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**EDUCATIONAL ATTAINMENT AND SUCCESS IN THE NEW ECONOMY:  
AN ANALYSIS OF CHALLENGES FOR IMPROVING HISPANIC STUDENTS'  
ACHIEVEMENT**

A Report by the Council of Economic Advisers

The President will announce today a new Council of Economic Advisers report on Hispanic education. This report focuses on education and the rewards to education among U.S. Hispanics. After documenting the gaps in educational outcomes for Hispanics relative to non-Hispanic whites, the report provides evidence about the increasing importance of education to economic success by focusing on Hispanics working in the information technology (IT) sector of the new economy. The report finds that those Hispanics who work in the highly paid, dynamic, and rapidly growing IT sector—where job growth is much faster than in the economy at large—are typically successful and earn far more than Hispanics who work in other occupations. However, Hispanics are significantly underrepresented in IT, primarily because they are less likely than their non-Hispanic peers to have the relatively high levels of education that IT jobs typically require. Policies that close the ethnic education gap at all levels can be expected to improve the future prosperity of Hispanic students and insure a greater flow into the labor force of workers prepared to contribute to the “new economy.”

**Among the significant findings in the report are:**

- *The Hispanic population is a rapidly growing, increasingly important segment of the U.S. population. In 20 years about 1 in 6 U.S. residents will be of Hispanic origin, and by the middle of this century—when today's young children are middle aged—this ratio will increase to about 1 in 4. The future productivity of the U.S. labor force hinges to a considerable degree on our nation's ability to provide high-quality education for Hispanic young people, who will play a vital role in the labor market in future decades.*
- *Despite tangible evidence of improvements for some groups, at present there are troubling gaps in the educational attainment of Hispanics. Over recent decades the average education of U.S.-born Hispanics has increased substantially, and the gap between them and non-Hispanic whites has declined. Nonetheless, the high school completion rate among young Hispanic adults is only 63 percent—compared with about 88 percent for whites and African Americans. And the fraction of Hispanics who graduate from 4-year colleges is less than half that of whites. While these differences are partially attributable to the low education*

levels of immigrant Hispanics, U.S.-born Hispanics also have relatively low educational attainment.

- *The economic advantages of education are growing.* The importance of improving educational outcomes for Hispanics is underscored by the increasing value of education in the labor market. For example, two decades ago, a male Hispanic college graduate earned 67 percent more than a male Hispanic without a high school diploma, whereas today a male Hispanic college graduate earns 146 percent more. These changes in the rewards to education are similar to those observed for other men in the labor market.
- *Currently, the relatively low levels of Hispanic earnings are explained in large measure by lower levels of educational attainment. Earnings premiums associated with higher education are much the same for Hispanics as for non-Hispanic whites.* Hispanics have much lower earnings than non-Hispanic whites; median earnings are 21 percent less for native-born Hispanics. After accounting for differences in age and gender and in education, the earnings gap declines to 6 percent for native-born Hispanics (with the remaining "unexplained" gap due to other factors not directly examined in the study, such as quality of education, geographic variation, and discriminatory employment practices).
- *Hispanics are greatly underrepresented in the high-paying IT sector, but those in IT occupations are generally successful.* While Hispanics are 11 percent of U.S. workers, they are only 4 percent of workers in five IT occupations. The Hispanic "digital divide" exists because the relatively low educational level of many Hispanics hinders entry into the IT labor market. This under-representation in IT contributes to the economy-wide Hispanic pay gap because IT jobs pay considerably more than other jobs: non-Hispanic whites earn 62 percent more in IT than non-Hispanic whites in other occupations, and Hispanics earn twice as much in IT as in non-IT occupations. Hispanics who are in IT occupations earn only marginally less (about 6 to 8 percent) than non-Hispanic whites, after adjusting for differences in gender, age, and education.

**Educational Attainment and Success in the New Economy: An Analysis  
of Challenges for Improving Hispanic Students' Achievement**

**June 2000**

**A Report by  
The Council of Economic Advisers**

## EXECUTIVE SUMMARY

This report focuses on education and the rewards to education among Hispanics in the United States. It documents the gaps in educational outcomes for Hispanics relative to non-Hispanic whites. The study also provides evidence about the increasing importance of education to the economic success of Hispanics in the new economy, focusing particularly on a high-paying, rapidly expanding sector, information technology (IT). Among the significant findings in the report are:

- *The Hispanic population is a rapidly growing, increasingly important segment of the U.S. population.* In 20 years about 1 in 6 U.S. residents will be of Hispanic origin, and by the middle of this century—when today's young children are middle aged—this ratio will increase to about 1 in 4. The future productivity of the U.S. labor force hinges to a considerable degree on our nation's ability to provide high quality education for Hispanic young people who will play a vital role in the labor market of the future.
- *Despite tangible evidence of improvements for some groups, there are troubling lags in the educational attainment of Hispanics.* Over recent decades the average education of Hispanics born in the United States has increased substantially, and the educational gap between U.S.-born Hispanics and non-Hispanic whites has narrowed. Nonetheless, the high school completion rate among all young Hispanic adults is only 63 percent—compared with 88 percent for whites and African Americans. And the proportion of Hispanics who graduate from 4-year colleges is less than half that of whites. While these differences are partially attributable to the low education levels of immigrant Hispanics, U.S.-born Hispanics also have relatively low educational attainment.
- *The economic rewards of education are on the rise.* The importance of improving educational outcomes for Hispanics is underscored by the increasing value of education in the labor market. Two decades ago, a male Hispanic college graduate earned 67 percent more than a Hispanic male with no high school education, an earnings premium that has increased to 146 percent today. Similar increases in the earnings premium are observed for all employed males.
- *Currently, the relatively low levels of Hispanic earnings are explained in large measure by lower levels of educational attainment. Earnings premiums associated with higher education are much the same for Hispanics as for non-Hispanics.* Hispanics have much lower earnings than non-Hispanic whites; median hourly earnings are 21 percent less for U.S.-born Hispanics. After accounting for differences in age and gender, U.S.-born Hispanics earned 15 percent less, and after controlling also for education, the gap narrows to 6 percent (with the remaining "unexplained" gap due to other factors not directly examined in the study, such as quality of education, geographic variation, and discriminatory employment practices). Educational differences also explain much of the wage gap for foreign-born Hispanics.
- *Hispanics are greatly underrepresented in the high-paying IT sector, but in general those in IT occupations are successful.* While Hispanics are 11 percent of employed workers, they are only 4 percent of workers in 5 IT occupations. This Hispanic "digital divide" exists because the relatively low educational level of many Hispanics hinders entry into the IT labor market. This under-representation contributes to the economy-wide Hispanic pay gap because these IT jobs pay considerably more than other jobs. Non-Hispanic whites earn 62 percent more in IT than non-Hispanic whites in other occupations, and Hispanics earn twice as much in IT as

in non-IT occupations. Hispanics who are in IT occupations earn only marginally less (about 6 to 8 percent) than non-Hispanic whites after adjusting for differences in age, gender, and education.

- *The IT case study illustrates that the consequences of underachievement in education are two-fold: The students' future prosperity is harmed, and the economy at large will have fewer individuals prepared to contribute in "new economy" occupations. Individuals' economic success in today's economy increasingly depends on being well educated. In turn, the strong performance of the American economy is propelled by the ingenuity and skills of our labor force, exemplified by new economy sectors like IT. Given the rapid growth of the U.S. Hispanic population, the gap in educational achievement between Hispanics and their peers is a matter of critical importance for Hispanic young people and society generally.*

## 1. INTRODUCTION

Hispanics are an extraordinarily vibrant, rapidly growing segment of the American population. The Census Bureau projects that in 20 years, approximately 1 in 6 U.S. residents will be of Hispanic origin, and by the middle of the century, about one quarter of the population will be Hispanic. Clearly, Hispanic Americans will play an increasingly important role in American life. In particular, the success of the American economy over the coming decades depends to a considerable degree on the productivity of a labor force in which Hispanics will play a progressively larger role.

In this light, enhancing the current state of Hispanic education in the United States must be viewed as a public policy priority. While Hispanic student achievement and educational attainment have shown some progress over the past decades, troubling gaps remain. Hispanics lag behind non-Hispanics on a variety of educational measures. A much smaller proportion of the Hispanic population than the non-Hispanic population completes high school. Similarly, college entrance and completion rates are much lower among Hispanics than among non-Hispanic whites.

These educational achievement gaps are especially troubling in a labor market in which the economic rewards of education are large and increasing. Evidence suggests that demand has increased for workers who bring strong problem-solving ability and technical skills to the workplace. Statistics presented below verify that the economic rewards of education are much the same for Hispanics as for non-Hispanics. Those who fall behind in educational achievement will also lag in terms of economic success in the new economy.

To highlight these issues, this report focuses on one rapidly expanding, highly paid sector of the economy—information technology (IT). An examination of labor market data indicates that the generally well-educated Hispanics who attain positions in IT occupations earn twice as much as Hispanics in other occupations. Further, Hispanics in IT earn only slightly less than non-Hispanic whites with similar demographic characteristics and education. However, there is a significant “digital divide” in IT employment stemming from a dramatic underrepresentation of Hispanics in IT occupations. This underrepresentation appears in large measure to be the result of educational differences between Hispanics and non-Hispanics. While Hispanic students who attend college are as likely as other students to major in science and engineering, Hispanics are much less likely than others to attend college.

The IT case study illustrates that the consequences of underachievement in education are two-fold. Underachievement not only hurts the future prosperity of students themselves, but also reduces the number of individuals in the U.S. labor market prepared to contribute in new economy occupations. Individuals' economic success in the modern economy depends on their being well educated. In turn the performance of the American economy is strong in part because of the ingenuity and skills of our labor force, especially in new economy sectors like IT. In light of the rapid growth of the U.S. Hispanic population, the gap in educational achievement between Hispanics and their peers is a matter of critical importance for Hispanic young people themselves and also to society more generally.

## 2. A BRIEF OVERVIEW OF TRENDS IN HISPANIC EDUCATION

Over the past 5 decades there has been a marked increase in the educational attainment of young Americans. Recent data indicate that high school completion rates for young adults (aged 25-29) are approximately 88 percent for both whites and African Americans, with the earlier

Chart 1. High School Completion Rates of 25- to 29-Year-Olds by Race and Ethnicity

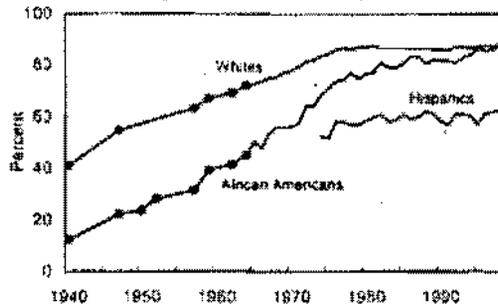
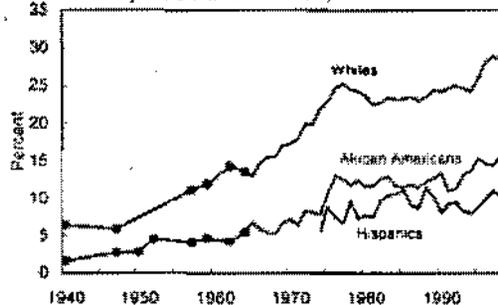


Chart 2. College Completion Rates of 25- to 29-Year-Olds by Race and Ethnicity



pronounced differences between the races disappearing by 1998 (Chart 1).<sup>1</sup> Hispanics, however, have not experienced the same gains. The proportion of those aged 25-29 completing high school remains relatively low—about 63 percent in 1998—and, though data are unavailable for this series on Hispanics prior to 1974, there has been little growth in high school graduation rates since that time.

Similarly, as demonstrated in Chart 2, the college completion rate for Hispanics have lagged behind those of whites and African Americans. For whites the college completion rate—the fraction earning bachelor's degrees—rose significantly, from 6 percent in 1940 to 28 percent in 1998. Despite some progress, racial and ethnic gaps in college graduation rates remain large. Currently, only 10 percent of Hispanic adults aged 25-29 have graduated from college.

One major reason for the lower levels of education for Hispanics relative to non-Hispanics is that new immigrants are much less educated.<sup>2</sup> If we look only at Hispanics born in the United States ("native-born"), there has been clear growth in educational attainment. Census data from 1970, 1980, and 1990 indicate that among working-age adults, native- and foreign-born Hispanics trail native-born whites in average educational levels (see Table 1 on the next page). However, the education gap between whites and native-born Hispanics has been narrowing. In contrast, the gap in average education between whites and immigrant Hispanics has become wider. Measures of educational achievement for Hispanics such as those given in Charts 1 and 2 combine the relatively less educated immigrant Hispanic group with those born in the United States.<sup>3</sup>

<sup>1</sup> Charts 1 and 2 are based on Census data, which include both Hispanic and non-Hispanic whites among "whites" and similarly has some Hispanics included in the African American group. The gaps between Hispanics and non-Hispanics are thus even larger than those pictured. Prior to the mid-1960s annual data are not available (the dots in the charts indicate points for which data are available).

