettuce (now relatively more expensive). The price of the market basket increases 22.5% under the geometric mean formula.

Low-level Consumer Substitution

Since consumers do respond to changes in relative prices by changing their consumption bundles, the conceptual cost-of-living index ought to incorporate those responses. However, the data collected in constructing the CPI do not provide enough information about shifts in quantities and expenditures to determine whether consumer substitution behavior at the lowest level more closely mimics the first, fixed market-basket scenario, or the second scenario in which quantities are adjusted to hold the share of expenditures on each item constant.

The issue, framed in terms of economic theory, has to do with the price elasticity of demand, or the closely related concept of consumer elasticity of substitution. Economists have shown that the geometric mean is the appropriate or "exact" cost-of-living index formula if the elasticity of substitution is equal to one, whereas the fixed basket formula is the

appropriate formula if the elasticity of substitution is zero.[1] Thus one important issue in comparing the formulas is determining the best approximation for the within-stratum elasticity of substitution.

Unfortunately, determining this value may be quite difficult for several reasons. First, the lowest level of aggregation is, by definition, the level at which the Consumer Expenditure Survey ceases to provide much information on levels of and changes in consumer expenditures. Thus the empirical information available for learning about substitution elasticities is quite limited.

Economists have suggested some possible rules for inferring elasticities in the absence of empirical data. George Stigler wrote, "The only general rule is that the elasticity of demand will be (numerically) greater, the better the substitutes for the commodity."[2]

A further complication is that relative price changes at this level can derive from many sources. In particular, we need to consider at least the following factors:

1. Shifts in relative price between brands of items.
2. Shifts in relative price between outlets.
3. Shifts in relative prices between categories of items within the stratum. For example, both roasted coffee and instant coffee are within the CPI coffee stratum, even though empirical evidence shows that consumers do not substitute much between the two when their relative prices change.
4. Shifts in relative prices between geographic areas. Several of the CPI strata are regional aggregates containing a sample of metropolitan or non-metropolitan urban areas located throughout a region. Also, some of the large urban areas cover a substantial geographical area that may cross state boundaries. Rents and prices that are subject to state regulation may be particularly affected by geographical differences.

A number of studies have suggested that the brand-level elasticity is usually quite large, typically around 1.5-2.0.[3] How relevant this estimate is to the CPI will depend, however, on how much Factor 1 above contributes to the relative price change within the typical CPI stratum. The recent changes in CPI methodology that corrected the formula bias problem have removed the inappropriate weighting that had previously been applied to temporary price changes, such as one-time sales or promotions. Consequently, if most relative price changes between brands are temporary, then Factor 1 may not contribute much to the long-run variation in relative prices.

One can think of examples where Factor 3 or Factor 4 may be important and because of the lack of close substitutes for an item whose relative price has changed, e.g., insulin or local telephone service, one could conclude on *a priori* grounds that the relevant elasticity of substitution is much closer to zero than one. On the other hand, some consumer items, such as home computers, have shown sales revenue growth while prices have fallen, which would appear to be consistent with an elasticity greater than one. If the divergence between the

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[1] These results are derived in a number of sources, for example, Robert A. Pollak, *The Theory of the Cost-of-Living Index*, Oxford University Press, 1989.

[2] George J. Stigler, *The Theory of Price*, 3rd ed., Macmillan, 1966, p. 24.

[3] Gerard J. Tellis, "The Price Elasticity of Selective Demand: A Meta-Analysis of Econometric Models of Sales," *Journal of Marketing Research*, November 1988, pp. 331-341.

geometric mean and Laspeyres index formulas tends to be large in strata where the elasticities of substitution are small, then the Laspeyres could provide the more accurate approximation to a cost-of-living index. Alternatively, if the strata with large divergences between the two indexes tend to have large elasticities of substitution, then the geometric mean index may provide the more accurate approximation to a cost-of-living index. Finally, it may be reasonable to consider the case where neither an assumption of an elasticity of zero nor an elasticity of one is universally appropriate, and different estimators might be used for different strata.

Research plans

BLS researchers have been at the forefront in studying the geometric mean and other issues related to the construction of the CPI. We expect the continuing BLS research to be able to address at least the following two questions:

1. What is the decomposition of within-stratum price change among the four factors shown earlier?
2. Using available data (e.g., the limited within-stratum data available from the Consumer Expenditures Survey, data from other non-BLS sources such as scanner data, surveys of published economic and marketing research) what can we learn about the magnitudes of the price elasticity of demand or the consumer elasticity of substitution at the below-stratum level?

Examples of New Car Reliability/Durability Quality Adjustments in the CPI Since 1992:

- Improved corrosion protection - body, electrical system, fuel tank, pump, shocks, brakes and cables
- Increased warranties
- Body side cladding
- Sealing improvements
- Stainless steel exhaust
- Longer life spark plugs - 100,000 mile life
- Improved steering gears
- Powertrain improvements
- Dextron III transmission fluid - 100,000 mile life
- Water pump front face - 150,000 mile life
- Battery saver
- Increased catalyst load - 100,000 mile life
- Rust resistant fuel injection -100,000 mile life
- Clearcoat paint
- sided galvanized steel body panels
- Serpentine drive belt

1987 and 1998 Item Classification Structures

Legend: ⌐ MAJOR GROUP ¬ - INTERMEDIATE AGGREGATE - Expenditure Class - Item Strata

1987 Item Classification Structure	1998 Item Classification Structure
FOOD AND BEVERAGES	**FOOD AND BEVERAGES**
FOOD	FOOD
FOOD AT HOME	FOOD AT HOME
CEREALS AND BAKERY PRODUCTS	CEREALS AND BAKERY PRODUCTS
Cereals and cereal products	Cereals and cereal products
Flour and prepared flour mixes	Flour and prepared flour mixes
Cereal	Breakfast cereal
Rice, pasta, cornmeal	Rice, pasta, cornmeal
Bakery products	Bakery products
White bread	Bread
Other breads, rolls, biscuits, and muffins	Fresh biscuits, rolls, muffins
Cakes, cupcakes, and cookies	Cakes, cupcakes, and cookies
Other bakery products	Other bakery products
MEATS, POULTRY, FISH, AND EGGS	MEATS, POULTRY, FISH, AND EGGS
MEATS, POULTRY AND FISH	MEATS, POULTRY AND FISH
MEATS	MEATS
Beef and veal	Beef and veal
Ground beef	Uncooked ground beef
Chuck roast	Uncooked beef roasts
Round roast	Uncooked beef steaks
Other steak, roast, and other beef	Uncooked other beef and veal
Round steak	
Sirloin steak	
Pork	Pork
Bacon	Bacon, breakfast sausage, and related products
Pork chops	Ham
Ham	Pork chops
Other pork, including sausage	Other pork including roasts and picnics
Other meats	Other meats
Other meats	Other meats
Poultry	Poultry
Fresh whole chicken	Chicken
Fresh or frozen chicken parts	Other poultry including turkey
Other poultry	
Fish and seafood	Fish and seafood
Canned fish and seafood	Fresh fish and seafood
Fresh or frozen fish and seafood	Processed fish and seafood
Eggs	Eggs
Eggs	Eggs

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1987 and 1998 Item Classification Structures

Legend: ___MAJOR GROUP___ - INTERMEDIATE AGGREGATE - Expenditure Class - Item Strata

1987 Item Classification Structure	1998 Item Classification Structure
DAIRY PRODUCTS	
Fresh milk and cream	**Dairy and related products**
Fresh whole milk	Milk
Other fresh milk and cream	Cheese and related products
	Ice cream and related products
	Other dairy and related products
Processed dairy products	
Butter and other dairy products	
Cheese	
Ice cream and related products	
FRUITS AND VEGETABLES	**FRUITS AND VEGETABLES**
	FRESH FRUITS AND VEGETABLES
Fresh fruits	**Fresh fruits**
Apples	Apples
Bananas	Bananas
Oranges	Citrus fruits
Other fresh fruits	Other fresh fruits
Fresh vegetables	**Fresh vegetables**
Potatoes	Potatoes
Lettuce	Lettuce
Tomatoes	Tomatoes
Other fresh vegetables	Other fresh vegetables
Processed fruits	**Processed fruits and vegetables**
Fruit juices and frozen fruits	Canned fruits and vegetables
Canned and dried fruits	Frozen fruits and vegetables
	Other processed fruits and vegetables including dried
Processed vegetables	
Frozen vegetables	
Canned and other processed vegetables	
	NONALCOHOLIC BEVERAGES AND BEVERAGE MATERIALS
	Juices and nonalcoholic drinks
	Carbonated drinks
	Frozen noncarbonated juices and drinks
	Nonfrozen noncarbonated juices and drinks
	Beverage materials including coffee and tea
	Coffee
	Other beverage materials including tea
OTHER FOOD AT HOME	**OTHER FOOD AT HOME**
Sugar and sweets	**Sugar and sweets**
Candy and other sweets	Sugar and artificial sweeteners
Sugar and artificial sweeteners	Candy and chewing gum
	Other sweets

1987 and 1998 Item Classification Structures

Legend: ___MAJOR GROUP___ - INTERMEDIATE AGGREGATE - Expenditure Class - Item Strata

1987 Item Classification Structure	1998 Item Classification Structure
Fats and oils	**Fats and oils**
Fats and oils	Butter and margarine
	Salad dressing
	Other fats and oils including peanut butter
Other prepared foods	**Other foods**
Canned and packaged soup	Soups
Frozen prepared foods	Frozen and freeze dried prepared foods
Snacks	Snacks
Spices, seasonings, condiments, sauces	Spices, seasonings, condiments, sauces
Other prepared food	Baby food
	Other miscellaneous foods
Nonalcoholic beverages	
Carbonated drinks	
Coffee	
Other noncarbonated drinks	
Food away from home	**Food away from home**
Lunch	Full service meals and snacks
Dinner	Limited service meals and snacks
Other meals and snacks	Food at employee sites and schools
Unsampled board and catered affairs	Food from vending machines and mobile vendors
	Other food away from home
	ALCOHOLIC BEVERAGES
Alcoholic beverages	**Alcoholic beverages at home**
Beer, ale, and alcoholic malt	Beer, ale, and other malt beverages at home
Distilled spirits at home	Distilled spirits at home
Wine at home	Wine at home
Alcoholic beverages away from home	
	Alcoholic beverages away from home
	Alcoholic beverages away from home