<sup>2</sup> As of 1997, 38 percent of the Hispanic population were foreign-born, compared with 8 percent of whites and 6 percent of African Americans.

<sup>3</sup> For additional analysis see Julian R. Betts and Magnus Lofstrom, "The Educational Attainment of Immigrants: Trends and Implications," National Bureau of Economic Research Working Paper 6757, October 1998.

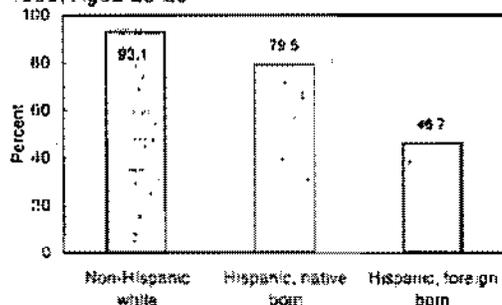
**Table 1. Average Years of Education for Individuals Aged 16-64**

	1970	1980	1990
<b>Men</b>			
Native White	11.6	12.7	12.9
Native Hispanic	9.5	10.9	11.4
Immigrant Hispanic	8.8	9.1	8.9
<b>Women</b>			
Native White	11.5	12.4	12.8
Native Hispanic	9.2	10.5	11.3
Immigrant Hispanic	8.4	9.0	9.1

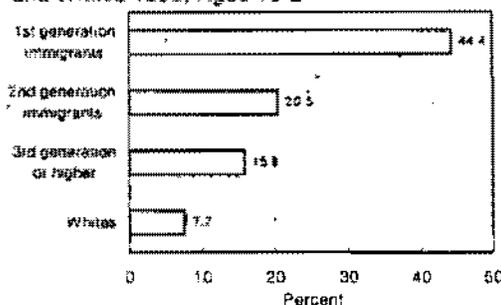
Source: Betts and Lofstrom (1998), based on data from the U.S. Census.

While the educational attainment of U.S.-born Hispanics has been increasing over time, U.S.-born Hispanics continue to have lower school completion rates than do non-Hispanic whites. The average high school completion rate for 25- to 29-year-olds stood at about 80 percent for the 1995-1999 period, compared with a rate of 93 percent for non-Hispanic whites (Chart 3).<sup>4</sup> In contrast, the completion rate for foreign-born Hispanics averages below 50 percent. Data on dropout rates for those aged 16-24—the fraction of individuals who are neither enrolled in high school nor have completed high school—show similar patterns. The dropout rate (in Chart 4) is especially high for foreign-born Hispanics (“first generation immigrants”) and for native-born Hispanic youth who had at least one parent born outside the United States (“second generation immigrants”).<sup>5</sup> However, even for Hispanics who were born in the United States and whose parents were also born in the United States (“third generation” or higher), the dropout rate was approximately twice as high for Hispanics as for non-Hispanic whites—15.8 percent vs. 7.7 percent. Clearly the Hispanic education gap is not solely the consequence of relatively low educational attainment among immigrant Hispanics. A central challenge for improving Hispanic educational outcomes, then, lies in improving the educational prospects of both immigrant and native-born Hispanic youth.

**Chart 3. High School Completion Rates 1995-1999, Aged 25-29**



**Chart 4. Dropout Rates for Hispanic Immigrants and Whites 1998, Aged 16-24**



<sup>4</sup> This completion rate of 93 percent for non-Hispanic whites is higher than the 88 percent completion rate reported in Chart 1 which is for whites generally (including Hispanic whites). This analysis uses the Current Population Survey (CPS) for 1995 through 1999. Consistent with the definition used by the Census Bureau, this analysis (as well as all other original analysis conducted for this report) defines individuals as “native born” if they were born in the United States or an outlying area of the United States, or were born in a foreign country but had at least one parent born in the United States.

<sup>5</sup> Phillip Kaufman, et al., “Dropout Rates in the United States: 1998,” U.S. Department of Education, National Center for Education Statistics, November 1999. Their analysis compares those born in the 50 states and the District of Columbia to those born elsewhere.

### 3. THE PATH TO HIGHER EDUCATIONAL ATTAINMENT

Early education in the home and at school appears to be critical to successfully following a path towards higher educational attainment. Evidence suggests that the ethnic education gap can arise from learning differences at very young ages. One report using 1999 data indicates that among 3- to 5-year-olds not yet enrolled in kindergarten, Hispanic children were less likely than non-Hispanic children to regularly engage in such "home literacy" activities as being read to, told a story, or taught letters, words, or numbers. These home literacy activities in turn were found generally to be associated with higher levels of "children's emerging literacy." Thus, the Hispanic children in the study were less likely to recognize all letters, count to 20 or higher, write their names, or read or pretend to read storybooks.<sup>6</sup> Statistics also indicate that Hispanic 3- and 4-year-olds are less likely than their white counterparts to be enrolled in early childhood education programs, and are underrepresented in Head Start enrollment.

At older ages, Hispanics on average trail non-Hispanic whites in reading and mathematics proficiency (at ages 9, 13, and 17, as measured by the National Assessment of Educational Progress).<sup>7</sup> Not surprisingly then, Hispanics on average also score lower than non-Hispanic whites on college entrance exams. This latter difference can be traced in part to family background. Hispanic students who take the Scholastic Aptitude Test (SAT) are much less likely than non-Hispanic whites to have a parent with a college degree, who might be in a better position to assist a child in the college-preparation process.<sup>8</sup> Hispanic SAT takers are also less likely than their non-Hispanic counterparts to have taken the Preliminary SAT (PSAT).<sup>9</sup>

Careful research shows that much of the disparity between the educational attainments of Hispanics and non-Hispanic whites stems from large differences in family background and income.<sup>10</sup> One study found that by age 15, 44 percent of Hispanic children had fallen one or two years behind the expected grade level—apparently because these students started school at older ages or were not advanced along with other children in their elementary school classes. Only about half as many non-Hispanic white children (23 percent) had fallen behind their expected grade level. Statistical analysis indicates that much of this educational gap can be explained by differences in family background characteristics, such as household income and parents' education. Furthermore, future prospects of completing high school and going on to college are greatly diminished for children who fall behind by age 15. For students who were 2 years behind the expected grade level, 67 percent of Hispanics and 80 percent of non-Hispanic whites failed to

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<sup>6</sup> See Christine Winquist Nord, et al., "Home Literacy Activities and Signs of Children's Emerging Literacy: 1993 and 1999," U.S. Department of Education, National Center for Education Statistics, 2000.

<sup>7</sup> From the early 1980s to present there has been improvement on these scores for all age groups of Hispanics, although only slightly for reading.

<sup>8</sup> About one third of Hispanic SAT takers have a parent with a college education, compared with more than half of non-Hispanic whites. See the National Science Foundation, *Women, Minorities, and Persons with Disabilities in Science and Engineering: 1998, 1999*.

<sup>9</sup> Statistics also indicate that for Hispanic groups as well as for other racial and ethnic groups, performance on the American College Test (ACT) is clearly correlated with family income. (National Science Foundation, *Women, Minorities, and Persons with Disabilities in Science and Engineering: 1998, 1999*.) These findings are relevant for Hispanic families in particular because family incomes are far lower for Hispanic households than non-Hispanic white households.

<sup>10</sup> The research reported in this paragraph is from Stephen V. Cameron and James J. Heckman, "The Dynamics of Educational Attainment for Blacks, Hispanics, and Whites," National Bureau of Economic Research working paper 7249, July 1999. The authors emphasize the role that economic background plays on children's educational achievement.

complete high school or earn a GED by age 24. Virtually none of these students (1 percent of Hispanics and 2 percent of non-Hispanic whites) had attended college by age 24. Thus, a disparity in educational outcomes appears among young children—long before they reach the ages when they are making decisions about completing high school and continuing on to college.

This evidence indicates that the ethnic disparities in high school completion and college attendance stem in large measure from a lifetime of disadvantage. The existing disparities must be addressed among disadvantaged students well before they reach the ages at which they are most likely to drop out of high school.

While evidence suggests that children from low-income families are less likely to be college-ready (by failing to earn a high school degree or otherwise failing to acquire skills or prepare to attend college), researchers also argue that low family income can be an important direct determinant of college attendance.<sup>11</sup> The high cost of college education can pose a serious deterrent. As indicated in Table 2, high-income families are much more likely than low-income families to send their children to college, and they are particularly likely to send them to four-year colleges.<sup>12</sup> The vast majority (90 percent) of students whose parents were in the top quartile of the income distribution were pursuing post-secondary education within 20 months of high school graduation, compared with only 60 percent of students whose parents were in the bottom quartile. And of those lower income students enrolling in post-secondary education, fewer than half enrolled in a 4-year college, compared with almost three-quarters of students from the top income group. Much of these differences in youths' college attendance may arise from the differences in preparedness for college just discussed, rather than from financial barriers. However, even after considering such family background influences, parental income remains an important determinant of college attendance.

**Table 2. Percentage of Students from Families in Each Income Quartile Enrolling in Post-Secondary Schools within 20 Months of High School Graduation**

Parental Income Quartile	Total	Vocational, Technical	2-Year College	4-Year College
Top	90	5	19	66
Second	79	6	25	48
Third	70	7	25	38
Bottom	60	10	22	28

Source: Kane (1999), based on data from the high school class of 1992.

Young people, their families, and the broader community continue to face the challenge of finding ways to insure that more disadvantaged young people complete high school and have college access. This must include improving educational prospects for disadvantaged children at every level, and insuring that financial barriers do not prove to be an obstacle at the college level.

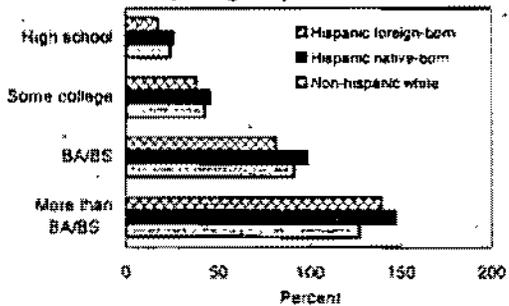
<sup>11</sup> As of 1998 median income for Hispanics was \$28,330 compared with \$42,439 for non-Hispanic whites. Data from the 1993 Survey of Income and Program Participation suggest that the median net worth of non-Hispanic white households was over 10 times that of Hispanic households. The 1998 *Economic Report of the President* provides a detailed overview of racial and ethnic disparity in income and assets.

<sup>12</sup> Thomas J. Kane, "Rethinking the Way Americans Pay for College," *The Milken Institute Review*, Third Quarter 1999.

#### 4. THE IMPORTANCE OF EDUCATION FOR ECONOMIC SUCCESS

On average, higher levels of education lead to better labor market outcomes—to higher rates of employment, lower rates of unemployment, and higher wages. And the wage premium associated with education has risen over time. In 1999, Hispanic men with a college degree earned 146 percent more than Hispanic men who had not completed high school. In contrast, in 1979 this same premium was a much smaller 67 percent for college completion. (Over the same period the premium for college education for all men in the work force rose similarly, from 57 percent to 147 percent.) The increasing premium appears to stem from the increasing value that the market places on technology-intensive skills, including computer skills that are used in service sector jobs. The wage premium for completing high school relative to dropping out has also risen over time for Hispanic men, increasing from 33 percent in 1979 to 40 percent in 1999. Recent research suggests that employers seeking to hire high-school educated individuals are looking for those with strong cognitive skills (including mastery of basic reading, math, and problem-solving skills). This preference for cognitive rather than manual skills might account for the rising pay premium for high school education.

Chart 5. Earnings Premium by Education  
Relative to Completing Only Grade 10 or 11



whites, native-born Hispanics and foreign-born Hispanics.<sup>14</sup> The general relationship between educational attainment and labor market success clearly holds for both Hispanics and non-Hispanics whites.<sup>15</sup>

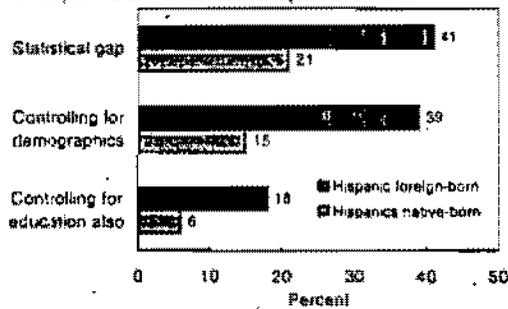
The raw comparisons in wages across education level described above do not take account of any differences in age structure or gender between workers in these groups. Chart 5 demonstrates that after controlling for age and gender, the premium for education is even higher for U.S.-born Hispanics than for non-Hispanic whites.<sup>13</sup> The earnings premiums, which show the percent increase in earnings for specific educational levels relative to those who drop out of high school after receiving 10 or more years of education, are given separately for non-Hispanic

<sup>13</sup> Specifically, these results are based on regression models estimated for each ethnic/nativity group using a pooled sample of the 1995 through March 2000 monthly data from the CPS (with respondents in 1995-1998 included only in their last survey months and respondents in 2000 included only in their fourth survey month). The dependent variable is the log of individuals' per hour earnings, and explanatory variables are gender, age (included as indicator variables for 5-year age groupings), and educational category (less than grade 10, an omitted category of grade 10 or more but no high school diploma, high school, some college, BA or BS, graduate education). The analysis focuses on full-time workers aged 20 or older who are not self-employed. Earnings are converted to December 1999 dollars using the monthly CPI-U. Sample sizes are 262,843 non-Hispanic whites and 30,650 Hispanics (just over half of whom are foreign-born). Median regression is used, which allows one safely to ignore earnings top-coding of the CPS data. Coefficients reported in Chart 5 are for educational levels of high school and above. They are transformed to represent percent changes in hourly earnings.

<sup>14</sup> The "earnings premiums" reported in Chart 5 reflect in part the causal effect of education on workers' earnings (e.g., the increased earnings due to the higher productivity of workers in the labor markets). In principle, these numbers may also reflect that on average workers who attain higher education may also have valued unobserved characteristics (such as inherent cognitive ability or personal drive) that differ from those with lower levels of education. Evidence suggests that the premiums reported in ordinary regression analysis are reasonably good measures of the causal effects of education on earnings. (See

Since Hispanics have returns to education that are at least as great as those of non-Hispanic whites, the generally lower wages earned by Hispanics arise in large part from their lower levels of education. Specifically, over the last half of the 1990s, median hourly earnings of Hispanics were one-third less than those of non-Hispanic whites. Native-born Hispanics earned 21 percent less than whites, while foreign-born Hispanics earned 41 percent less (Chart 6). Part of these wage gaps are due to differences in gender and age composition; after adjusting for these demographic factors, the gap is 15 percent for native-born Hispanics and 39 percent for foreign-

Chart 6. Differences in Wages of Hispanic Groups Relative to Non-Hispanic Whites



born Hispanics. After controlling for available measures of educational attainment, the gap declines further to 6 percent for native-born Hispanics and 18 percent for foreign-born Hispanics. Part of the remaining "unexplained gaps" may be the consequence of differences in the quality and type of education at measured levels (for example, if non-Hispanic whites typically live in communities with higher quality public high schools than Hispanics, or if immigrants educated abroad received relatively lower quality education). Additionally, these gaps may reflect

differences in language ability, variations in regional labor markets, and any wage differentials arising because of discriminatory employment practices. (Among foreign-born Hispanics the differential might also stem in part from the inclusion of illegal immigrants.) The central conclusion, though, is that for native-born and immigrant Hispanics alike earnings disparities are due in substantial measure to differences in educational attainment.<sup>16</sup>

## 5. EDUCATION AND EARNINGS: A CASE STUDY OF THE IT SECTOR

By most accounts the U.S. economy is experiencing a technological transformation that has changed the nature of work and placed a premium on a new set of skills. While this transformation has affected many jobs in the economy, there is a core set of occupations at the forefront of the revolution—occupations in information technology (IT). In the last 10 years, firms' expenditure on IT surged to become one of the largest components of investment. And employers appear increasingly to need workers with the problem-solving skills and technical expertise necessary to efficiently utilize these new IT investments.

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David Card, "The Causal Effect of Education on Earnings," in *Handbook of Labor Economics*, volume 3, edited by Orley Ashenfelter and David Card, North-Holland, 1999.)

<sup>15</sup> For all of the analysis using the CPS it is useful to note that some differences between native-born and foreign-born Hispanics may stem from the inclusion in the CPS data of illegal immigrants, many of whom are presumably in a poor position to compete for good jobs in the United States. For a discussion about the presence of illegal immigrants in the CPS data, see Guillermina Jasso, et al., "The New Immigrant Survey Pilot (NIS-P): Overview and New Findings About U.S. Legal Immigrants at Admission," *Demography*, February 2000.

<sup>16</sup> The results about the importance of education for explaining the ethnic wage gap are consistent with recent research indicating that three-quarters of the wage gap between Mexican Americans and non-Hispanic whites is attributable to Mexican Americans' relative youth, English language deficiencies, and especially their lower educational attainment (Steven J. Trejo, "Why Do Mexican Americans Earn Low Wages?" *Journal of Political Economy*, 1997).

This section examines the role of Hispanic Americans in IT. The analysis provides a vivid case study of the general problem of low educational attainment for Hispanic Americans, and the importance of closing the educational gap.

Although there is no exact definition of an IT worker, there are a number of occupations that quite clearly fall into the general domain of IT.<sup>17</sup> The analysis in this report considers a number of core IT occupations for which data are available from the Current Population Survey (CPS), a large nationally representative sample with information on workers' weekly earnings, demographic characteristics, and occupation. These core IT occupations are:

- electrical and electronic engineers;
- computer systems analysts and scientists;
- operations and systems researchers and analysts;
- computer programmers; and
- computer operators.

Definitions of these occupations are provided in the Appendix.

### IT Occupations: Rapid Growth and High Wages

The combined employment level in these five occupations has grown by almost 81 percent since 1983 (Chart 7), with particularly strong growth in the last 5 years. In contrast, total employment in the overall economy grew by just 32 percent since 1983. Today these IT occupations comprise approximately 3.4 million workers (about 2.6 percent of all employed workers). Employment projections by the Bureau of Labor Statistics suggest that rapid growth for computer-related occupations is expected to continue well into this century.

Chart 7. Workers Employed in IT Occupations

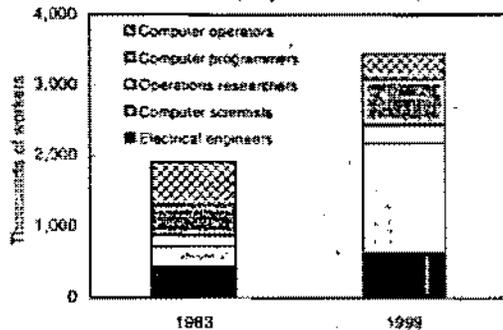
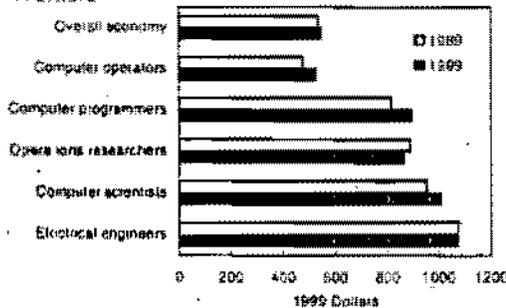


Chart 8. Median Weekly Earnings of Full-Time Workers



Within specific occupations, the most notable feature is the strong and steady growth of computer systems analysts and scientists. In 1983, this occupation had just over a quarter of a million workers, or 14 percent of the total IT workforce. By 1999, there were 1.5 million workers in this occupation, or 45 percent of the total. Also notable is the decline in the number of computer operators, perhaps stemming from changes in computing technology.

In addition to experiencing high employment growth, these occupations are also characterized by high wages (Chart 8). Median weekly earnings for four of the five IT occupations—all but computer operators—easily

<sup>17</sup> For a further discussion of these and related issues see Carol Ann Meares et al., "The Digital Workforce: Building Infotech Skills at the Speed of Innovation," U.S. Department of Commerce, Office of Technology Policy, June 1999.

exceeded median weekly earnings for all workers in 1999 as well as in 1989. The median earnings for the highest-paid IT occupation—electrical and electronic engineers—was almost twice that of all workers (\$1,073 vs. \$549 in 1999).

### Hispanics in IT Occupations

As in many other higher-paid occupations, Hispanic Americans are severely underrepresented in IT. There is some indication that this underrepresentation has improved modestly over the last decade.<sup>18</sup> Nonetheless, an examination of data from the CPS shows that over the late 1990s (1995 to the most recent available data, March 2000), Hispanics represented 11 percent of all employed workers, but only 4.1 percent of the workforce in these five IT occupations.

The underrepresentation of Hispanics in IT contributes to the ethnic economic gap because Hispanics and non-Hispanics alike earned far more in IT than in other occupations. Median hourly earnings for non-Hispanic whites in IT were 62 percent higher than for non-Hispanic whites in non-IT occupations, and Hispanics earned twice as much in IT as in other occupations. Moreover, evidence suggests that Hispanics in IT earned only modestly less than similar non-Hispanic whites: In an analysis of earnings that accounts for differences in education, age and gender, native-born Hispanics earn about 6 percent less than non-Hispanic whites. And foreign-born Hispanics earn an additional 2 percentage points less than native-born Hispanics (a difference that is not statistically significant).<sup>19</sup> The "unexplained" pay gap of 6 percent is comparable to the 6 percent gap that emerges in the general labor market for native-born Hispanics when controlling for demographics and education.

The general conclusions about Hispanics in IT—that Hispanics earn only slightly less than non-Hispanics but are greatly underrepresented in IT—are reinforced when a somewhat broader set of science and technology occupations is examined.<sup>20</sup> In this expanded sample an analysis that controls for age, gender, and education indicates that native-born Hispanics earn

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<sup>18</sup> This conclusion comes from comparing average representation of Hispanics in IT occupations in 1987-89 with 1997-99 (using various issues of *Employment and Earnings* from the Bureau of Labor Statistics). There were increases in Hispanic representation in four of the occupations—computer operators (up 1.1 percentage points to 7.1 percent), computer programmers (up 1.2 percentage points to 4.4 percent), computer scientists (up 1.0 percentage points to 3.6 percent), and electrical engineers (up 1.5 percentage points to 3.9 percent). There was a decline in Hispanic representation for operations researchers (a 0.8 percentage point drop to 3.4 percent).

<sup>19</sup> This is based on a regression model estimated using a pooled sample of the 1995 through March 2000 monthly CPS data, with a dependent variable log of individuals' per hour earnings, and explanatory variables, gender, age category, Hispanic and foreign-born Hispanic indicators, and educational category (less than high school, high school, some college, associate degree, BA or BS, and graduate education). The analysis focuses on full-time workers aged 20 or older who are not self-employed. Earnings are converted to December 1999 dollars using the monthly CPI-U. The sample includes Hispanics and non-Hispanic whites. The sample has 8,469 individuals, including 355 Hispanics. Median regression was used. The coefficient for the "Hispanic" indicator was significantly different from zero (t-statistic of -2.0), and "foreign-born Hispanic" was not (t-statistic of -0.5).

<sup>20</sup> This broader set includes the 5 IT occupations and also engineers of all types (aerospace, metallurgical and materials, mining, petroleum, chemical, nuclear, civil, agricultural, industrial, mechanical, marine and naval architects), mathematical scientists (including actuaries and statisticians), natural scientists (physicists and astronomers, chemists, atmospheric and space scientists, geologists and geodesists, physical scientists, agricultural and food scientists, biological and life scientists, forestry and conservation scientists, and medical scientists), and technicians of all sorts (electrical and electronic, industrial engineering, mechanical engineering, engineering, biological, chemical, and science technicians).

about 4 percent less than non-Hispanic whites, while foreign-born Hispanics earn an additional 2 percentage points less than native-born Hispanics (earnings differences that are not statistically significant).<sup>21</sup> However, a large gap exists in Hispanic employment: Hispanics are 11 percent of all employed workers but only 4.3 percent of workers in these science and technology occupations.

As detailed in a 1999 Office of Technology Policy report, the lack of Hispanic workers in these high-paid and rapidly-growing occupations stems from disparities in education that exist among young people prior to entering the labor force.<sup>22</sup> In particular, the report indicates that as of 1996 Hispanic college students earned bachelor's degrees in science and engineering at the same rate as whites (33 percent of students major in science or engineering). And rates are comparable also in engineering specifically (5.3 percent for Hispanics and 4.9 percent for whites) and computer science (1.8 percent for Hispanics and 1.7 percent for whites). The shortage of Hispanics in new economy jobs is not the consequence of Hispanic college students shying away from technical fields. Instead, the key to increasing Hispanic representation in science and engineering appears to be identifying and implementing strategies to increase the overall pool of Hispanic undergraduates.