HOUSING	**HOUSING**
SHELTER	**SHELTER**
Pure rent-renter occupied	**Rent of primary residence**
Rent of dwelling	Rent of primary residence
Lodging while out of town	
Lodging while at school	**Lodging away from home**
	Housing at school, excluding board
	Other lodging away from home including hotels and motels
Rental equivalence and household insurance	**Owners' equivalent rent of primary residence**
Owners' equivalent rent	Owners' equivalent rent of primary residence
Unsampled household insurance	
Tenants' insurance	**Tenants' and household insurance**
Tenants' insurance	Tenants' and household insurance
Maintenance and repair services	
Property maintenance and repair services	

1987 and 1998 Item Classification Structures

Legend: _ MAJOR GROUP_ - INTERMEDIATE AGGREGATE - Expenditure Class - Item Strata

1987 Item Classification Structure	1998 Item Classification Structure
Maintenance and repair commodities	
Materials, supplies, equipment for home repairs	
Other property maintenance commodities	
FUELS AND UTILITIES	**FUELS AND UTILITIES**
FUELS	**FUELS**
Fuel oil and other fuels	Fuel oil and other fuels
Fuel oil	Fuel oil
Other fuels	Other household fuels
Gas (piped) and electricity	Gas (piped) and electricity
Electricity	Electricity
Utility natural gas service	Utility natural gas service
Other utilities and public services	Water and sewer and trash collection services
Telephone services, local charges	Water and sewerage maintenance
Water and sewerage maintenance	Garbage and trash collection
Community antenna and cable television	
Garbage and trash collection	
Interstate telephone services	
Intrastate telephone services	
HOUSEHOLD FURNISHINGS AND OPERATIONS	**HOUSEHOLD FURNISHINGS AND OPERATIONS**
Textile house furnishings	Window and floor coverings and other linens
Linens, curtains, drapes, sewing materials	Floor coverings
	Window coverings
	Other linens
Furniture and bedding	Furniture and bedding
Bedroom furniture	Bedroom furniture
Sofas	Living room, kitchen, and dining room furniture
Living room chairs and tables	Other furniture
Other furniture	Unsampled furniture
Household appliances	Appliances
Refrigerators and home freezers	Major appliances
Laundry equipment	Other appliances
Stoves, ovens, portable dishwashers, window air conditioners	Unsampled appliances
Other household equipment and furnishings	Other household equipment and furnishings
Floor/window coverings, outdoor/infant/laundry equipment	Clocks, lamps, and decorator items
Clocks, lamps, and decorator items	Indoor plants and flowers
Tableware, serving pieces, nonelectric kitchenware	Dishes and flatware
Lawn and garden equipment, tools, hardware	Nonelectric cookware and tableware
Small kitchen appliances, sewing machines, portable heating/cooling equip	
Indoor plants and fresh cut flowers	Tools, hardware, outdoor equipment and supplies
Unsampled household equipment parts, small furnishings	Tools, hardware and supplies
	Outdoor equipment and supplies
	Unsampled tools, hardware, outdoor equipment and supplies
Housekeeping supplies	Housekeeping supplies
Laundry and cleaning products	Household cleaning products
Household paper products, including stationery	Household paper products
Other household products, lawn and garden supplies	Miscellaneous household products

1987 and 1998 Item Classification Structures

Legend: ⬜ MAJOR GROUP ⬜ - INTERMEDIATE AGGREGATE - Expenditure Class - Item Strata

1987 Item Classification Structure	1998 Item Classification Structure
Housekeeping services	**Household operations**
Postage	Housekeeping services
Unsampled baby-sitting	Gardening and lawn care services
Domestic service	Moving, storage, freight expense
Other household services	Repair of household items
Appliance and furniture repair	Unsampled household operations
Care of invalids, elderly, and convalescents in the home	
Unsampled rent/repair of household equipment, sound equipment	
Television and sound equipment	
Television sets	
Video cassette recorders, disc players, and tapes	
Audio components, radios, recordings, and other	
Unsampled accessories for electronic equipment	
Information processing equipment	
Information processing equipment	

APPAREL AND UPKEEP	**APPAREL**

APPAREL COMMODITIES

MEN'S AND BOYS' APPAREL	**MEN'S AND BOYS' APPAREL**
Men's apparel	**Men's apparel**
Men's suits, coats, sportcoats, jackets	Men's suits, sport coats, and outerwear
Men's furnishings	Men's furnishings
Men's shirts	Men's shirts and sweaters
Men's pants and shorts	Men's pants and shorts
Unsampled uniforms and other clothing	Unsampled men's apparel
Boys' apparel	**Boy's apparel**
Boys' apparel	Boy's apparel
Unsampled boys' uniforms and other clothing	Unsampled boy's apparel

WOMEN'S AND GIRLS' APPAREL	**WOMEN'S AND GIRLS' APPAREL**
Women's apparel	**Women's apparel**
Women's coats and jackets	Women's outerwear
Women's dresses	Women's dresses
Women's separates, sportswear	Women's suits and separates
Women's underwear, nightwear, accessories	Women's underwear, nightwear, sportswear and accessories
Women's suits	Unsampled women's apparel
Unsampled uniforms and other clothing	
Girls' apparel	**Girls' apparel**
Girls' apparel	Girls' apparel
Unsampled uniforms and other clothing	Unsampled girls' apparel
Footwear	**Footwear**
Men's footwear	Men's footwear
Boys' and girls' footwear	Boys' and girls' footwear
Women's footwear	Women's footwear

1987 and 1998 Item Classification Structures

Legend: ⌐_MAJOR GROUP_⌐ - INTERMEDIATE AGGREGATE - Expenditure Class - Item Strata

1987 Item Classification Structure	1998 Item Classification Structure
Infants' and toddlers' apparel	**Infants' and toddlers' apparel**
Infants' and toddlers' apparel	Infants' and toddlers' apparel
Unsampled accessories and other clothing	
Sewing materials and luggage	
Sewing materials, notions, luggage	
Jewelry	**Jewelry and watches**
Watches	Watches
Jewelry	Jewelry

APPAREL SERVICES

Apparel services
Other apparel services
Apparel laundry and dry-cleaning, excluding coin operated

TRANSPORTATION	**TRANSPORTATION**
PRIVATE TRANSPORTATION	**PRIVATE TRANSPORTATION**
New vehicles	**New and used motor vehicles**
New cars	New vehicles
New trucks	Used cars and trucks
New motorcycles	Leased cars and trucks
	Car and truck rental
	Unsampled new and used motor vehicles
Used vehicles	
Used cars	
Unsampled other used vehicles	
Motor fuel, motor oil, coolant, and fluids	**Motor fuel**
Motor fuel	Gasoline (all-types)
Motor oil, coolant, and other fluids	Other motor fuels
Automobile parts and equipment	**Motor vehicle parts and equipment**
Tires	Tires
Vehicle parts and equipment other than tires	Vehicle accessories other than tires
Automobile maintenance and repair	**Motor vehicle maintenance and repair**
Automotive body work	Motor vehicle body work
Automotive drive-train, front-end repair	Motor vehicle maintenance and servicing
Automotive maintenance and servicing	Motor vehicle repair
Automotive power plant repair	Unsampled service policies
Unsampled automotive repair service policy	
Automobile insurance	**Motor vehicle insurance**
Automobile insurance	Motor vehicle insurance
Vehicle finance charges	
Automobile finance charges	
Unsampled other vehicle finance charges	
Vehicle rental, registration, and inspection	**Motor vehicle fees**
State and local automobile registration, license, inspection	State and local registration and license
Other automobile-related fees	Motor vehicle property tax
Unsampled docking and landing fees	Parking and tolls
	Unsampled motor vehicle fees

1987 and 1998 Item Classification Structures

Legend: ⎯ MAJOR GROUP ⎯ - INTERMEDIATE AGGREGATE - Expenditure Class - Item Strata

1987 Item Classification Structure	1998 Item Classification Structure
Public transportation	**Public transportation**
Airline fare	Airline fare
Other intercity transportation	Other intercity transportation
Intracity transportation	Intracity transportation
Unsampled school bus	Unsampled public transportation
MEDICAL CARE	**MEDICAL CARE**

MEDICAL CARE COMMODITIES (1987) — **MEDICAL CARE COMMODITIES** (1998)

Prescription drugs and medical supplies
Prescription drugs and medical supplies

1998: **Prescription drugs and medical supplies**
Prescription drugs and medical supplies
Unsampled rent or repair of medical equipment

Nonprescription drugs and medical supplies
Nonprescription drugs and medical supplies
Nonprescription medical equipment and supplies

1998: **Nonprescription drugs and medical supplies**
Internal and respiratory over-the-counter drugs
Nonprescription medical equipment and supplies

MEDICAL CARE SERVICES

Professional services
Physicians' services
Dental services
Eyeglasses and eye care
Services by other medical professionals

Hospital and other medical care services (1987)
Hospital room, in patient
Other in-patient services
Hospital out-patient services
Unsampled rent or repair of medical equipment

Hospital and related services (1998)
Hospital services
Nursing homes and adult daycare

Health insurance
Commercial health insurance
Blue cross/Blue Shield
Health Maintenance Organizations / Plans
Other health insurance / Medicare and other health insurance

ENTERTAINMENT (1987) — **RECREATION** (1998)

Video and audio
Televisions
Cable television
Other video equipment
Video cassettes, discs, and other media including rental
Audio equipment
Audio discs, tapes and other media
Unsampled video and audio

Pets, pet products and services
Pets and pet products
Pet services including veterinary