## 6. CONCLUDING REMARKS

In light of the rapid growth of the U.S. Hispanic population, the gap in educational achievement between Hispanics and their peers is a matter of critical policy importance. This report emphasizes a number of salient facts on this issue. First, there is a large gap between the education of Hispanics and non-Hispanic. The ethnic education gap stems in part from the comparatively low levels of education among immigrant Hispanics. However, while there has been improvement in the educational achievement of native-born Hispanics, much of the gap is the consequence of poor educational outcomes among native-born Hispanics. Closing the education gap will require improved educational outcomes for immigrant and non-immigrant Hispanics alike. Second, this ethnic gap in education is a strong contributing factor to a corresponding gap in economic outcomes. Hispanics earn substantially less than non-Hispanic whites, in large measure because of the education gap. As a key example, the education gap contributes to a serious "digital divide" in employment in IT occupations and other science and technology jobs. Hispanics who work in these occupations generally have high earnings—only moderately less (4 to 8 percent) than similar non-Hispanic whites. However, Hispanics are severely underrepresented in these new economy occupations in part because relatively few Hispanics achieve the necessary educational levels. Underachievement in education hurts the future prosperity of the students themselves and also reduces the number of workers in the labor force prepared to contribute in new economy jobs.

Research described in this report suggests that the relatively poor educational outcomes of Hispanic youth often stem from a lifetime of disadvantage. The solution to the education gap lies in finding and implementing initiatives that not only target students at the ages when they are making decisions about completing high school and continuing on to college, but that also focus

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<sup>21</sup> The sample is 718 Hispanics and 16,495 non-Hispanic whites. The coefficient for "Hispanic" is not significant (t-statistic of -1.6) nor is the coefficient for "foreign-born Hispanic" (t-statistic of -0.6).

<sup>22</sup> "The Digital Work Force: Building Infotech Skills at the Speed of Innovation," U.S. Department of Commerce, Office of Technology Policy, June 1999. This report also highlights that women generally are underrepresented in IT occupations. In contrast to racial and ethnic minorities, women are underrepresented because they are less likely to choose science and engineering fields when in college.

on children earlier in the educational process. In short, the education gap must be addressed at all age levels. The accompanying box lists some of the ways in which the federal government is seeking to improve educational outcomes for U.S. youth—programs that indeed focus on all educational levels. If the ethnic education gap is to be narrowed substantially and rapidly, major efforts will be required from families and communities, and from the private and public sectors at all levels.

#### **Examples of Federal Government Efforts to Improve Educational Opportunity.**

Research indicates that the early preschool years, when human ability and motivation are being shaped, are critical to skill formation. Developmental programs that intervene early in life have been shown to be more cost-effective than later attempts at remediation. One such program is the federally funded Head Start program, which, since 1965, has provided comprehensive developmental services for low-income preschool children as well as social services for their families. This program has been shown to have large positive effects on test scores and schooling attainment for Hispanic children specifically. (See Janet Currie and Duncan Thomas, "Does Head Start Help Hispanic Children?" National Bureau of Economic Research, working paper 5805, 1996.) The success of Head Start has prompted the Administration to nearly double funding for the program since 1993 and to seek a \$1 billion (19 percent) increase in funding for the program as part of the fiscal 2001 budget.

As part of their agenda to improve public education, President Clinton and Vice President Gore have insisted on high standards for all students; demanded accountability for results; and expanded investment in strategies aimed at raising student achievement. The Clinton-Gore education agenda has focused on reducing class size in the early grades, expanding after-school and summer-school opportunities, ensuring access to educational technology, improving teacher quality, and expanding public school choice. (The 2000 *Economic Report of the President* details federal initiatives targeting each of these agenda items.) As part of the Hispanic Education Action Plan, the Administration has requested funding in the fiscal 2001 budget for programs that will improve the education of Hispanic students, including Title I grants to local educational agencies, bilingual education, migrant education, an adult English literacy initiative, and programs to help students prepare for and complete college.

Finally, the federal government has a number of programs to aid students in preparing for post-secondary education and to help make college affordable. GEAR UP partnerships of middle schools, colleges, and community organizations provide low-income students with mentoring, tutoring, and information on financial aid, starting no later than 7<sup>th</sup> grade. Another example is the TRIO programs—educational outreach programs designed to motivate and support students from low-income families. Other examples include programs that provide financially needy students with assistance, most prominently the \$4.9 billion Hope Scholarship, \$2.4 billion Lifelong Learning tax credits, and \$7.6 billion provided in the 2000 budget for Pell grants.

## APPENDIX. DESCRIPTIONS OF IT OCCUPATIONS STUDIED IN THIS REPORT

*Electrical and Electronic Engineers* design, develop, test, and supervise the manufacturing of electrical and electronic equipment. These engineers specialize in different areas such as power generation, transmission, and distribution; communications; computer electronics; and electrical equipment manufacturing — or a subdivision of these areas. They design new products, write performance requirements, and develop maintenance schedules. They also test equipment, solve operating problems, and estimate the time and cost of engineering projects.

*Computer Systems Analysts, Engineers, and Scientists* is a category which includes a wide range of computer-related occupations. Systems analysts solve computer problems and enable computer technology to meet the individual needs of an organization. Computer engineers work with hardware and software aspects of systems design and development. Computer scientists include a wide range of computer professionals who design computers and the software that runs them, develop information technologies, and develop and adapt principles for applying computers to new uses.

*Operations Researchers and Analysts* conduct research and perform analyses to support management in increasing the performance of an organization. Managers begin the process by presenting the symptoms of an operations-related problem to the analyst, who then formally defines the problem and selects the most appropriate analytical technique to examine it. Upon completion of the analysis, the analyst presents management with recommendations based on the results of the analysis.

*Computer Programmers* write, test, and maintain the detailed instructions, called programs or software, that computers must follow to perform their functions. In many larger organizations, programmers follow descriptions that have been prepared by software engineers or systems analysts. The transition from mainframe to personal computers has blurred the once rigid distinction between the programmer and the user. Increasingly, adept users are taking over many of the tasks previously performed by programmers, such as writing simple programs to assess data or perform calculations.

*Computer Operators* oversee the operation of computer hardware systems to ensure that they are being used most efficiently. These systems include mainframes, minicomputers, or networks of personal computers. Computer operators must anticipate problems and take preventative action, as well as solve problems that occur during operations. Increased automation and other technological advances are shifting the responsibilities of many computer operators to areas such as network operations, user support, and database maintenance.

Source: Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2000-01 Edition*, 2000.

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**REACHING THE UNINSURED:  
ALTERNATIVE APPROACHES TO EXPANDING  
HEALTH INSURANCE ACCESS**

**September 2000**

**A Report by  
The Council of Economic Advisers**

**THE ECONOMIC IMPACT OF THIRD-GENERATION WIRELESS TECHNOLOGY**

**October 2000**

**A Report by  
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## THE ECONOMIC IMPACT OF THIRD-GENERATION WIRELESS TECHNOLOGY

### EXECUTIVE SUMMARY

"Third-generation" (3G) wireless technology provides high-speed mobile access to the Internet and other communications networks. This technology offers significant benefits to consumers and telecommunications providers and complementary benefits to the U.S. economy. It is urgent that the United States follow other advanced countries in making adequate spectrum available for 3G applications. This report documents the likely benefits of 3G technology and explains why adequate spectrum is needed to provide these services efficiently. The key points are these:

- **Telecommunications and the Internet are among the most important sectors of the New Economy.** Telecommunications represented 3 percent of GDP in 1998, having grown at a 7 percent annual rate over the previous 10 years. Wireless carriers employ over 150,000 people in the United States and generate \$44 billion in annual revenue. At the end of 1999, the United States had 86 million wireless subscribers; today that number exceeds 100 million. By year-end 2000 there will be over 600 million wireless subscribers worldwide. The Internet has spawned thousands of companies, as entrepreneurs have raced to provide content, commerce, and new services to consumers and firms. Consumers purchased \$5.5 billion of goods and services over the Internet during the second quarter of 2000 alone. Sales over the Internet between businesses are estimated to hit \$251 billion in 2000, up from only \$43 billion in 1998. The most successful Internet startup companies have created hundreds of billions of dollars of market value.
- **Third-generation wireless technology combines two powerful innovations: wireless communications and the Internet.** Today's wireless devices are designed to transmit voice and brief text messages and cannot handle digital multimedia and other high-bandwidth Internet content. 3G devices, by contrast, provide high-speed mobile connections to the Internet and other communications networks, giving users full access to the rich content and commercial possibilities of the "information superhighway."
- **This new technology promises substantial benefits to consumers, producers, and the economy as a whole.** The annual consumer benefit from today's wireless telephone services is estimated at \$53-\$111 billion. The consumer benefits from 3G services will likely be of this order of magnitude. Providers also stand to reap substantial gains. Recently completed 3G spectrum auctions in Europe have raised \$150-\$600 per capita. These auction revenues indicate the expected producer benefits from operating 3G licenses.
- **To provide 3G applications most efficiently, adequate spectrum must be made available for commercial use.** In telecommunications, the most important scarce resource is spectrum. While current U.S. carriers can develop 3G applications using currently allocated spectrum, the allocation of additional spectrum could lower the cost of bringing 3G to U.S. consumers. However, parts of the spectrum being considered for 3G applications are already in use.

- **Delays in introducing 3G products and services can be costly.** Besides the foregone benefits to 3G consumers and providers, delay may be harmful to U.S. firms seeking to provide complementary products and services. Early investments are necessary to develop a vibrant U.S. industry for 3G applications. Knowledge spillovers, which are important in high-tech industries, tend to be geographically localized. Finland, which allocated its 3G spectrum licenses in March 1999, has already taken the lead in developing an industry to provide mobile applications.
- **Government policy in allocating spectrum must weigh carefully all benefits and costs.** Consumer benefits, provider profits, and the potential benefits of industry leadership should be weighed against the possible costs of moving incumbent users to ensure that adequate spectrum is made available for 3G applications.

# THE ECONOMIC IMPACT OF THIRD-GENERATION WIRELESS TECHNOLOGY

## I. INTRODUCTION

The U.S. economy has performed remarkably over the last several years. Productivity growth has accelerated from about 1½ percent per year from 1973 to 1995 to about 3 percent per year from 1995 to 1999. This acceleration is heavily related to technology, both the investment in IT hardware and software and the extraordinary productivity of the industries producing the technology. Between January 1993 and September 2000 the total market value of firms on the NYSE and NASDAQ increased by 400 percent. Knowledge and intangible capital are increasingly important: R&D spending has soared, along with the numbers of patents.

At the heart of this "New Economy" lie a series of dramatic technological innovations. Advances in computing, information storage, and data transmission have reduced costs, created new markets, and expanded existing markets. These innovations came from a remarkable flourishing of entrepreneurship, often concentrated in Silicon Valley and other high-technology corridors in the United States. Firms and other organizations have moved quickly to exploit the opportunities provided by these new technologies. Firms are spending billions on enterprise systems, sophisticated software and hardware packages that integrate ordering, procurement, inventory, finance, and human resources. Consumers are offered an increasing array of goods and services for communication, entertainment, shopping, education, and other activities. In some industries, firms are taking advantage of technological improvements by expanding and consolidating their operations to reduce costs; in other industries, startup companies are using technology to create new products and markets. These changes explain a large portion of recent U.S. productivity gains.

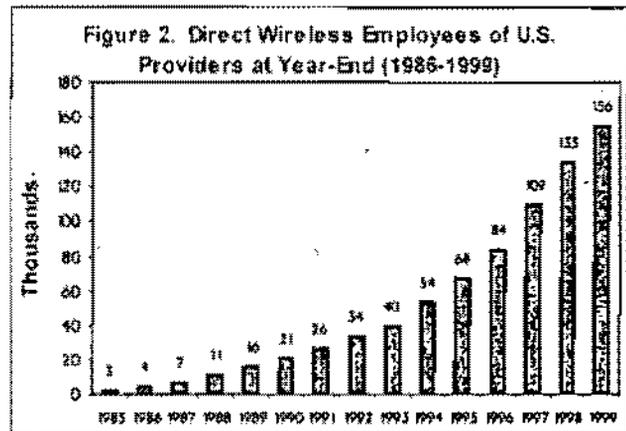
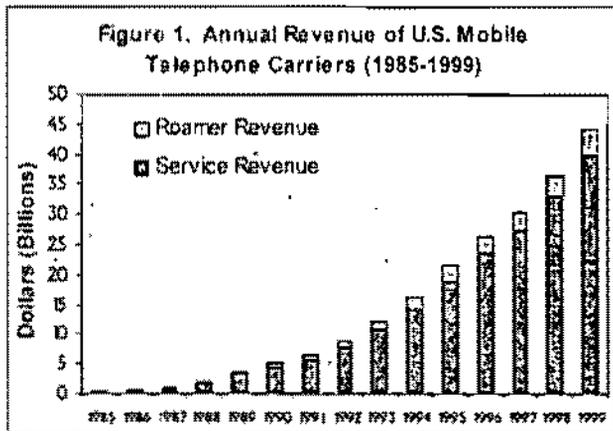
The telecommunications sector has been a primary beneficiary of these technological advances. Radical improvements in computing power, along with healthy competition in the communications sector, have reduced the costs of communications dramatically. As costs have fallen, and capabilities have expanded, the wireless telephone and pager markets have expanded rapidly. Wireless carriers employ more than 150,000 people in the United States and generate over \$44 billion in annual revenue (see Figures 1 and 2). Mobile-phone penetration in the United States now exceeds 35 percent. Today, the number of U.S. wireless subscribers exceeds 100 million. Experts estimate that by year-end 2000, there will be over 600 million wireless subscribers worldwide.<sup>1</sup>

The Internet is also transforming the ways individuals and organizations communicate and manage information. Nearly 54 percent of U.S. households have access to the Internet and surveys indicate that over 50 percent of U.S. businesses will sell products online in the year 2000.<sup>2</sup> Traditional firms and new firms alike are competing to deliver consumers higher-speed access to the Internet and more sophisticated services for this new medium. Internet sales to

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<sup>1</sup> Cellular Telephone Industry Association ([www.wow-com.com](http://www.wow-com.com)); Electronic Trend Publications, "The Worldwide Wireless Network," July 2000.

<sup>2</sup> NUA Internet, "How Many Online," September 2000 ([www.nua.ie/surveys/how\\_many\\_online](http://www.nua.ie/surveys/how_many_online)); Internet Economy Indicators, October 6, 2000 ([www.internetindicators.com/facts.html](http://www.internetindicators.com/facts.html)).



Source: CTIA Semi-Annual Wireless Survey, 1999.

consumers—so-called B2C ecommerce—were \$5.5 billion for the second quarter of 2000 alone.<sup>3</sup> Sales over the Internet between businesses (B2B) have increased even more dramatically. B2B sales are estimated to hit \$251 billion in 2000, up from only \$43 billion in 1998.<sup>4</sup>

The latest advance in mobile communications technology, “third-generation” (3G) wireless, will be capable of combining the powerful technologies of wireless communications and the Internet.<sup>5</sup> Today’s wireless service, used for analog and digital cellular phones and pagers, was designed to transmit voice and brief text messages. These devices transfer data at relatively slow speeds, around 9.6 kilobits per second (kbps)<sup>6</sup>—significantly slower than conventional 56 kbps dial-up modems. 3G devices, by contrast, will transmit data at speeds between 144 kbps and 2 megabits per second, about as fast as a cable modem or digital subscriber line. Increasing the data-transfer rate allows mobile phones, hand-held computers, and other products to become multimedia access devices. Further, the international standards that have been developed for 3G allow global roaming with a single device.<sup>7</sup>

The market for high-speed, or “broadband,” wireless access has tremendous potential. Broadband applications such as streaming audio and video are already becoming increasingly popular on the Internet, as evidenced by the rapid growth of high-speed cable and DSL modems.

<sup>3</sup> U.S. Department of Commerce, Press Release, August 31, 2000.

<sup>4</sup> Forrester Research, Inc., “Resizing Online Business Trade,” November 1998.

<sup>5</sup> First-generation (1G) wireless phones, introduced in the United States in 1983, use analog technology to transmit voice calls. Second-generation (2G) wireless phones use digital technology and were introduced into widespread commercial service in 1996 following the FCC’s auction of PCS spectrum licenses in 1994 and 1995. While both technologies are currently used in the United States, since 1999 the number of 2G subscribers has exceeded the number of 1G subscribers. Judy Berck, “A Brief History of PCS (Digital Cellular) Technology Development in the United States,” April 1998 ([www.pcsdata.com/history.htm](http://www.pcsdata.com/history.htm)); Federal Communications Commission, *Fifth Competition Report*, August 18, 2000.

<sup>6</sup> Competitive Intelligence Publications, “3G Mobile: Future Markets,” Research Report #103, Chapter 2, May 2000 ([www.electronics.ca/reports/global/cit103.html](http://www.electronics.ca/reports/global/cit103.html)).

<sup>7</sup> Throughout this document we generally use “3G” to refer to the entire class of high-speed wireless communications technologies. Other writers distinguish between 3G and an intermediary set of technologies, “2.5G,” which offer mobile data services at rates between 56 kbps and 144 kbps, the speeds of conventional modems and ISDN lines, respectively. Both 3G and 2.5G will offer substantial upgrades to the existing mobile data transmission capabilities, and development of both technologies benefit from allocation of additional spectrum.

As these and other applications multiply, wireless devices will require 3G capabilities to access existing Internet materials, along with new Internet sites optimized for mobile access. The bandwidth provided by 3G facilitates secure mobile commerce, real-time videoconferencing, on-line gaming, and other, not-yet-imagined applications. The 3G technology also gives the user an "always-on" mobile Internet connection.

More importantly, the development of 3G technologies will encourage investment and innovation in complementary services such as specialized content and billing and payment systems. The Internet has spawned thousands of companies as entrepreneurs have raced to provide content, products and new services to consumers and to firms. The most successful of these startup companies have created hundreds of billions of dollars of market value and have impacted the economy dramatically. The combined market capitalization of 15 leading internet applications companies—Yahoo, Verisign, eBay, Inktomi, Commerce One, Amazon, CMGI, Infospace, Vignette, Lycos, Internet Capital Group, Akamai, Real Networks, Healthon/WebMD, and Cacheflow—was \$193 billion on October 2, 2000. An appropriate allocation of commercial spectrum licenses and other policies that favor investment have the potential to unleash a wave of innovation in 3G applications. The impact of these yet-to-be-developed applications is impossible to predict precisely, but history suggests that they may be profound.

Several other countries, including Finland, Japan, Spain, the U.K., the Netherlands, and Germany, have already allocated new spectrum specifically for high-speed wireless devices and applications.<sup>8</sup> It is urgent that the United States follow other advanced countries in making adequate spectrum available for 3G applications. As explained below, delay is costly.

This report documents the likely benefits of 3G technology and explains why an adequate supply of commercial spectrum licenses is needed to provide these services efficiently. In general, benefits of technological innovation accrue to the consumers who use the new technology, the producers who provide it, and other firms that supply complementary goods and services. Introducing new technologies is also costly: research and development must be funded; existing technologies must be modified or abandoned, and new capital must be provided. In telecommunications, the most important scarce resource is spectrum. Commercial spectrum licenses allow firms to transmit data over a particular frequency in a particular area. To provide high-speed and other wireless applications efficiently, spectrum must be allocated to its highest valued use. This may require a reallocation of spectrum.

## 2. BENEFITS FROM NEW TECHNOLOGIES

Technological innovation does not occur in a vacuum; it requires a particular structure of incentives and institutions. Firms' demands for new technologies are derived from consumers' demands for new products and services. Those firms that quickly learn to satisfy consumer needs stand to reap substantial gains, particularly in markets where network effects and first-mover advantages are important. There can also be significant spillover benefits to firms that provide complementary goods and services.

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<sup>8</sup> European regulators have mandated that newly allocated spectrum be used only for 3G technology. U.S. law generally permits carriers to use their allocated spectrum for a variety of technologies.

## A. Benefits to Consumers

The potential consumer benefits from introducing 3G technology are substantial. While it is impossible to predict the precise demand for any future product, one can see the order of magnitude by studying the introduction of related technologies. For instance, a well-known study attempts to measure the "consumer surplus" created by the introduction of analog cellular service (1G).<sup>9</sup> Economists define consumer surplus as the difference between the prices consumers actually pay and the maximum amounts they would be willing to pay for a particular good or service. Consumer surplus is thus a measure of the net benefits to consumers created by a particular market. Using data on price and number of subscribers in the top 30 cellular phone markets between 1989 and 1993, the study estimates that consumer surplus generated by the introduction of the cellular telephone was in the range of \$31 billion to \$50 billion *per year* in constant 1994 dollars.<sup>10</sup> In light of such potential benefits, delays in the introduction of these services can be extremely costly to consumers.

How have the benefits from the introduction of digital wireless (2G) compared with the benefits of (1G)? Updated calculations estimate that the combined consumer surplus from 1G and 2G was between \$53 and \$111 billion in 1999.<sup>11</sup> This new consumer surplus is the product of several factors. First, to the extent that consumers value the quality improvements such as improved clarity provided by digital wireless, their willingness to pay rises and overall demand increases. Second, because digital wireless uses spectrum more efficiently, providers can offer the same service at lower cost. Consumers benefit to the extent that providers pass along these gains through price reductions. Third, allocating new spectrum for digital wireless introduced new competitors into the market. The average number of competitors in major metropolitan areas has increased from two to more than four. Increased competition pressures firms to lower costs, ensuring that the cost savings from technological improvement are passed on to consumers.

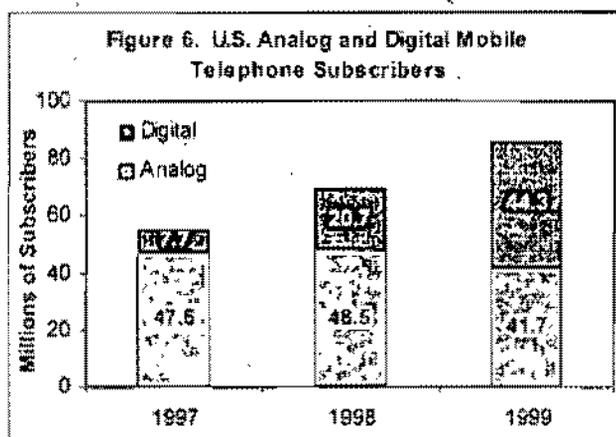
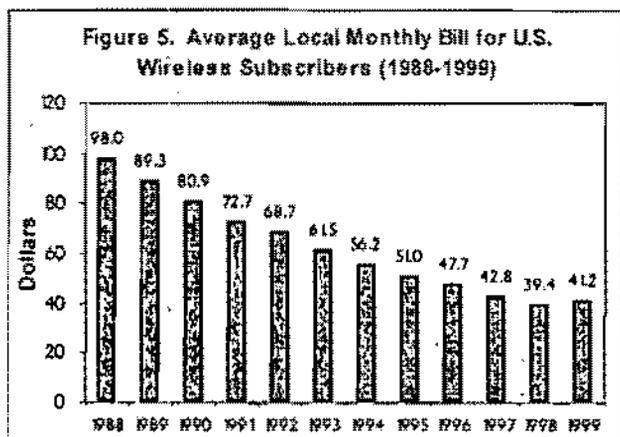
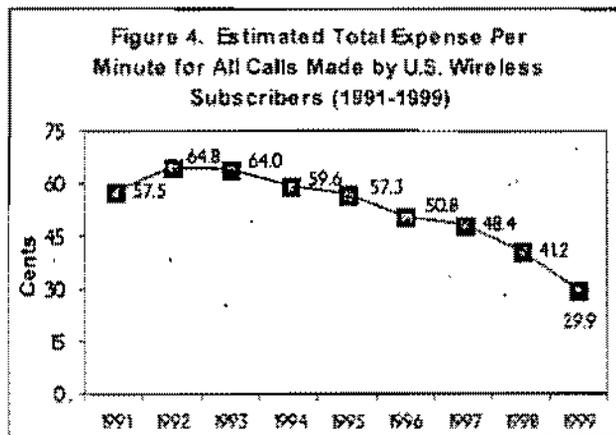
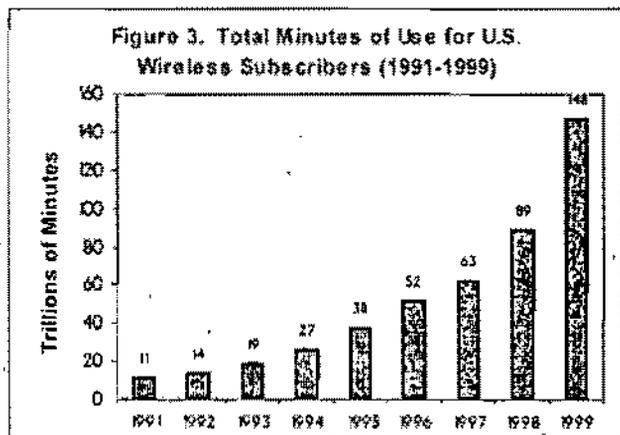
The combined results have been dramatic, as shown in the figures below. Following the allocation of new spectrum for digital services starting in 1994, total wireless use has risen sharply, prices have fallen rapidly, and subscribership has increased substantially. As shown in Figure 3, total minutes of use by U.S. wireless customers more than tripled from 1995 to 1999. During the same period, consumers' fully weighted cost per minute dropped by nearly 50 percent (Figure 4), and average local monthly prices fell from \$51 in 1995 to \$41 in 1999 (Figure 5). In 1999, more than half of all mobile subscribers were using digital technology (Figure 6).