1987 and 1998 Item Classification Structures

Legend: `MAJOR GROUP` - INTERMEDIATE AGGREGATE - Expenditure Class - Item Strata

1987 Item Classification Structure	1998 Item Classification Structure
Sporting goods and equipment	Sporting goods
Sports vehicles, including bicycles	Sports vehicles including bicycles
Sports equipment	Sports equipment
	Unsampled sporting goods
Toys, hobbies, and other entertainment commodities	Photography
Toys, hobbies, and other entertainment commodities	Photographic equipment and supplies
Photographic supplies and equipment	Photographers and film processing
Pets and pet products	Unsampled photography
Unsampled souvenirs, fireworks, optic goods	
	Other recreational goods
	Toys
	Sewing machines, fabric and supplies
	Music instruments and accessories
	Unsampled recreation goods
Entertainment services	Recreation services
Club membership dues and fees	Club membership dues and fees for participant sports
Fees for participant sports	Admissions
Admissions	Fees for lessons or instructions
Fees for lessons or instructions	Unsampled recreation services
Photographers, film processing, pet services	
Unsampled rental of recreational vehicles	
Reading materials	Recreational reading materials
Newspapers	Newspapers and magazines
Magazines	Recreational books
Unsampled newsletters	Unsampled recreational reading materials

OTHER GOODS AND SERVICES	EDUCATION AND COMMUNICATION
	EDUCATION
School books and supplies	Educational books and supplies
School books and supplies for college	Educational books and supplies
Reference books and elementary and high school books	Unsampled educational books and supplies
Unsampled miscellaneous school purchases	
Daycare, tuition, and other school fees	Tuition, other school fees, and child care
College tuition and fees	College tuition and fees
Elementary and high school tuition and fees	Elementary and high school tuition and fees
Child daycare, nursery school	Child care and nursery school
Other tuition and fees	Technical and business school tuition and fees
Unsampled miscellaneous school items, rentals, and other services	Unsampled tuition, other school fees, and child care
	COMMUNICATION
	Postage and delivery services
	Postage and delivery services
	Delivery services

1987 and 1998 Item Classification Structures

Legend: ⌐ MAJOR GROUP ¬ - INTERMEDIATE AGGREGATE - Expenditure Class - Item Strata

1987 Item Classification Structure	1998 Item Classification Structure
	INFORMATION AND INFORMATION PROCESSING
	Telephone services
	Telephone services, local charges
	Telephone services, long distance charges
	Cellular Telephone services
	Information and information processing
	other than telephone services
	Personal computers and peripheral equipment
	Computer software and accessories
	Computer information processing services
	Other information processing equipment
	Unsampled information and information processing
	OTHER GOODS AND SERVICES
Tobacco products	**Tobacco and smoking products**
Tobacco and smoking supplies	Cigarettes
Unsampled smoking products and accessories	Tobacco products other than cigarettes
	Unsampled tobacco and smoking products
	PERSONAL CARE
Toilet goods and personal care appliances	**Personal care products**
Hair, dental, shaving, miscellaneous personal care products	Hair, dental, shaving, and miscellaneous personal care products
Cosmetics, bath/nail/make-up preparations and implements	Cosmetics/perfume/bath/nail preparations and implements
	Unsampled personal care products
Personal care services	**Personal care services**
Beauty parlor services for females	Haircuts and other personal care services
Haircuts and other barber shop services for males	
Unsampled repair of personal care appliances	
Legal, financial, and funeral services	**Miscellaneous personal services**
Legal fees	Legal services
Banking and accounting expenses	Funeral expenses
Cemetery lots and funeral expenses	Laundry and dry cleaning services
Unsampled miscellaneous personal services	Apparel services other than laundry and dry cleaning
	Financial services
	Care of invalids and elderly at home
	Unsampled items
	Miscellaneous personal goods
	Miscellaneous personal goods

Research Issues Related to the Geometric Mean Formula for Elementary Indexes

The possibility of using the geometric mean formula to calculate the elementary (i.e., the lowest level of aggregation or the within-stratum level) indexes in the U.S. CPI was first raised by BLS researchers in the December 1993 issue of the *Monthly Labor Review*. Since then BLS researchers have continued to conduct research and have written a number of papers, but not all issues related to the geometric mean formula have been resolved. This note will briefly discuss the conceptual and empirical issues that arise in comparing the geometric mean formula to the CPI's current modified Laspeyres formula.

What does the geometric mean formula do?

The modified Laspeyres formula currently used by the CPI estimates the price each month of a fixed basket of goods and services. In contrast, the geometric mean estimates the price of a varying basket of goods and services. If all prices within the basket increase by the same amount, say 5 percent, then both the modified Laspeyres and the geometric mean will show the index increasing by 5 percent. The two formulas will give different results, however, if prices of items within the basket increase by different proportions.

For example, suppose that the sample market basket for lettuce in Boston consists of two items, a pound of iceberg lettuce and a pound of Romaine lettuce. If the price of iceberg lettuce increases from $1.00 to $1.50, while the price of Romaine lettuce remains equal to $1.00, then the price of the fixed market basket increases from $2.00 to $2.50, an increase of 25%. That is the price increase that would be reported by the current CPI formula.

The geometric mean formula, however, assumes that the market basket varies in a specific manner with the change in relative price between iceberg lettuce and Romaine lettuce. In particular, the geometric mean formula assumes that the quantities of the two types of lettuce that are purchased adjust so that relative expenditures on the two items remain constant. In our example, the market basket shifts to include roughly 20% more of the Romaine lettuce (now relatively less expensive) and 20% less of the iceberg lettuce (now relatively more expensive). The price of the market basket increases 22.5% under the geometric mean formula.

Low-level Consumer Substitution

Since consumers do respond to changes in relative prices by changing their consumption bundles, the conceptual cost-of-living index ought to incorporate those responses. However, the data collected in constructing the CPI do not provide enough information about shifts in quantities and expenditures to determine whether consumer substitution behavior at the lowest level more closely mimics the first, fixed market-basket scenario, or the second scenario in which quantities are adjusted to hold the share of expenditures on each item constant.

The issue, framed in terms of economic theory, has to do with the price elasticity of demand, or the closely related concept of consumer elasticity of substitution. Economists have shown that the geometric mean is the appropriate or "exact" cost-of-living index formula if the elasticity of substitution is equal to one, whereas the fixed basket formula is the

appropriate formula if the elasticity of substitution is zero.[1] Thus one important issue in comparing the formulas is determining the best approximation for the within-stratum elasticity of substitution.

Unfortunately, determining this value may be quite difficult for several reasons. First, the lowest level of aggregation is, by definition, the level at which the Consumer Expenditure Survey ceases to provide much information on levels of and changes in consumer expenditures. Thus the empirical information available for learning about substitution elasticities is quite limited.

Economists have suggested some possible rules for inferring elasticities in the absence of empirical data. George Stigler wrote, "The only general rule is that the elasticity of demand will be (numerically) greater, the better the substitutes for the commodity."[2]

A further complication is that relative price changes at this level can derive from many sources. In particular, we need to consider at least the following factors:

1. Shifts in relative price between brands of items.
2. Shifts in relative price between outlets.
3. Shifts in relative prices between categories of items within the stratum. For example, both roasted coffee and instant coffee are within the CPI coffee stratum, even though empirical evidence shows that consumers do not substitute much between the two when their relative prices change.
4. Shifts in relative prices between geographic areas. Several of the CPI strata are regional aggregates containing a sample of metropolitan or non-metropolitan urban areas located throughout a region. Also, some of the large urban areas cover a substantial geographical area that may cross state boundaries. Rents and prices that are subject to state regulation may be particularly affected by geographical differences.

A number of studies have suggested that the brand-level elasticity is usually quite large, typically around 1.5-2.0.[3] How relevant this estimate is to the CPI will depend, however, on how much Factor 1 above contributes to the relative price change within the typical CPI stratum. The recent changes in CPI methodology that corrected the formula bias problem have removed the inappropriate weighting that had previously been applied to temporary price changes, such as one-time sales or promotions. Consequently, if most relative price changes between brands are temporary, then Factor 1 may not contribute much to the long-run variation in relative prices.

One can think of examples where Factor 3 or Factor 4 may be important and because of the lack of close substitutes for an item whose relative price has changed, e.g., insulin or local telephone service, one could conclude on *a priori* grounds that the relevant elasticity of substitution is much closer to zero than one. On the other hand, some consumer items, such as home computers, have shown sales revenue growth while prices have fallen, which would appear to be consistent with an elasticity greater than one. If the divergence between the

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[1] These results are derived in a number of sources, for example, Robert A. Pollak, *The Theory of the Cost-of-Living Index*, Oxford University Press, 1989.

[2] George J. Stigler, *The Theory of Price*, 3rd ed., Macmillan, 1966, p. 24.

[3] Gerard J. Tellis, "The Price Elasticity of Selective Demand: A Meta-Analysis of Econometric Models of Sales," *Journal of Marketing Research*, November 1988, pp. 331-341.

geometric mean and Laspeyres index formulas tends to be large in strata where the elasticities of substitution are small, then the Laspeyres could provide the more accurate approximation to a cost-of-living index. Alternatively, if the strata with large divergences between the two indexes tend to have large elasticities of substitution, then the geometric mean index may provide the more accurate approximation to a cost-of-living index. Finally, it may be reasonable to consider the case where neither an assumption of an elasticity of zero nor an elasticity of one is universally appropriate, and different estimators might be used for different strata.

The following are some examples of item strata within which one might expect, on a priori grounds, the items to have either high (near one or above) or low (near zero) elasticity of substitution.

Low expected substitution elasticity	High expected substitution elasticity
Rent	Cakes, cupcakes, and cookies
Electricity	Ground beef
Telephone services, local charges	Apples
Other apparel services (incl. shoe repairs, coin-operated laundry, alterations)	Refrigerators and home freezers
Intracity transportation	Television sets
Prescription drugs	Men's shirts
Physicians' services	Tires

Research plans

BLS researchers have been at the forefront in studying the geometric mean and other issues related to the construction of the CPI. We expect the continuing BLS research to be able to address at least the following two questions:

1. What is the decomposition of within-stratum price change among the four factors shown earlier?
2. Using available data (e.g., the limited within-stratum data available from the Consumer Expenditures Survey, data from other non-BLS sources such as scanner data, surveys of published economic and marketing research) what can we learn about the magnitudes of the price elasticity of demand or the consumer elasticity of substitution at the below-stratum level?