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<sup>9</sup> Jerry A. Hausman, "Valuing the Effect of Regulation on New Services in Telecommunications," *Brookings Papers on Economic Activity, Microeconomics* (1997), pp. 1-37.

<sup>10</sup> An earlier study concluded that the total consumer welfare loss from the 10-year delay in licensing the cellular (1G) spectrum at \$86 billion in 1991, or 2 percent of GDP in 1983 when the licensing finally occurred. J. Rohlf, C. L. Jackson, and T. E. Kelley, "Estimate of the Loss to the United States Caused by the FCC's Delay in Licensing Cellular Telecommunications," National Economic Research Associates Report (1991).

<sup>11</sup> Jerry A. Hausman, "Mobile Telephone," *Handbook of Telecommunications Economics*, forthcoming.



Source: CTIA Semi-Annual Wireless Survey, December 1999; FCC, *Fifth Report on Commercial Mobile Services*, August 18, 2000.

Moreover, digital wireless has allowed new services, such as voice messaging, text messaging, and caller ID, to be integrated into mobile phones. The introduction of voice messaging services for basic telephony created an estimated \$1.3 billion in consumer surplus in constant 1994 dollars.<sup>12</sup> This technology, which is included in the service provided to many digital wireless subscribers, may be even more valuable to consumers when combined with the freedom that mobility provides.<sup>13</sup>

Consumers in other countries are already enjoying wireless Internet applications using 2G technology. In Japan, for example, Nippon Telegraph and Telephone's DoCoMo subsidiary has launched a service called i-mode. Over 10 million Japanese customers have subscribed. Subscribers use an i-mode phone that can send and receive e-mail as well as access websites optimized for tiny screens. With a thumb-controlled joystick, subscribers can tap into online news, browse through restaurant guides, buy airline tickets, and trade stocks. Using another technology called wireless application protocol (WAP), several European firms have turned phones into

<sup>12</sup> Hausman, "Valuing the Effect of Regulation."

<sup>13</sup> Hausman, "Telecommunications: Building the Infrastructure for Value Creation," in R. Nolan and S. Bradley, eds., *Sense and Respond* (Cambridge, Mass.: Harvard Business School Press, 1998), provides a method to estimate an upper and lower bound for consumer surplus for other goods using limited data, and he applies this method to internet access.

electronic wallets, allowing customers to pay for goods and services via their mobile phone bill rather than via credit cards or cash. According to recent news reports, Finnish consumers can make vending machine purchases, pay rent, phone, or electricity bills, and pay for parking spaces with their mobile phones.

Possible 3G applications are even more impressive. According to the International Telecommunication Union (ITU), 3G devices will be compact enough to fit into a pocket or handbag and will integrate the functions of a range of existing devices. The ITU suggests that the 3G device

will function as a phone, a computer, a television, a pager, a videoconferencing center, a newspaper, a diary and even a credit card. [It will] support not only voice communications, but also real-time video and full-scale multimedia via a screen that can be pulled-out and flexible. It will also function as a portable address book and agenda, containing all the information about meetings and contacts and able to remind you automatically before an important appointment or automatically connect to an audio or videoconference at a specified time. It will automatically search the Internet for relevant news and information on pre-selected subjects, book your next holiday for you on-line, and download a bedtime story for your child, complete with moving pictures. It will even be able to pay for goods when you shop via wireless electronic funds transfer. In short, the new mobile handset will become the single, indispensable "life tool," carried everywhere by everyone, just like a wallet or purse is today.<sup>14</sup>

## B. Benefits to Providers

In a dynamic, rivalrous market such as the U.S. telecommunications market, firms compete aggressively to provide new goods and services to consumers. First-mover advantages can be important in many telecommunications markets, so the profits from establishing an early lead in these markets can be substantial. Of course, the precise value to U.S. operators of additional spectrum for 3G technology is uncertain. A simple analysis of the existing wireless industry indicates that, in the aggregate, U.S. wireless operators earned \$238 million of revenue per MHz under the existing spectrum allocation in 1999. At similar rates, an additional 150 MHz of spectrum could bring an additional \$35.7 billion of service revenues per year, depending on what services are provided. Mobile data technology may also facilitate new business models for providers, as revenues from advertising, licensing content and applications providers, transaction processing, and billing may augment or replace the traditional fee-for-service (subscription) model.

A second, more precise measure of the order of magnitude of provider benefits is given by the recently completed auctions for 3G spectrum in Europe. Auctions in Germany and the U.K. raised \$46 and \$35 billion, respectively, representing total payments in excess of \$500 per inhabitant in these two countries. An auction in the Netherlands raised about \$2.5 billion, or \$150 per inhabitant. Table 1 describes the results of these auctions.

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<sup>14</sup> International Telecommunication Union, "The Next Generation of Mobile Communications," October 10, 2000 ([http://www.itu.int/itu/what\\_is/3rdgen/index.html](http://www.itu.int/itu/what_is/3rdgen/index.html)).

Table 1. Comparison of European Spectrum Auctions

	UK	Germany	Netherlands
Start Date	3/2000	7/31/2000	7/10/2000
End Date	4/27/2000	8/17/2000	7/24/2000
Net Proceeds	\$35.4 billion (£22.5)	\$46.2 billion (98.8 DM)	\$2.5 billion
Net Proceeds per Capita	\$599	\$563	\$158.4
Number of Licenses	5*	6**	5***
Fees Paid by Winners	\$7.1 billion	\$7.7 billion	\$0.5 billion
Winning Firms (parent company country of origin)	<ul style="list-style-type: none"> <li>• Vodafone Airtouch (UK)</li> <li>• BT Cellnet (UK)</li> <li>• Orange (France Telecom)</li> <li>• One2One (Deutsche Telekom)</li> <li>• Telesystem International Wireless (Tele-globe - Canada)</li> </ul>	<ul style="list-style-type: none"> <li>• Deutsche Telekom (Germany)</li> <li>• Viag Telekom (British Telecom)</li> <li>• Mannesmann (Vodafone)</li> <li>• Telefonica / Sonera (Spain / Finland)</li> <li>• E-Plus (Netherlands)</li> <li>• MobilCom (Germany) / France Telecom</li> </ul>	<ul style="list-style-type: none"> <li>• Libertel (Netherlands)</li> <li>• KPN Mobile (Netherlands)</li> <li>• Dutchtone (Netherlands)</li> <li>• Telfort (British Telecom)</li> <li>• 3G Blue consortium (Tele Danmark / Deutsche Telecom / Belgacom)</li> </ul>

Source: UMTS Forum; population figures from *Statistical Abstract of the United States, 1999*. All figures converted to current U.S. dollars.

\*National licenses

\*\*Each operator purchased 2 sets of 2x5 MHz licenses. The result is 6 national licenses.

\*\*\*National licenses

The most a company will be willing to pay for a spectrum license is the present value of the future profits (after tax) it expects to make from using this license.<sup>15,16</sup> In a competitive auction with multiple bidders, the price paid by each winning firm will come close to, but will not exceed, this willingness to pay.<sup>17</sup> Using the data from Table 1, this suggests that winners of the German auctions, for example, expect to earn at least \$7.7 billion in present value of profits from operating 3G licenses in Germany. Annuitizing this present value at a 15 percent rate suggests

<sup>15</sup> The present value of expected future profits is the sum of all expected future profits discounted by the project's cost of capital. Future profits are all cash flows from operating the service less operating costs and additional investments required to bring the service online.

<sup>16</sup> A more refined view also considers the value of profits foregone if the firm does not win the license. Since 3G is partly a substitute for existing services, incumbent firms must consider their expected reduction in profits from 1G and 2G services in the case in which they do operate a 3G license and in the case in which they do not operate a 3G license. For example, incumbents without the new technology may lose customers to entrants that provide the newer services. In theory, this can increase a firm's willingness to pay for the license (and will depend on its existing market share with the current technology). By contrast, new entrants consider only their expected future profits from operating using the license.

<sup>17</sup> It is possible for a firm to overpay if its expectation and that of other bidders is too optimistic.

that each of the six winning firms expects future after-tax profits in excess of \$1 billion per year.<sup>18</sup>

Will 3G be as profitable for U.S. companies? While these auction results suggest that European firms have high expectations for 3G, European and the U.S. wireless markets differ in important ways. First, three of the bands under consideration for 3G applications in the United States—the 306–960 MHz, 1710–1850 MHz, and 2500–2690 MHz bands—are currently used by analog cellular phone providers, the Department of Defense, fixed wireless providers, satellite broadcasters, school systems, and private video teleconferences. The U.K., Germany, and the Netherlands, by contrast, did not face significant incumbency problems when spectrum was auctioned for 3G applications.

Moreover, wireless Internet access may be less popular here than abroad because U.S. prices for wireline Internet access are already low. The average monthly U.S. price for 30 hours of Internet access at off-peak times is \$22; the average monthly price for all OECD countries is \$35.<sup>19</sup> To the extent that wireless and wireline Internet access are substitutes, these price differences could reduce the potential market for 3G services in the United States. On the other hand, wireless and wireline Internet access may be complements, and providers could choose to provide combined service. Of course, firms in the United States and abroad may change their pricing strategies for wireline Internet access once 3G services become available.

Finally, firms' expectations about the profitability of 3G may change. Carriers will learn more about the technology and about consumer demand between now and a U.S. auction. If 3G applications developed within the next 2 years turn out to be highly successful, carriers may decide that U.S. licenses are more valuable than previously thought. Firms that win 3G licenses in other countries may also view U.S. licenses as more valuable if bargaining power with equipment suppliers and learning-by-doing decreases anticipated costs. Additionally, as information about 3G emerges, financial markets' willingness to finance license purchases may change. Early evidence suggests that financial markets are not as willing to finance European 3G licenses as firms had anticipated. After bidding an average of \$7.7 billion for German UMTS licenses, companies including Deutsche Telekom have seen their credit ratings fall. France Telecom's credit rating was lowered from AA- to A after it supported winning bidders in the U.K. and Germany. (Of course, these downgrades may reflect other factors as well.) A ratings downgrade of this sort typically increases a firm's cost of borrowing significantly. Macroeconomic changes, too, may have an impact on firms' cost of borrowing. A significant increase in U.S. interest rates, for example, would likely depress firms' bids.

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<sup>18</sup> Besides the cost of the license, firms will have additional capital expenditures to operate their networks in Germany. Cash flow from operations must cover the expense for this as well.

<sup>19</sup> OECD, Directorate of Science Technology and Industry, "Internet Access Price Comparison," September 21, 2000 ([www.oecd.org/dsti/sti/it/cm/](http://www.oecd.org/dsti/sti/it/cm/)).

### C. Benefits to U.S. Industry

Besides the direct benefits to consumers and 3G providers, the introduction of this technology could unleash a wave of secondary innovations in related goods and services, and to foster the development of new "technology corridors" such as Silicon Valley. The spillover benefits to the U.S. economy could be significant.

The emergence of the Internet economy, particularly in the United States, shows how technological innovation can generate large social returns. Communications protocols such as TCP/IP and HTML provide a standard platform for exchanging information between computers. Opening a new platform stimulates investment not only for the provision of the necessary hardware and software, but also for applications and content delivered over that platform. Widespread diffusion of these communications standards has given rise to entire industries devoted to providing Internet content and commercial services to consumers and businesses. Startup companies, along with established retailers and information services, have created hundreds of billions of dollars of shareholder wealth through Internet-related activities. Employment in several IT sectors more than doubled between 1993 and 1999.<sup>20</sup> These investments in IT and complementary services have been major contributors to productivity improvements over the latter half of the 1990s.<sup>21</sup>

Importantly, the sectors producing these technological innovations often cluster geographically. One reason is that knowledge spillovers between firms, and spillovers between firms and academic institutions, are particularly significant in high-technology sectors. A recent study of knowledge flows used patent citations to show that these spillovers tend to be geographically localized, even after controlling for pre-existing research activity.<sup>22</sup> In the technology sector much of the relevant knowledge is "tacit," rather than explicit, making close social ties (between entrepreneurs and venture capitalists, for example) all the more important.<sup>23</sup> Investigators have shown that spatial concentration of innovations was significantly higher in industries in which knowledge generation—as measured by industry R&D/sales, the use of skilled labor, and the importance of academic research—was particularly important.<sup>24</sup> In short, location matters.

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<sup>20</sup> U.S. Department of Labor, Bureau of Labor Statistics, "National Employment, Hours, and Earnings," series EEU00500001 and EEU80737001.

<sup>21</sup> Dale Jorgenson and Kevin Stiroh, "Raising the Speed Limit: US Economic Growth in the Information Age," Working Paper, Department of Economics, Harvard University (May 2000); Stephen Oliner and Daniel Sichel, "The Resurgence of Growth in the Late 1990s: Is Information Technology the Story?" Working Paper, Federal Reserve Board (February 2000).