Examples of New Car Reliability/Durability Quality Adjustments in the CPI Since 1992:

- Improved corrosion protection - body, electrical system, fuel tank, pump, shocks, brakes and cables
- Increased warranties
- Body side cladding
- Sealing improvements
- Stainless steel exhaust
- Longer life spark plugs - 100,000 mile life
- Improved steering gears
- Powertrain improvements
- Dextron III transmission fluid - 100,000 mile life
- Water pump front face - 150,000 mile life
- Battery saver
- Increased catalyst load - 100,000 mile life
- Rust resistant fuel injection -100,000 mile life
- Clearcoat paint
- sided galvanized steel body panels
- Serpentine drive belt

U.S. DEPARTMENT OF LABOR
Bureau of Labor Statistics

OFFICE OF PRICES AND
LIVING CONDITIONS

Bias in the Consumer Price Index: What Is the Evidence?

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Economists have noted for decades that the U.S. Consumer Price Index (CPI) may tend to overstate changes in the cost of living. But bias in the CPI became an important policy issue only recently, when it became part of the debate over a balanced budget. Alan Greenspan (1995) triggered this controversy in January 1995 when he told the Budget Committees of Congress, "[T]he official CPI may currently be overstating the increase in the true cost of living by perhaps 1/2 percent to 1-1/2 percent per year. ... If the annual inflation adjustments to indexed programs and taxes were reduced by 1 percentage point ... the annual level of the deficit will be lower by about $55 billion after five years." Subsequently, the Senate Finance Committee (1995) held a series of hearings on the Consumer Price Index, and then appointed an advisory commission of experts to investigate the bias.[1] The panel's interim report estimated that the CPI has had a bias of 1.5 percent per year during recent years, and projected a bias of 1 percent per year in the future (Advisory Commission, 1995).

The public debate over bias in the CPI was preceded by a flurry of new research, much of it conducted by economists at the Bureau of Labor Statistics and other statistical agencies around the world, as well as by academic economists. This research focused on identifying and measuring the biases in the consumer price index. Table 1 summarizes a range of estimates that have been presented. The range is clearly quite wide. The diversity of beliefs is probably even greater than indicated in this tabulation, because several of the experts testifying before the Committee declined to give an estimate (for

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[1] The commission is chaired by Michael Boskin. The members are Ellen Dulberger, Robert Gordon, Zvi Griliches, and Dale Jorgenson.

example, Katharine Abraham, Janet Norwood, Robert Pollak, and Joel Popkin), and most of these individuals were critical of the larger estimates. In many cases, the same evidence has been interpreted in a number of different ways. Griliches (1995) said, "the Committee assumes that we already know that the CPI is overstated. But the scientific basis for this judgment is much weaker than the [Committee's] questions seem to imply ... The various 'guesstimates' in these sources are not independent of each other." For some of the sources of bias, the evidence is based on case studies of a small number of commodities. The differences between estimates seems to be largely determined by the willingness of experts to extrapolate from these case studies to estimates for broader categories of goods. The available research results may reflect a kind of selection effect, where researchers have tended to study the goods for which there is a strong presumption of possible bias—computers, prescription drugs, etc.

Bias in the CPI impinges on most of the measurements economists make of economic growth and well-being. The CPI is often used directly to deflate nominal measures to "real" units, such as real wages. The CPI component indexes are also used by the Bureau of Economic Analysis to deflate personal consumption expenditures in constructing the national income accounts, so biases in the CPI could lead to biased measures of real growth and productivity.[2] The poverty thresholds are an example of another important economic indicator that is escalated by the CPI. As an example of the potential impact of CPI bias, consider the lower endpoint of the interval estimate given by

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[2] Components of the producer price index and import and export price indexes are also used to deflate components of the national accounts, and presumably are affected by some of the same biases as the CPI.

the CPI Advisory Commission, an upward bias of 0.7 percent per year. Over a 25 year period, a bias of that magnitude would cause the growth of quantities deflated by the CPI, such as real wages, to be understated by 19 percent. Bias of this magnitude substantially affects how we assess the growth of our economy and the well-being of its members. Larger biases would have a more dramatic impact. The upper endpoint of the estimate given by the CPI Advisory Commission is 2.0 percent per year, which over a 25 year period would imply that growth of real quantities are understated by about 64 percent.

Teachers of economics may find that the discussion of bias in the CPI provides a useful case study in economic data and policy. Most of the biases discussed below are related to simple economic theories that are usually taught in a principles course. Discussion of the CPI may provide students with an interesting application of economic theory that has important policy implications, and also teaches them some of the difficulties associated with measurement of economic variables.

In this article I do not intend to provide another set of "guesstimates." However, for economists who are consumers of the information contained in the CPI -- or of the related data derived in part from using the CPI to make adjustments, such as the GDP accounts, productivity, and real wages -- it may be useful to describe how the CPI is constructed and then to review the recent evidence on bias in the CPI. I begin with a brief description of the CPI program's sampling and estimation methods. Then, I will review the evidence on each of the sources of bias, trying to indicate the nature of the evidence and its strengths and weaknesses.

4

An Overview of the CPI

The Consumer Price Index is designed to measure the change in the cost of purchasing a fixed market basket of goods and services representing average consumption patterns during some base period. An index based on a fixed, historical market basket is called a Laspeyres index.[3] The actual index is constructed in two stages.

At the stage of index aggregation, the CPI is built up from 44 geographical strata (for example, the Denver metropolitan area) and 207 strata of items (for example, women's shoes), which combine to create 9,108 strata indexes. These strata indexes are aggregated into the all-items CPI using weights derived from the Consumer Expenditure Survey. The weights have historically been changed at roughly 10-year intervals. The current weights were introduced into the index at the beginning of 1987 and are based on expenditures during 1982-84.[4] Current plans for CPI revision call for the next change of weights to occur at the beginning of 1998, using weights from 1993-95. The relative importance of major CPI categories are shown in Table 2.

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[3] In the CPI, the index $I_{T,0}$ measures the relative change between periods 0 and T in the cost of a fixed basket of goods from a base period B:

$$I_{T,0} = \frac{\sum_i Q_{Bi} P_{Ti}}{\sum_i Q_{Bi} P_{0i}},$$

where Q_{Bi} is the quantity of good i consumed during period B, and P_{0i} and P_{Ti} are the prices during periods 0 and T.

[4] Thus, it would be accurate to call the CPI a "modified" Laspeyres index, modified because the market basket refers to a different, earlier, period (say 1982-84) than the period over which the prices are compared (say, 1987 to the present).

5

At the disaggregated stage, each of the strata indexes is estimated, using a representative sample of outlets and prices. To determine which actual outlets should be visited to determine prices, a Point-of-Purchase Survey is conducted, in which consumers are asked detailed questions about the outlets at which they purchased consumer goods and services. The allocation of consumer expenditures across outlets is estimated from the Point-of-Purchase Survey, which is conducted 1-2 years before a sample is selected.[5] From the responses to this survey, a sample of outlets is selected, with probability of selection proportional to expenditures. Within each selected outlet, a BLS field economist then selects one or more specific varieties of items — again with probability proportional to sales — and the prices of these items will then be checked for the following five years. Through this process, the samples for about one-fifth of the indexes are replaced (or "rotated") each year.[6] Detailed checklists are employed to ensure that precisely the same item is repriced each month. Any changes in the quality or characteristics of the sample item are noted and lead to the quality adjustment procedures discussed later in this paper. The overall sample sizes are 95,000 items from 22,000 retail outlets for commodities and services other than shelter, which are repriced monthly or bimonthly, and 35,000 rental units for measuring changes in rent and owners' equivalent

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[5] When the sample in a particular city is replaced, prices are collected for both the old and new samples and the indexes from the old sample are linked to the indexes from the new sample. Linkage procedures are discussed later in this paper.

[6] The selection of samples according to formal rules of probability, as well as the regular replacement of samples, were processes introduced in 1978 in response to recommendations made by the Stigler Commission, a committee of eminent economists and statisticians charged with reviewing government price statistics (Stigler, 1961).

rent, which are repriced every six months.[7] The rent sample is continuously augmented with a sample of new construction.

A number of practical problems arise in this process. One especially worth noting, because it relates to the conceptual issue of how the price index is developed, is that direct information on base-period quantities is generally not available; instead, the household surveys provide information on total base-period expenditures on categories of items. Direct information on the base-period price of the sample items is also generally not available, because the outlet sample of items is selected after the household expenditure data are collected and processed. One area where quantity information is available is for rent, where expenditure and price are the same, since the consumer is paying for the use of one housing unit. However, for commodities and services other than shelter, the index is calculated using information on base-period expenditures, adjusted by relative price changes since that time.[8] At the disaggregated stage, the base-period expenditure weights refer to the Point-of-Purchase Survey period.

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[7] A sample of about 35,000 owner units is also interviewed biannually, but the change in owners' equivalent rent is imputed from the rent change of renter units. Prices are collected at bimonthly or semi-annual frequency for strata of items that tend to have infrequent price changes, and the price changes for those items receive 1/2 or 1/6 of the weight of price changes for items that are priced every month.

[8] When direct information on base-period quantities are not available, the index formula is made operational using information on base-period expenditures,

$$E_{Bi} = Q_{Bi} P_{Bi},$$

and relative price change:

$$I_{T,0} = \frac{\sum_i E_{Bi}(P_{Ti}/P_{Bi})}{\sum_i E_{Bi}(P_{0i}/P_{Bi})}.$$

7

Commodity Substitution Bias

A true economic cost-of-living index would measure the change in the cost of obtaining a fixed level of economic well-being, or utility. However, the consumer price index calculates the change in cost of obtaining a fixed basket of goods, which is not quite the same thing. Most economists have used the cost-of-living index concept as the standard against which biases of the CPI are to be measured.

The substitution bias reflects the failure of the fixed basket index to account for the fact that consumers will tend to substitute relatively less expensive items in place of items that have become relatively more expensive. Several empirical strategies have been employed to estimate the substitution bias. A strategy that was frequently employed prior to 1980 was to estimate a system of demand equations and then, using this information about what substitution would occur as prices changed, to calculate directly the exact cost-of-living index associated with the demand system (Braithwait, 1980).

The more recent literature has avoided the difficulties of estimating a complete demand system by relying on the concept of *superlative* price indexes, which was introduced by Diewert (1976). In contrast to the Laspeyres index, which requires information on expenditures from only one period, and which for all subsequent periods can be calculated using price information only, superlative indexes generally require complete information on expenditures or quantities for each period. Diewert showed that certain superlative index numbers -- for example, either the Fisher or the Törnqvist

index[9]—will closely approximate an exact cost-of-living index. Essentially, using quantity and price information from each time period allows the substitution to be taken into account.

Several recent empirical studies have compared a Laspeyres index (like the CPI) to superlative indexes. For example, Manser and McDonald (1988) relied on Personal Consumption Expenditure data covering the period 1959-85, whereas Aizcorbe and Jackman (1993) used data from the Consumer Expenditure Survey and strata price indexes covering the period 1982-91. Both studies found that the Laspeyres index tends to grow 0.2 to 0.25 percentage points per year faster than alternative measures that allow for consumer substitution, such as the Fisher or Tornqvist superlative indexes. However, these papers have not unequivocally resolved such questions as whether the substitution

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[9] The formula for the Fisher index is

$$F = (L \cdot P)^{1/2},$$

where L is the simple two-period Laspeyres index,

$$L = \Sigma Q_{0i} P_{Ti} / \Sigma Q_{0i} P_{0i},$$

and P is the index weighted by current quantities or *Paasche* index,

$$P = \Sigma Q_{Ti} P_{Ti} / \Sigma Q_{Ti} P_{0i}.$$

The Laspeyres index is usually an overestimate of the cost-of-living index, while the Paasche index is usually an underestimate. The Törnqvist formula is

$$T = \exp\{\Sigma[(S_{0i} + S_{Ti})/2]\ln(P_{Ti}/P_{0i})\},$$

where

$$S_{0i} = Q_{0i} P_{0i} / \Sigma Q_{0i} P_{0i}$$

is the expenditure share for good i in period 0, and similarly for S_{Ti}.

bias increases with the inflation rate, or whether the rate of substitution bias grows with the time elapsed since the last market basket update.

These superlative indexes also rely on certain assumptions that should be remembered. For example, these measurements have assumed that consumer tastes have remained constant over the measurement period. If demand for certain goods were to shift exogenously—for example, a shift in demand for eggs due to scientific information about the effects of cholesterol on health—it could confound the measurement of the substitution effect because the quantity consumed could fall at the same time that the relative price is falling.[10] This "simultaneity" problem has not been adequately addressed in these studies of substitution effects. More generally, since these studies have largely been based on the expenditures of a representative consumer, thus overlooking issues of aggregation across consumers, they run the risk of confounding true substitution effects with the results of geographical shifts, demographic changes, and changes in consumption motivated by factors other than changes in relative prices. Also, these studies have usually treated prices and expenditures as known amounts rather than as estimates subject to sampling error.

It should also be recognized that Diewert's (1976) original result showed that the superlative indexes provide a close approximation to any exact cost-of-living index only if the income elasticities of consumers are equal to one for all goods (that is, if preferences are homothetic). If income elasticities of demand differ from 1, then a rising

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[10] Brown and Schrader (1990) studied the demand for eggs, a case in which consumption has fallen despite a declining relative price.

income level will be shifting the composition of the desired consumer basket over time.[11] Users of superlative indexes should recognize that income effects can matter, especially for comparisons over long periods of time, such as several decades, and avoid confusing these income effects with substitution effects from price changes.

The existing studies of substitution bias have been limited to studying substitution at the level of strata indexes and above. This may capture substitution from say, canned soup to frozen meals, but it will not capture substitution inside a given category, like from one type of frozen meal to another. The standard data sources are not available to investigate this issue because the Consumer Expenditure Survey does not provide information below the stratum level. Recently, however, Reinsdorf (1996) and Bradley (1996) have used supermarket scanner data to study low-level substitution bias for a handful of grocery items. These results, although very limited, do suggest that low-level substitution effects may also be important.

Formula Bias

A few years ago, BLS researcher Marshall Reinsdorf (1993) set out to explain a striking empirical result: the fact that CPI for many food items had grown 1.5-2.0 percent

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[11] Diewert (1976), however, also showed that with non-homothetic preferences, under certain conditions a superlative index will approximate the cost-of-living index for an intermediate utility level, providing a justification for focusing on the superlative index in spite of non-homothetic preferences. More generally, results from Caves, Christensen and Diewert (1982) show that the Törnqvist index, in particular, is the geometric mean of the cost-of-living indexes with reference period and current utility levels under non-homothetic translog preferences. Balk (1990) proposed an econometric method for calculating approximate cost-of-living index numbers for arbitrary base-period income levels.

faster per year than average price series calculated using the same data. In this paper, he attributed the difference entirely to outlet substitution effects, which are discussed in the next section. Subsequent research has shown that much of the difference between the CPI and average prices is attributable to what has become known as "functional form" or "formula" bias (Reinsdorf, 1994).[12]

Formula bias arises in this way. Remember, about one-fifth of the sample is rotating each year. The base price for the sample item should represent its average price during the expenditure base period. Because the sample item had not yet been selected during the base period, neither the base price nor the base-period quantity is observable and a method is required for estimating the base price. From 1978 until 1996 the BLS used the following procedure: take the price of the sample item during the sample replacement or "link" month and deflate it to the base period using the overall price index for the stratum. This procedure causes items that are on sale or otherwise have an unusually low price when they are introduced to the sample to receive a disproportionately large weight, because the expenditure weight is divided by an atypically low base price for the item on sale.[13] These items are likely to go off sale the

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[12] The formula bias problem is closely related to a more general problem of upward bias for indexes that are calculated using averages of ratios (Carruthers, Sellwood, and Ward, 1980; Szulc, 1983; Dalén 1992; Diewert, 1995a).

[13] Specifically, the true modified Laspeyres can be written as

$$\Sigma W_i (P_{Ti} / P_{0i}),$$

where the weight

$$W_i = E_{Bi}(P_{0i}/P_{Bi})/\Sigma E_{Bi}(P_{0i}/P_{Bi})$$

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next period, and thus show a price rise. Conversely, a relatively smaller weight is applied to items that are off sale when the new sample is introduced, and may go on sale the following period. The net effect is that the estimator may apply too much weight to price increases and too little weight to price decreases immediately after the introduction of a new sample or a new sample item. In other words, transitory price movements are systematically related to the weights because of the way those weights have been constructed.

Table 3 shows a numerical example of how formula bias can appear immediately following sample replacement. In this example the sample consists of prices from three outlets for a relatively homogeneous item, such as tomatoes. Each month two of the outlets sell the item at full price, $2.00, while at one of the outlets the item is on sale for $1.25. To keep the problem simple, assume that all outlets have expenditure weights equal to $100. For the old sample, assume all items have base prices equal to $1.00, so that the implicit base-period quantity purchased at each outlets is equal to dollar

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represents the share of expenditures that would be spent on i during period 0 if quantities were held fixed at period B levels. If period 0 represents the link month, then the base-price setting method formerly used by the CPI reduces to

$$\Sigma S_{Bi}(P_{Ti}/P_{0i}),$$

where

$$S_{Bi} = E_{Bi}/\Sigma E_{Bi}$$

is the base period expenditure share. If (P_{0i}/P_{Bi}) is smaller than the average for the stratum, as, for example, if item i is on sale during the link period, then

$$S_{Bi} > W_{Bi},$$

so the CPI method will apply too much weight to the outlet, relative to the modified Laspeyres target.

expenditures divided by base price, i.e., $100/$1.00 per pound = 100 pounds. Although the item is on sale at outlet B in June and at outlet C in July, the overall price index does not show any overall price change between these months. This is because, with equal expenditures and equal base prices in each outlet, the index change is calculated as the ratio of the sums of the prices times the inferred base period quantities:

$$I_{July} = \frac{100 \times \$2.00 + 100 \times \$2.00 + 100 \times \$1.25}{100 \times \$2.00 + 100 \times \$1.25 + 100 \times \$2.00} = \frac{\$525}{\$525} = 1.$$

But beginning in August a new sample of outlets is drawn, which raises the problem of linking the two indexes. For August, prices from the old sample are used in the index calculation, and again no price change is reflected in the index. When the new outlets enter the sample, the first step is to discount them back to the base period given the overall inflation in the strata; since there hadn't been any overall inflation, the base prices in the new sample are taken to be the same as the prices when these outlets are first sampled in August. Notice that as a result of the sample replacement, the base prices have shifted. The outlet with the sale price during August, outlet E, was implicitly assigned a quantity weight of $100/$1.25 per pound = 80 pounds. The two outlets that did not have a sale were implicitly assigned quantity weights of $100/$2.00 per pound = 50 pounds. The change in the stratum index from August to September now involves calculating the ratio that multiplies the implied quantities at each outlet times the price at that outlet, and then divides the September figure by the August figure:

$$I_{Sept} = \frac{80 \times \$2.00 + 50 \times \$2.00 + 50 \times \$1.25}{80 \times \$1.25 + 50 \times \$2.00 + 50 \times \$2.00} = \frac{\$322.50}{\$300.00} = 1.075.$$

But the reason behind this conclusion is that the outlet with the sale during August (outlet E) received a low base price, and so the increase in price at that outlet was overweighted compared to the fall in price at outlet D. In the October index, again no change in the index is reported. Although the formula bias cannot be guaranteed to disappear after the first months, empirical studies and simulations have suggested that the bias is usually concentrated in the first month after the calculation of the proxy base prices.