<sup>22</sup> Adam B. Jaffe, Manuel Trajtenberg, and Rebecca Henderson, "Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations," *Quarterly Journal of Economics*, Vol. 108 (1993), pp. 577-98.

<sup>23</sup> Gunnar Eliasson, "Business Competence, Organizational Learning, and Economic Growth: Establishing the Smith-Schumpeter-Wicksell Connection," in F. M. Scherer and M. Perman, eds., *Entrepreneurship, Technological Innovation, and Economic Growth: Studies in the Schumpeterian Tradition* (Ann Arbor: University of Michigan Press, 1992); Jacqueline Senker, "Tacit Knowledge and Models of Innovation," *Industrial and Corporate Change*, Vol. 4 (1995), pp. 425-77.

<sup>24</sup> David B. Audretsch and M. P. Feldman, "R&D Spillovers and the Geography of Innovation and Production," *American Economic Review*, Vol. 86 (1996), pp. 630-40.

Besides this academic work on spillovers, strong anecdotal evidence suggests that location can be important in the early-stages of high technology industries. Silicon Valley is the most famous example. Moreover, in Finland—which allocated its 3G spectrum in March 1999—a vibrant cluster of startups developing commercial applications for 3G and existing digital wireless technologies has emerged. Nearly 3,000 companies in Finland are involved in telecommunications and other IT industries, including work on wireless technologies and applications ranging from bill-payment systems to wireless portals and entertainment. Recently, major companies such as Hewlett-Packard have chosen to base their wireless applications development programs there, where wireless penetration is the highest among the OECD economies. (See Appendix 2 for a description of the Finnish wireless cluster.)

Economic clusters such as these play a major role in advanced economies.<sup>25</sup> Firms within economic clusters are often able to perceive new customer needs more clearly and more rapidly. According to one important study on economic clusters, “cluster participation also offers advantages in perceiving new technological, operating, or delivery possibilities.”<sup>26</sup> Moreover, new business formation occurs more readily in economic clusters, because the barriers to entry are lower there than elsewhere. The required assets, skills, inputs, and staff are readily available at the cluster location and are more easily assembled there.<sup>27</sup>

Finally, it should be noted that first-mover advantages are particularly important in markets with network externalities.<sup>28</sup> Many Internet markets display strong network externalities,<sup>29</sup> and wireless Internet markets may be subject to the same effects. In short, to promote a domestic cluster of internationally competitive wireless firms, it is essential that adequate spectrum be made available for commercial use.

### 3. THE NEED FOR ADEQUATE SPECTRUM

If the benefits to firms from operating 3G are so large, why aren't U.S. mobile operators and owners of other spectrum already scrambling to offer this service? No law prevents providers from using their currently licensed spectrum for mobile data services such as 3G. In principle, some (or all) of the roughly 200 MHz currently in use for wireless telephone technologies could be converted by its owners to provide 3G service. However, there are several reasons why converting currently used spectrum to this new technology may be costly.

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<sup>25</sup> Michael E. Porter, “Location, Competition, and Economic Development: Local Clusters in a Global Economy,” *Economic Development Journal*, Vol. 14 (2000), pp. 15–34. Porter defines economic clusters as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate.” See also Porter, *The Competitive Advantage of Nations* (New York: The Free Press, 1990).

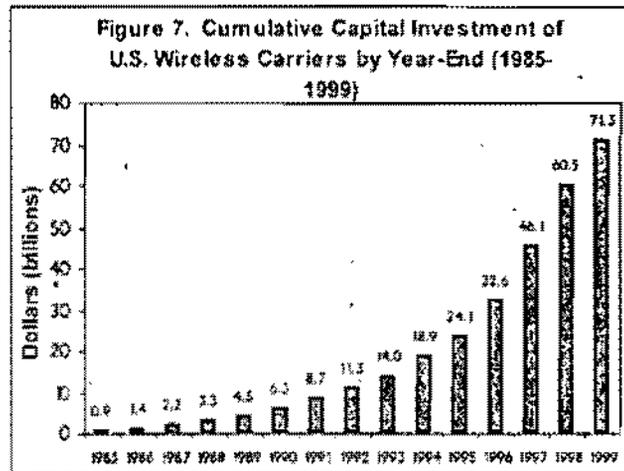
<sup>26</sup> Porter, “Location, Competition, and Economic Development.”

<sup>27</sup> *Ibid.*

<sup>28</sup> Michael L. Katz and Carl Shapiro, “Systems Competition and Network Effects,” *Journal of Economic Perspectives*, Vol. 8 (1994), pp. 93–115.

<sup>29</sup> For example, consider this explanation from CEO Meg Whitman for eBay's dominance of the online-auction business: “We have the largest marketplace by far. That does matter because the sellers want to be where the buyers are and the buyers want to be where the sellers are.” *Wall Street Journal*, November 22, 1999.

First, as bandwidth becomes increasingly scarce, the costs and prices for current mobile phone services such as voice will increase. Second, much of the existing capital stock would have to be replaced. Through the end of 1999, wireless carriers had invested over \$70 billion in capital equipment (see Figure 7). A carrier that tried to use its existing spectrum for 3G would find some fraction of its current capital stock obsolete. Third, the allocation of new spectrum licenses could lower the cost of entry into the wireless market, reducing costs by increasing competition.



Moreover, physical capacity limitations may set in with wireless technology before the consumer demand for additional bandwidth is exhausted. Although technological improvements have increased the amount of data that can be transmitted per unit of spectrum, transmitting more wireless data will, at some point, require allocation of more spectrum for these services.<sup>30</sup>

Given these considerations, the provision of additional spectrum for high-speed applications should be considered a cost reduction for mobile data services. Depending on competitive conditions, this cost reduction could lead to substantially lower prices and higher quantities for consumers.

Uncertainty itself can also cause firms to delay investments and hinder the diffusion of new technologies.<sup>31</sup> In the current environment, U.S. firms face three types of uncertainty: regulatory, technical, and business. Whether and when the FCC will allocate new spectrum licenses are the key elements of regulatory uncertainty. If firms are required to use existing spectrum to introduce 3G services, technical uncertainty will be high, because equipment manufacturers and service providers must learn to squeeze both existing and 3G applications into existing bandwidth. Customer demand for new services is the major source of business uncertainty. Because the demand for mobile data services will be dependent on the applications developed for it (i.e., the software that will run on the 3G hardware), the timing of customer demand must also be considered. The decisions made by software developers will depend on their estimates of the size of the user base. If developers believe that the user base will be small or slow to develop—because of high service prices or because service providers themselves will delay investments—they will choose to develop fewer applications. This may, in turn, stall the development and diffusion of the technology.<sup>32</sup>

<sup>30</sup> Splitting cells requires very expensing additional network infrastructure, especially in congested areas (Berck, "A Brief History of PCS"). Goldman Sachs (Wireless Data, 2000) points out that in large metro areas, carriers are already hitting capacity constraints. This allows them to sustain higher prices.

<sup>31</sup> Michael E. Porter and A. Michael Spence, "The Capacity Expansion Process in a Growing Oligopoly: The Case of Corn Wet Milling," in J. McCall, ed., *The Economics of Information and Uncertainty* (Chicago: University of Chicago Press, 1982).

<sup>32</sup> Katz and Shapiro, "Systems Competition and Network Effects."

In short, while some mobile data services would probably be forthcoming without the provision of additional commercial spectrum licenses, one can assume that the amount would be dramatically lower (at significantly higher prices) without adequate spectrum.

#### 4. COSTS OF DELAY

The process of allocating additional U.S. spectrum for 3G applications is complicated by the presence of incumbent users. The costs borne by these incumbents must be figured into any calculation of costs and benefits. Nonetheless, the potential benefits from the allocation of additional spectrum that have been documented in this paper are substantial. Each year of delay in introducing 3G will deprive consumers of the surplus that technology will generate. Producers, of course, will also lose the potential profits from providing 3G devices and applications. Finally, the U.S. Treasury will lose the interest on delayed auction revenues, which could be substantial.

Perhaps the most important cost of delay is the forgone benefits from the creation of internationally competitive industry clusters dedicated to 3G products and services. As discussed above, these clusters are already emerging in Finland and elsewhere. The most important providers of wireline Internet services—firms like AOL, Amazon.com, Yahoo!, and eBay—are located in the United States. For U.S. firms to develop similar leadership in wireless technologies, it is essential that the supporting institutions be developed as quickly as possible.

#### 5. CONCLUSION

3G applications promise substantial benefits. In the United States, however, parts of the spectrum suitable for 3G applications are already in use. In judging the costs of delaying 3G development, it is important to take into account not only the expected revenues from auctioning spectrum licenses, but also the expected consumer benefits. These benefits are likely to be substantial—on the order of tens of billions of dollars per year. Further, greater delay in providing additional spectrum licenses for high-speed applications reduces the likelihood that U.S. industry will take the lead in developing wireless technology and applications.

APPENDIX 1. CHARTS AND TABLES

Table A-1. Schedule of Allocations of Commercial Licenses to 3G Spectrum

Country	Date Scheduled		Completed?	Type	Comment
	Month	Year			
Finland	Mar	1999	√	Beauty Contest	• 4 national licenses awarded
Spain	Mar	2000	√	Beauty Contest	• 4 national licenses awarded
United Kingdom	Apr	2000	√	Auction	• 5 national licenses awarded
Japan	Jun	2000	√	Beauty Contest	• \$35 billion • 3 licenses awarded; service to commence 5/01
The Netherlands	Jul	2000	√	Auction	• 5 national licenses • \$2.5 billion
New Zealand	Jul	2000		Auction	• 4 national licenses
Germany	Jul	2000	√	Auction	• 6 national licenses • \$45 billion
France	Sep	2000		Beauty Contest	• 4 national licenses • fixed cost of FFf 32.5 billion (\$4 billion) per license
Sweden	Nov	2000		Beauty Contest	• 4 national licenses
Italy	Nov	2000		Hybrid Auction / Beauty Contest	
South Korea	Year end	2000		Beauty Contest	
Singapore	Year-end	2000		Hybrid Auction / Beauty Contest	
Australia	Jan	2001		Auction	
Taiwan	Early	2001		undecided	
U.S.	Sep	2002		auction	

Source: UMTS Forum, August 18, 2000 ([www.umts-forum.org](http://www.umts-forum.org)).

Note: In a beauty contest, license winners are generally chosen by government regulators on the basis of firms' competing business plans. Firms' business plans include descriptions of service offerings, pricing, geographic coverage, and timing of new technology introduction.

**Table A-2. Wireless Subscribers as a Fraction of the Population in G7 Countries and Scandinavia**

	1995	1998	1999
Finland	19.9%	58.0%	65.0%
Norway	22.8	48.6	61.8
Sweden	22.8	46.5	57.6
Italy	6.9	35.8	52.5
Japan	8.2	37.7	44.9
UK	9.8	25.6	40.3
France	2.5	19.1	34.9
U.S.	11.8	25.5	31.5
Germany	4.6	16.9	28.6
Canada	8.8	17.6	22.7

Source: OECD Telecommunications Database. By October 2000 the U.S. figure exceeded 35 percent.