A number of methods have been studied by BLS researchers for improving the estimation procedure. Early research focused on use of alternative estimation formulas, like using the geometric mean rather than the arithmetic mean (Moulton, 1993; Reinsdorf and Moulton, 1994; Moulton and Smedley, 1995). The geometric mean has several attractive econometric characteristics—in particular, it requires only information on base-period expenditures, and it is an exact index formula under Cobb-Douglas preferences—and several other countries have recently adopted a geometric mean estimator for strata indexes. If the objective is to estimate a modified Laspeyres index, however, then the geometric mean has been shown to produce inflation estimates that are systematically too small (McClelland, 1996).

BLS recently adopted a new method for addressing this estimation issue, which it has applied to food-at-home items beginning in January 1995, and to all other items beginning in June and July 1996. The approach is to hold out the new samples for three to four months after the base prices are estimated (Armknecht, Moulton, and Stewart, 1995; McClelland, 1996; Moulton, 1996). In the example in Table 3, note that the upward bias

occurs in calculating the August to September index change, immediately following the rotation. Substantial simulation and analysis indicates that this pattern is typical: the formula bias is concentrated in the first month or two following the introduction of the new sample. Holding out the new sample for several months thus sidesteps the problem.

The magnitude of the formula bias problem, including the problem of inappropriately weighting replacement samples, and a related formula bias in calculation of homeowners' equivalent rent, was estimated to be about 0.24 percent per year during 1993-94.[14] However, the changes that BLS implemented in January 1995 and June and July 1996 have effectively eliminated this formula bias.

Outlet Substitution Bias

Another potential problem related to sample rotation, also originally raised by Reinsdorf (1993), is the treatment of new discount outlets in BLS sampling and estimation procedures. Discount outlets, like all other types of outlets, are selected for CPI samples in proportion to consumer expenditures as reported in the Point-of-Purchase Survey. The new outlets are linked into the survey as described in the example in the previous section. But the linkage procedure means that prices in the old and new outlets'

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[14] These calculations are based on unpublished estimates made by Karin Smedley and Claire Gallagher of BLS. The changes implemented in January 1995 had an estimated effect of about 0.14 percent per year, and the changes implemented in 1996 had an estimated effect of about 0.10 percent per year. Simulations of the geometric mean resulted in somewhat larger estimates, as large as 0.5 percent per year including homeowners' equivalent rent, but some of the difference between the geometric mean and the CPI is due to the fact that it is estimating a different population target than the modified Laspeyres index (Moulton and Smedley, 1995).

are not compared directly. Thus any savings that consumers potentially receive from switching to discount outlets (after netting out quality differences) are not reflected by the CPI.

In many respects, the entry of discount outlets is a special case of the new goods problem. Market entrants succeed by either providing improved services or lower prices, and in principle these gains to consumer well-being should be reflected in a true cost-of-living index (Fixler, 1993). But measuring the bias that results from linking of new outlets is a tricky empirical problem, since the measurement depends both on the relative quality of services provided by the new and old outlets and the price response of the old outlets. If the price difference of the discount outlet largely reflects a lower level of retail services, then directly comparing the prices between traditional and discount outlets would overstate the consumer gains from entry of the discount outlets. Similarly, if the traditional outlets respond to the entry of discounters by lowering their prices, then the CPI procedures would reflect those price changes.

At this point, the empirical evidence on the effect of discount outlets is quite limited. Reinsdorf (1993) compared prices for food and motor fuel between old and new samples during an overlap period when the samples were undergoing rotation. The differences indicated that prices in the new samples were about 1.25 percent lower than in the old samples over a 2-year period. These results would be consistent with an upward bias of 0.25 percent per year (since one-fifth of the sample rotates each year), assuming that the price differences are not offset by any declines in quality. But the Reinsdorf

results are barely statistically significant, and it would be very useful if this research could be replicated for additional years.

A rough calculation of the effects of discount stores can be made using information on the size of the price differential between discount stores and traditional outlets, and the rate of growth of the discount stores. MacDonald and Nelson (1991) provide evidence on the price differential, by comparing the price of food warehouse outlets to traditional outlets. They found that prices in the warehouse stores were about 13.4 percent lower. The rate of growth of the share of warehouse stores between 1983 and 1991 according to data published by the trade journal, *Progressive Grocer*, was about 0.7 percent per year. Combining these—a price difference of 13.4 percent, together with a growth in market share of 0.7 percent per year—would imply a maximum bias for grocery-store food of about $0.134 \times 0.7 = 0.1$ percent per year, assuming no quality differential. If the warehouse stores provide significantly lower retail services, the quality adjustment would further reduce the estimated bias.

The entry of discount outlets is not confined to food; in recent years, it has probably been more important in categories like consumer electronics and hardware. Evidence on outlet substitution bias for these other expenditure categories is not yet available. Some retail services have also seen growth of discount outlets, e.g., discount brokerages. But many of the services categories, which account for 57 percent of the CPI market basket, are categories like rent, electric and gas utilities, and college tuition, which are probably not much affected by outlet substitution factors. Outlet substitution is

clearly an important issue whether the bias is 0.25 percent or less than 0.1 percent annually, but like the related problem of new goods, precise estimation is difficult.

Quality Adjustment

Many of the procedures used by the CPI program in processing data are specifically designed for separating price changes from quality changes. The data collection begins with detailed checklists that the data collectors use to assure that precisely the same item is repriced from period to period. If the sample item has changed in any observable way, one of three general procedures may be applied to the data. An economist with specialized knowledge of the item examines information on the two versions of the item and determines whether: a) the change has not resulted in a significant change in the quality of the item, so that the prices of the old version and the new version can be directly compared; or b) a significant change in quality occurred and information is available for estimating the dollar value of the change in quality; or c) a significant change in quality occurred and information on the value of the change in quality is not available.

Manufacturers of a product are one possible source of information of what a certain change in quality cost. An alternative method is hedonic regression analysis. The hedonic method estimates the price-quality relationship by running regressions of price on characteristics of goods. The coefficients of these regressions can then be used to infer the value of changes in characteristics of the goods in the sample. For example, the

observed valuation of computers with different processor speeds could be used to estimate the quality improvement of a new computer with a faster processor. The CPI has used hedonic methods since 1988 for calculating the effects of depreciation on rent, and since 1991 for quality changes in apparel.[15]

When hedonic methods aren't practical, then some other method must be found for linking or imputing the effect of the quality change on price. To understand how such a linkage can work, consider a simplified situation where a certain product is available one month, but then is replaced the next month by a product of different quality. In a linkage calculation, the first step is to calculate the rate of inflation during that month based only on a class of other, similar goods, and completely ignoring the good which was replaced. For the sake of this example, say that the inflation rate based on the other goods was 2 percent, but that the new and improved product, when it appeared, cost 5 percent more than the earlier version. Then, linkage effectively assumes that of the 5 percent, 2/5 was due to the overall rise in the price of goods, and the other 3/5 was due to a quality improvement.

The method of linking can produce the optimal quality adjustment under certain assumptions; for example, if price levels are continuously at a competitive equilibrium (more precisely, a competitive hedonic equilibrium in which prices reflect all quality

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[15] For interpretation of the traditional methods used in hedonic quality adjustment, see Gordon (1990), Griliches (1990), and Triplett (1990). For description of changes in CPI quality adjustment procedures, see Randolph (1988), Liegey (1993), and Reinsdorf, Liegey, and Stewart (1996). In recent years a number of researchers have extended the theory of hedonic quality adjustment, integrating the method with the theory of the cost-of-living index (Triplett, 1983a; Fixler and Zieschang, 1992; Feenstra, 1995) and accounting for non-competitive market structure and consumer heterogeneity (Berry, Levinsohn, and Pakes, 1995; Goldberg, 1995).

differences), and all items are close substitutes. Most of the evidence suggests, however,
that when price changes are relatively small and quality improvements are substantial,
linking tends to understate the value of quality improvements from one version to the
next. For example, in the move from 486 to Pentium-based personal computers, if one
subtracts out the relatively small overall change in price levels, the remaining difference
in price doesn't seem large enough to capture the true increase in computer performance
from one generation of chip to the next. On the other hand, for goods that do not have
substantial quality improvements, the method of linking may attribute too much quality
change and too little price change to the replacement of models. Thus, in principle, any
bias due to the method of linking could be either upwards or downwards. Recognizing the
problems associated with linking, the BLS has taken steps in recent years to reduce the
dependency on linking, and increase the use of direct comparisons and direct quality
adjustments. When linking must be done, BLS has adopted new methods to determine a
more comparable class of other goods from which to calculate the inflation rate.

The direct quality adjustments and implicit quality adjustments due to linkage can
be significant—the change in the price index for new cars from 1967 to 1994 would have
been 80 percent greater if no adjustments had been made for quality improvements.[16] In
the past, the BLS has tended to rely on the linkage approach, and a number of studies
have compared BLS indexes to hedonic indexes for specific items or groups of items.
The most extensive of these studies is Gordon (1990), which found that because the BLS

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[16] The automobile index in the CPI rose 172.1 percent from December 1967 to December 1994,
while over the same period, without the quality adjustments, the new car component would have
risen 313.4 percent (Abraham, 1995).

indexes failed to capture quality improvements fully, the inflation rate in consumer durables was biased upward by 1.5 percent per year over the period 1947-83.[17] Large upward biases were also found by Berndt, Griliches, and Rappaport (1995) for personal computers and Griliches and Cockburn (1994) for prescription drugs, which were attributed to overreliance on linking. In contrast, Reinsdorf, Liegey, and Stewart (1996) suggest that linking may have led to downward bias for the apparel indexes, at least during 1978-86.

To date, the empirical research on quality bias has been heavily concentrated in durables and apparel. Since researchers choose to focus on sectors for which a problem is perceived, the results from the sectors that have been studied may not necessarily provide a useful guide to sectors that have not been studied. There are many sectors of the CPI, particularly services (including medical services), for which little research has been done that would provide information on the magnitude or, in some cases, even the direction of quality bias.[18] Research on quality changes can be difficult and tedious, and not all quality changes are amenable to hedonic or related procedures. Nevertheless, it would be very useful if researchers could try to fill in some of the gaps.

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[17] Because the BLS has introduced several improvements to quality adjustment procedures since the beginning of Gordon's study (Reinsdorf, Liegey, and Stewart, 1996), the relevance of his estimate of bias to the current CPI is questionable.

[18] Shapiro and Wilcox (1996) provide an interesting case study of improvement in medical treatment of cataracts that is suggestive of large quality bias for medical services.

New Goods

Sometimes new goods provide a service similar to an existing good, but with higher quality or a lower price: a generic drug provides the same service as its branded predecessor; a compact disk provides higher quality recorded music than a vinyl record. In other cases, new goods offer an additional variety of choices, but without fundamentally changing the services provided, as happens when new varieties of blue jeans are introduced. Finally, some new goods provide entirely new services that were previously unavailable, like interactive video games or cellular telephones. For the consumer price index, the appearance of new goods presents at least two important problems: bringing new goods into the samples on a timely basis; and accounting for differences in price between new goods and the old goods that provided the same or similar services (Armknecht, Lane, and Stewart, 1994).

One of the purposes of the CPI's periodic sample rotation is to bring new goods into the sample in a timely manner. As discussed earlier, one-fifth of the sample is replaced each year. BLS is planning to change the Point-of-Purchase Survey procedures during the next CPI revision so that more frequent sample replacements could be made as needed for specific categories of items.

The procedure of sample rotation by itself, however, may not appropriately account for improvements to consumer well-being that result from introduction of the new goods. The sample rotation results in a linking of the old and new samples, hence the implicit assumption is that prices in both samples fully reflect quality differences. In some

cases this assumption may be appropriate, if prices of the old goods fall as a result of direct competition from the new goods. But if the new sample includes items which provide the same services at a cheaper price, or new services that were previously unavailable, and the prices of the old goods do not fall commensurably, then benefits of those improvements will not be fully reflected in the measured price change.

Measurement of the new goods bias appear to be pretty much guesswork at present. Hicks (1940) showed that for consistency with the economic theory of the cost-of-living index, the consumer's surplus derived from introduction of the new good should be measured by reference to its reservation price. But estimation of reservation prices is a tricky econometric problem. These estimates appear to me to potentially confound several effects. The Hicksian consumer surplus from the introduction is the pure new goods effect, but the introduction of new goods is often immediately followed by significant quality improvements and price declines. Clearly separating the pure effects of new goods from quality change bias and substitution bias is a difficult empirical proposition. Most of the recent estimates of new goods bias in the CPI, including the estimate in the Advisory Commission report, are based on back-of-the-envelope calculations, and it seems possible that some of what is being counted as a new goods effect is also being included in estimates of quality change or substitution. If true, this double-counting would have the effect of overstating the overall upward bias in the CPI.

Several recent papers suggest that the CPI is missing some very large gains in consumer welfare because of the new goods problem. Hausman (1994) studied introduction of new brands of breakfast cereals, estimating the Hicksian consumer surplus

directly using econometric estimation of a demand system, and concluded that increases in consumer surplus that are missed by the CPI lead the price index for cereal to be substantially overstated. This finding is surprising for a commodity that is not undergoing major technological improvements.

However, Hausman's method for estimating the reservation prices for the new brands involves extrapolation of the demand functions well outside of the sample region. Nordhaus (1994) analyzed the cost of indoor illumination, and showed that there have been dramatic reductions in the price of light, as measured in lumens, when new technologies (such as compact fluorescent bulbs) are introduced. These product innovations would typically be linked into the CPI as the sample rotation picks up new products, rather than appearing as price declines in an existing product.

On the other hand, many economists have expressed skepticism about possibly exaggerated claims for the importance of new goods. If a new good replaces other close substitutes, it may be implausible to claim that its reservation price is much higher than its market price. If the price of a new good falls dramatically, consumers will tend to apply it to low valued uses (e.g., computers used for playing games, lights left on in unoccupied rooms.) The current state of empirical research has not done much to narrow the set of plausible beliefs about the effects of new goods.

Concluding Comments

Besides the various components of CPI bias, other CPI issues deserve our
attention and may affect the interpretation and policy uses of the measure. For example,
should an escalator intended for a specific demographic group, such as Social Security
recipients, reflect the expenditure patterns of that group? The CPI Advisory Commission
(1995) has argued not, based on several studies that found little difference between
indexes calculated for specific groups. If the basis for this is empirical, however, changes
in economic conditions could cause this result to be reversed. Furthermore, the biases
themselves could have differing impacts across different demographic groups. In my
view, further research is warranted on possible differences of inflation between the elderly
and the non-elderly, the poor and the non-poor, and other groups with different
expenditure patterns. Another issue is the effects of non-market goods, which affect
consumer well-being, but are not measured in studies that estimate cost-of-living indexes
based on prices of market goods. The purposes for which an index is to be used are
clearly relevant in determining how an index is to be defined. For example, Triplett
(1983b) argued that the usual expenditure-based cost-of-living index may not be the
appropriate index for escalation of Social Security benefits and pensions. Others,
including Griliches (1995), have questioned the policy of fixed escalation formulas.

The state of knowledge about the substitution and formula biases in the CPI has
increased substantially in the last couple of years, and recent changes to BLS procedures
have essentially eliminated the formula bias. However, the other categories of CPI bias

call out for additional information. Although I have suggested that the net effect of outlet substitution bias may not be large, entry of new firms is a pervasive phenomenon in the retail sector and one that is amenable to further research. Many researchers have tackled parts of the quality adjustment problem, but for selected categories of items. The new goods problem is the least amenable to systematic study, though a number of provocative papers have recently been written.

Perhaps the most encouraging outcome to date is the renaissance of research on price measurement issues. New data sources, such as supermarket scanner data and microdata from retail and trade associations, are providing detailed information that previously was not available. Although confidentiality restrictions have prevented general distribution by BLS of microdata on prices, BLS has policies that allow researchers access to the microdata for specific research projects (de Wolf, 1995). The tough measurement problems associated with quality change and new goods provide ample opportunities for researchers to do significant empirical and theoretical work, which ultimately may lead to improvements in the quality of the price data produced by government agencies. If the advance of a science is constrained by the quality of its measurement, then these are issues that should engage our best researchers.

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Table 1.
Recent Estimates of Bias in the U.S. Consumer Price Index

Author(s)	Point Estimate	Interval Estimate
Advisory Commission to Study the CPI (1995)	1.5	0.7 - 2.0
Michael Boskin (1995)	1.5	1.0 - 2.0
Congressional Budget Office (1995)	——	0.2 - 0.8
Michael R. Darby (1995)	1.5	0.5 - 2.5
W. Erwin Diewert (1995b)	——	1.3 - 1.7
Robert J. Gordon (1995)	1.7	——
Alan Greenspan (1995)	——	0.5 - 1.5
Zvi Griliches (1995)	1.0	0.4 - 1.6
Dale W. Jorgenson (1995)	1.0	0.5 - 1.5
Jim Klumpner (1996)	——	0.3 - 0.5
Lebow, Roberts, and Stockton (1994)	——	0.4 - 1.5
Ariel Pakes (1995)	0.8	——
Shapiro and Wilcox (1996)	1.1	0.7 - 1.6
Wynne and Sigalla (1994)	less than 1.0	——

Table 2.
Relative Importance of U.S. CPI Categories, December 1995

Expenditure category	Relative Importance
Food and Beverages	17.3
Housing	41.3
Apparel and Upkeep	5.5
Transportation	17.0
Medical Care	7.4
Entertainment	4.4
Other Goods and Services	7.1
Total	100.0
Commodities	42.9
Services	57.1
Total	100.0

Note: Relative importance is based on share of consumer out-of-pocket expenditures during 1982-84, updated by price change through December 1995.

Table 3.
Numerical Example of Formula Bias

item	Base Price[a]	Base Price[b]	Price				
			June	July	August (link)	September	October
Old sample							
A	1.00		2.00	2.00	1.25		
B	1.00		1.25	2.00	2.00		
C	1.00		2.00	1.25	2.00		
New sample							
D		2.00			2.00	1.25	2.00
E		1.25			1.25	2.00	2.00
F		2.00			2.00	2.00	1.25
Index	100	100	100	100	100	107.5	107.5
Percentage change				0	0	7.5%	0

[a] Estimated base-period prices for outlets in the old sample.
[b] Estimated base-period prices for outlets in the new sample.

STATISTICS UNDER THE SPOTLIGHT: IMPROVING THE CONSUMER PRICE INDEX: STATEMENT

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Given the importance of the Consumer Price Index (CPI), both as an economic indicator that provides timely information on the prices paid by consumers and as a measure used extensively for indexation, not only in a number of large and visible federal programs but also in many private contracts, it's not surprising that measurement issues pertaining to the CPI have garnered substantial attention over the years.

I probably remember more clearly than most of you the specific events that precipitated the recent intensification of interest in the CPI. Back in the early winter of 1995, Federal Reserve Board Chairman Alan Greenspan testified before the Congress that he thought the CPI substantially overstated the rate of growth in the cost of living. His testimony generated a considerable amount of discussion. Soon afterwards, Speaker of the House Newt Gingrich, at a town meeting in Kennesaw, Georgia, was asked about the CPI and responded by saying, "We have a handful of bureaucrats who, all professional economists agree, have an error in their calculations. If they can't get it right in the next 30 days or so, we zero them out, we transfer the responsibility to either the Federal Reserve or the Treasury and tell them to get it right."

I heard about this the next afternoon when I got a call at home from John Berry, a reporter for the Washington *Post*, who read this comment to me and wanted to know if I had any response that I'd like to make. I said to him then the same thing that I would say to you today. If there were problems with the CPI that Bureau of Labor Statistics (BLS) staff knew about and knew how to fix but were just refusing to address, I'd agree with the Speaker: he should zero us out. That is not, however, an accurate characterization of the BLS performance. Indeed, as other speakers have indicated in their comments--and I would like to express my appreciation for their kind words--the staff of the BLS have been at the forefront of trying to identify problems with the way that the CPI is put together, figuring out how to fix those problems, and making improvements in the index.

What I'd like to do in my time this afternoon is to talk about some of the things that the BLS has done recently to improve the CPI, about some of the things

that we have planned for the near future, and about some of the things that we'd like to do if we could identify the necessary resources and/or could figure out how to employ them. I'm not going to talk about biases in the CPI, other than to say that I'm considerably more agnostic than the other speakers in my assessment of the overall bias, if any, in the index. There are some things related to the formulas used to construct the CPI on which almost everyone agrees. Most importantly, as an index based upon a fixed market basket, the CPI does not allow for substitution in response to relative price changes and thus has a slight tendency to overstate the growth in the cost of living. There is less basis for agreement around the issues of how well we adjust for changes in the quality of goods and services, how we deal with new goods, and how we treat changes in the relative importance of different kinds of shopping outlets. At this point, there is a great deal that we just don't know about any possible upward or downward biases associated with these things.

Let me turn, then, to talking about the Bureau's continuing efforts to improve the CPI. I'm going to talk about three things: first, some very recent changes made to correct the so-called "formula bias" problem; second, our production of a set of alternative measures that answer different questions than does the CPI; and third, some things that we are doing and would like to do in the areas of quality adjustment, the treatment of new goods and changes in outlet mix.

Let me start with the so-called "formula bias" problem that was in the news this spring, a problem that grew out of the limitations of the data that we have available for use in putting the CPI together. The CPI is designed as a measure of the cost of purchasing a fixed market basket of goods and services. The market basket concept refers to the quantities of goods and services purchased, but the data we have available from our household surveys give us information on the amounts of money consumers spend on different sorts of items at particular stores. After this information has been compiled, our field economists visit stores to collect prices for specific items within each item category. Our procedure for constructing quantity weights for the items whose prices we're tracking used to be, first, to project the initial price collected for each item backwards using information on price trends for

similar items and then to divide the appropriate expenditure figure by this backwards-projected price to obtain a base period quantity weight for the item. This may sound pretty straightforward. The problem is that this procedure led us systematically to overweight items that were on sale as of the point in time when we first priced them--expenditure divided by a low price gives you a big quantity weight. The prices of sale items are apt to rise in subsequent months, however, and our procedures thus were imparting an upward bias to the index.

We only began fully to appreciate the existence and nature of this problem with the index during the course of 1994. In January of 1995, we introduced changes to deal with the problem for food-at-home items, and also made some related changes in the way we were putting the housing component of the index together. This summer, we are making further changes that we believe fully correct the problem. Going forward, then, the "formula bias" problem should be a non-problem.

There are, of course, other outstanding issues related to the formulas used to construct the CPI. As David Wilcox emphasized in his remarks, there are a variety of questions that you might use a consumer price measure to answer. The CPI tracks the price of a fixed market basket of goods and services, but, for many purposes, a measure that allowed for substitution among items as their relative prices changed, and thereby more closely approximated a true cost-of-living index, would be more appropriate.

The Bureau has done a fair amount of work oriented towards producing alternative indexes that answer different questions than the official CPI. We are in the process of producing an experimental measure that, within the most detailed cells in the index, uses geometric mean aggregation rather than Laspeyres aggregation. This measure may be more appropriate for tracking the cost of living than the CPI if you believe that it is a more reasonable approximation to assume that consumers' preferences exhibit an elasticity of substitution of one between items within item categories rather than an elasticity of substitution of zero. We've also produced experimental superlative measures of the sort originally proposed by Erwin Diewert that take substitution across item categories into account.

There are some issues related to these alternative measures that need to be considered. The key question about using the geometric mean formula for within-cell aggregation is whether assuming an elasticity of substitution of one across the board really is a more reasonable approximation than assuming an elasticity of substitution of zero. Evidence on this issue will be hard to come by.

The superlative measures are theoretically elegant, but are likely to be more difficult than the CPI for the general public to understand. From an operational perspective, production of the superlative measures requires expenditure share data that are available only with a lag. Our experimental superlative measures currently are not available until the fall of the year following the year to which they refer. It would be difficult to shorten that production cycle by very much even for an experimental index, and if we were to produce a superlative index subject to the same sort of review as the official CPI the necessary lag might well increase. For certain purposes, it is important to have a measure that comes out promptly.

There is also an issue about the precision of our experimental superlative measures. The weights for the superlative measures are constructed using data from the Consumer Expenditure Survey (CEX). For the official CPI, we use three years of CEX data to construct weights that our statisticians have deemed to be of adequate precision. For the superlative measure, only two years of expenditure data are used, because the superlative measure is based on the average of the expenditure shares for a base year and an ending year. To produce superlative measures that were of comparable precision to the official CPI would require a Consumer Expenditure Survey that was about 50 percent larger than we now have--and that would cost money.

On the general topic of alternative measures, David Wilcox alluded in his remarks to interest in the growth in the cost of living for the elderly. We have for some time now produced an experimental CPI for the elderly, which we construct by reweighting price change data that we already have using information based on the consumption pattern of the elderly. This method has shortcomings, but doing a better job would require selecting a separate sample of outlets and items to reflect where elderly consumers shop and what they buy, and thus would be quite an expensive proposition.

Turning to a third topic, I would like to talk about some things we have been doing or would like to do that relate to our treatment of quality change, new goods and different kinds of outlets in the index. With respect to the treatment of quality change, the obvious strategy is to try to make more use than we have in the past of hedonic adjustments or other explicit adjustments for changes in the features of the items that we're pricing. How much of this we do is mainly, though not exclusively, a resource issue. Making explicit adjustments for changes in item features requires that we collect information not only on item prices but also on item characteristics. This would not have to be done every month, but we would need substantially more information than we now collect to be able to look systematically, item category by item category, at the relationship between price and item characteristics.

Something that we have planned for implementation as part of the ongoing CPI Revision is the introduction of a new way of updating the CPI outlet and item samples. The current procedure is to update those samples each year for 20 percent of the areas in which we collect prices. By moving to a telephone survey to compile the underlying sampling frames, we'll be able to change that rotation pattern. Instead of bringing in new outlets and items geographic area by geographic area, we'll be able to bring in new outlets and items for whole item categories in all geographic areas at once. If there are categories of items for which we know that there has been a lot of change in what people are purchasing or where they are shopping, we'll be able to bring in new samples for those item categories on a more frequent basis.

Quite appropriately, there has been a great deal of attention devoted to the way that medical care is treated in the CPI. We're in the process of making some changes there as well. Under the procedures currently in place for constructing the hospital components of the CPI, we sample and collect prices for very specific items when we visit a hospital. We might, for example, end up tracking the price of a unit of blood. The problems with this approach have become clear to all of us. Hospital care really isn't sold specific item by specific item. In January of 1997--that is, this next January--we will be shifting over to an approach to tracking hospital care prices that involves visiting a hospital, picking a patient bill, identifying the key services covered by that bill, and then tracking the cost of providing that bundle of services. This is not, of course, a solution to all of the problems we have with tracking medical care prices, but looking at whole treatment bundles puts us in a better position to begin thinking about how to accommodate changes in treatment protocols in constructing the index.

There are a number of important outstanding issues that I would have to say we don't have good ways to handle. From an operational point of view, for example, we simply don't know how to go about comparing the prices of different items that may satisfy similar needs or even the prices of the same item sold at different types of outlets. Similarly, in an operational context, we don't have any good way to deal with the value consumers may attach to increases or decreases in the variety of items available for sale. We're working on some of these things, but I am not optimistic about our ever arriving at implementable solutions to all of the concerns that have been raised regarding the CPI.

As I've indicated, some of the things we could and would like to be able to do would require additional resources. Money is always tight, and it's even tighter today than in times past. In addition to seeking extra resources to do some of the things I've talked about, we

also need to be looking at whether we're using the money we already have in the most efficient possible way. Changing how we put together the area sample for the CPI, for example, might allow us to reduce our costs, and we've begun to look at that. When we update the sample of geographic areas in which we're collecting prices--something that we do roughly every ten years--it might be possible to have more overlap between the old and the new areas. The largest 30 or so metropolitan areas appear in the sample with certainty, and our area selection procedures already are designed to give some preference to smaller areas from the prior area sample. Most of the smaller geographic areas, however, are replaced during our regular Revisions. It's very expensive to go into a totally new area, hire staff, and begin collecting prices. Having more overlap in the geographic areas across area samples thus could save some money.

It also may not be necessary to collect prices for all item categories in all areas. The CPI sample of price quotations currently is structured so that we have a set of geographic areas and a set of item categories. With the exception of certain special cases like postage and used cars, we collect prices for all of the item categories in all of the geographic areas. The prices of items in certain categories, however, may be set in national markets, so that filling in the whole area/item-category matrix isn't necessary.
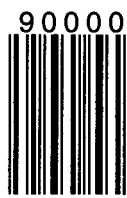
Moving away from our current approach to sample design would carry some risks. Further increasing the overlap between old and new geographic area samples, for example, might well make it more likely that we would end up with an area sample that was not truly representative of current reality. Similarly, selecting and pricing items nationally rather than locally, even if only in certain item categories, might increase the risk of not representing in our market basket items that account for a significant part of consumers' purchases or of not accurately reflecting price trends in individual areas. These risks are real, but I nonetheless believe that we ought to be looking at and evaluating the sorts of possible changes in our sampling strategy that I've mentioned.

Let me conclude by saying that, as the BLS moves forward, we can use all the help that we can get with continuing to improve the CPI. We are very eager to have ideas from any of you regarding how we could be doing a better job, and I've gotten some good ideas from the other panelists today. We are in the process of constructing research data bases suitable for addressing a wide range of price measurement issues and I'd invite any of you to talk with us if you have a project for which those data bases might be suitable and that might contribute to an improved understanding of price change in our economy.

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