**Table A-3. Wireless Subscribers, Internet Access, and Wireless Internet Access as a Fraction of the Population in G7 Countries and Scandinavia**

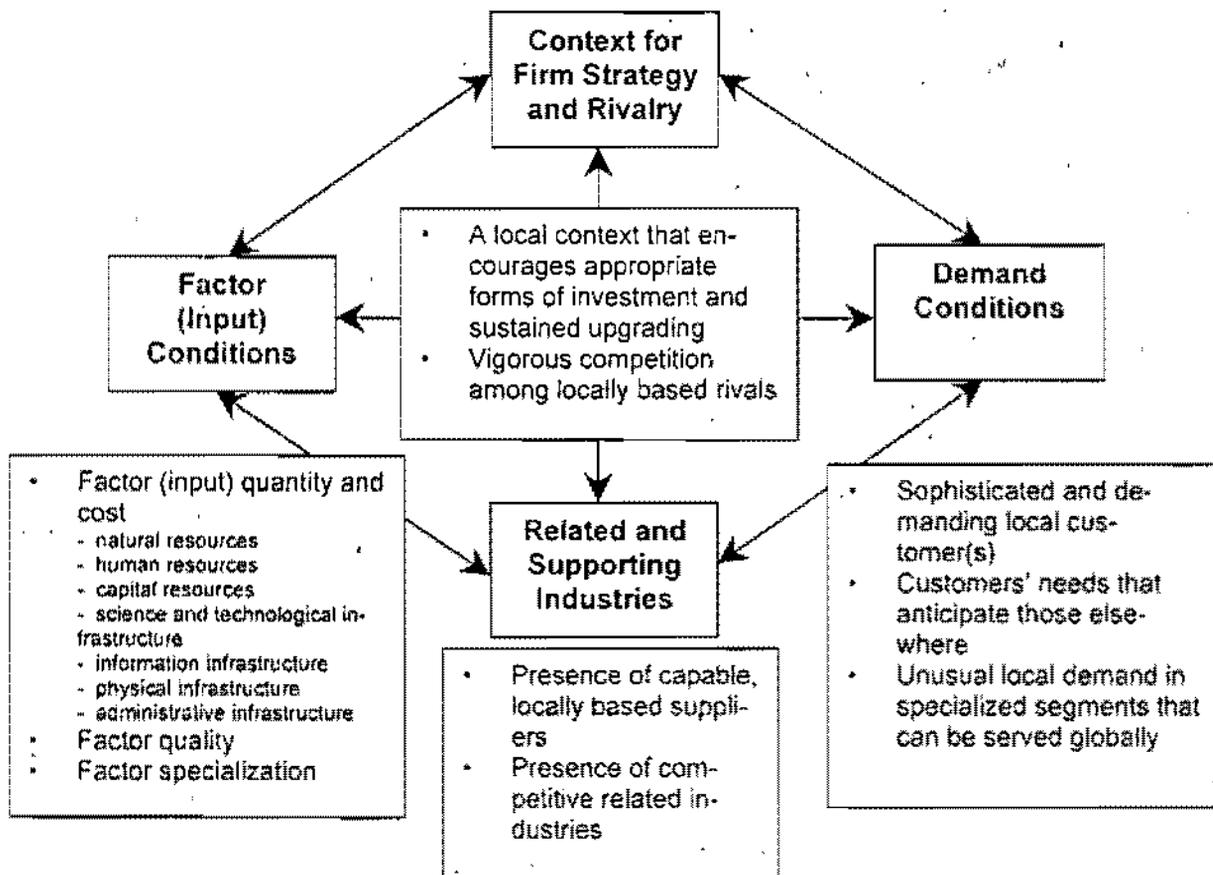
	Mobile phones, year-end 1999	Internet access, mid-year 2000	Wireless Internet subscribers, 2000 estimates
Finland	65.0%	42.5	3.7%
Norway	61.8	49.4	3.4
Sweden	57.6	50.3	3.5
Italy	52.5	19.6	2.1
Japan	44.9	20.6	7.9 *
UK	40.3	32.7	1.4
France	34.9	11.0	1.5
U.S.	31.5	49.8	1.3
Germany	28.6	16.0	1.2
Canada	22.7	41.8	N/A

Sources: 1999 OECD Telecommunications Database; Nielsen Netratings, September 7, 2000; International Data Corporation; Statistical Abstracts of the United States, 1999; Forrester Research, Inc., "Europe's Mobile Internet Opens Up," December 1999; Goldman Sachs; (\*) Estimates for Japan are from press releases claiming that i-mode has 10 million subscribers.

## APPENDIX 2. CASE STUDY OF FINNISH WIRELESS CLUSTER

Michael Porter offers a framework for analyzing the sources of competitive advantage in geographically concentrated industry clusters such as the California wine industry, the Dutch flower industry, or Silicon Valley's high-tech industry.<sup>33</sup> His framework identifies 4 complementary factors that promote "locational competitive advantage," which is characterized by above-average productivity and profitability among industry players in a particular region. These factors are (1) the context for firm strategy and rivalry, (2) factor (input) condition, (3) demand conditions, and (4) the existence of related and supporting industries. Figure A-1 diagrams the framework, used here to analyze the emerging Finnish wireless-applications cluster. The Finnish wireless industry displays advanced characteristics in each of the four areas.

Figure A-1. Sources of Locational Competitive Advantage



Reproduced from Porter, "Location, Competition, and Economic Development."

<sup>33</sup> Porter, *The Competitive Advantage of Nations*, and Porter, "Location, Competition, and Economic Development."

Finland is a country of 5.2 million people situated between Sweden and Russia, with per capita GDP of \$23,780 (1999), or 69 percent of the U.S. per capita GDP in purchasing power parity terms.

### Context for Firm Strategy and Rivalry<sup>34</sup>

Finland has had competition in telecommunications throughout the 20<sup>th</sup> century. The national Post and Telecommunications never enjoyed a monopoly. After the U.K., Finland was the first country to deregulate in several areas related to telecommunications: the manufacture of end-user terminals, basic telecommunications services, and data services. Today there are one hundred telecommunications operators in Finland, or two operators per 100,000 residents.

Two mobile operators, Sonera and Radiolinja, have actively developed and launched new mobile services and applications. This has created a favorable environment for small companies in related areas. Currently the Finnish telecommunications and IT sector is populated by approximately 3,000 firms. A consortium of more than 30 smaller operators has recently been granted a license to build a competing mobile network.

Besides domestic competition from Finnish carriers and equipment companies, Finnish firms face staunch competition from neighboring Sweden.

### Factor (Input) Conditions

Finland was the first country to allocate licenses for third-generation wireless networks. These licenses were granted free of charge to Sonera, Radiolinja, 3G (a consortium of local phone companies and Swedish Netcom), and Telia (Sweden).<sup>35</sup> Some of the firms awarded 3G licenses plan to provide mainly network operations, leasing their assets to other firms that will provide consumer marketing and service.

The public sector in Finland has been supportive of R&D in telecommunications. Tekes, Finland's National Technology agency, has jointly sponsored a program, "TLX: Creating a Global Village," with the private sector and Finnish research institutes. This program has provided FIM 710 million (\$120 million) over three years to fund technology development, including 3<sup>rd</sup> and 4<sup>th</sup> generation wireless systems and wireless value-added services. Tekes has also funded the "Electronics for the Information Society Programme," and the Academy of Finland has sponsored a research program in "Teletronics."<sup>36</sup> Tekes also funds R&D programs conducted in small and medium sized enterprises.<sup>37</sup>

A recent *Financial Times* Survey of Finland indicates that private sector funding—outside of the major equipment providers and carriers—for mobile applications has become widely available as well. In this survey, a partner at venture capital firm Eqvitec claims that \$2 billion in venture capital funding has been made available in the last year and a half.<sup>38</sup>

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<sup>34</sup> The major source for the following section is Finland Ministry of Transport and Communication, "Telecommunications Statistics 2000."

<sup>35</sup> "Finland opposes auctioning, because it considers this a form of indirect taxation, slowing down the spread of new technologies." *Ibid.*

<sup>36</sup> Tekes Web site ([www.tekes.fi](http://www.tekes.fi)).

<sup>37</sup> Vijay Maheshwari, "Survey—Finland 2000: All Wired Up and Going Many Places," *Financial Times*, July 10, 2000.

<sup>38</sup> *Ibid.*

## Demand Conditions

Finnish consumers may be the world's most sophisticated consumers of mobile technology. At the end of 1999, mobile phone penetration in Finland reached 65 percent, and by August 2000 penetration reached 70 percent.<sup>39</sup> The average household has 1.35 mobile telephone connections (subscriptions). In early 2000, 20 percent of all Finnish households abandoned their wired telephones altogether and opted only for mobile phones. Wireless revenue exceeded wireline revenue for the first time in 1997.

In 1999, more than 650 million short message services (SMSs) were sent in Finland. SMSs are value added mobile services that use the narrow-band data transmission capability of GSM. Examples of SMSs include instant news, financial information, or sports reports, and online chat.

Because of its high mobile penetration rate, Finland has become a test-market for WAP (Wireless Application Protocol) applications. Applications developed in Finland include using phones to make vending machine purchases and to purchase time at parking lots, sending and receiving e-mail, and reading public transportation timetables. As a result, major international corporations and venture capitalists have identified Finland as the development site for mobile phone applications. Hewlett-Packard has headquartered its WAP development unit in Helsinki.<sup>40</sup> Germany's largest technology company, Siemens, has announced that it will locate a new mobile data unit in Finland. Extensive venture capital money has been distributed in Finland to create mobile Internet products.<sup>41</sup>

## Related and Supporting Industries

Nokia, the world's largest producer of mobile handsets, is headquartered in Finland. Formerly a widely diversified company, Nokia has focused exclusively on mobile technology since 1992, and has shed its non-mobile businesses. Nokia has become one of the world's most competitive telecommunications equipment suppliers. Its market capitalization of nearly \$160 billion is second largest among telecom equipment producers and exceeds that of Lucent, Ericsson, Siemens, Alcatel, and Motorola, and represents about 65 percent of the Helsinki stock market's capitalization.<sup>42</sup>

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<sup>39</sup> Ministry of Transport and Communications Press Release, August 17, 2000 ([www.mintc.fi](http://www.mintc.fi)).

<sup>40</sup> Tero Kultinen, "Finland: WAP Pioneer," October 6, 2000 ([www.wapland.com](http://www.wapland.com)).

<sup>41</sup> Maheshwari, "All Wired Up and Going Many Places."

<sup>42</sup> Source: [www.hex.fi/eng](http://www.hex.fi/eng), as of October 6, 2000. Nokia shares also trade on the New York Stock exchange.

Philanthropy in the American Economy

A Report by

The Council of Economic Advisers

November 25, 2000

**Philanthropy in the American Economy**  
**A report by the Council of Economic Advisers**

**Executive Summary**

As a follow-up to the 1999 White House Conference on Philanthropy, this report provides an economic analysis of philanthropic behavior in the United States. It discusses trends in giving over the past several decades and highlights the economic explanations behind the observed increase in donations. The report also discusses possible future directions for philanthropy and how even greater giving might be encouraged. Among its main findings are:

- *Charitable giving reached a record high in 1999.* In 1999 Americans donated over \$190 billion. This represents an increase of 41 percent since 1995. Furthermore, giving has increased sharply as a fraction of the Gross Domestic Product, rising from 1.7 percent of GDP in 1995 to 2.1 percent in 1999.
- *Growth in the income and wealth of the population explains much of this trend.* Average net worth for the sample of families we analyze grew by an estimated 28 percent between 1992 and 1998 and average income increased by 15 percent over the same period. Both income and wealth are strongly positively related to the probability and amount of giving.
- *Individual giving accounts for the largest fraction of all charitable giving.* In 1998, 70 percent of American households made a charitable contribution and individual giving accounted for 85 percent of all donations. Although the largest fraction of giving is attributable to individuals, the fastest growing component of philanthropic activity was giving by foundations, which rose by 72 percent from 1995 to 1999.
- *The elderly are more generous donors than any other age group.* Controlling for differences in income and wealth, those aged 65 and over are approximately 25 percent more likely to make a charitable contribution than younger individuals, and when they do give, they give \$500-\$600 more per year on average. Furthermore, because these calculations do not include charitable bequests, the true difference in the total amounts given by the elderly and the non-elderly is likely to be even larger.
- *Single women are more likely to give than single men.* When differences in economic resources are accounted for, single women are significantly more likely to make charitable contributions than are single men. Within the population of unmarried women, women who have never been married are more likely to give than widowed or divorced women.
- *African Americans are more likely to give than whites.* After accounting for differences in income, wealth, and education, African Americans are more likely to make charitable contributions than whites, and on average give approximately the same amount as white Americans. Other evidence suggests that minorities are under-used resources with respect to philanthropic giving.

• *The New Economy has brought changes in the methods of giving.* The Internet has affected philanthropy as it has so many aspects of American life. Internet sites now provide information about charitable organizations, help match donors with causes, and provide a convenient way to make contributions. Lessons learned from the venture capital sector are also being applied to philanthropy. Although still in their infancy, these developments have the potential to increase the amount of giving and to improve the efficiency with which grants are used by the recipients.

• *The aging of the baby boomers is good news for philanthropy.* Because both older Americans and those with greater wealth give more, the aging of the baby boomers and the wealth of that cohort point to the likelihood of a dramatic growth in giving, perhaps increasing by several hundred percent over the next couple of decades.

• *The Administration's tax policies will likely also lead to increases in giving.* Both economic theory and empirical studies indicate that Americans respond to financial incentives to give. Through the tax deductibility of charitable contributions, both *inter vivos* gifts and bequests are increased in number and size. Recent proposals to extend the deductibility of donations to those who do not itemize on their income tax returns, and to simplify other aspects of the tax code, will likely result in further increases in giving. Evidence suggests that eliminating the estate tax will decrease charitable bequests.

## INTRODUCTION

The tradition of philanthropy in the United States is as strong as ever. Americans donated a record \$190.2 billion in 1999! Adjusted for inflation, this represents a 41 percent increase just since 1995, and a more than doubling since 1980. Americans also gave generously of their time, although volunteerism is not the focus of this study. In 1998, citizens gave an estimated 20 billion hours volunteering for charitable organizations. In fact, over half (56 percent) of adults volunteered that year, the highest percentage in at least a decade. These gifts of both time and money help support an estimated 1.6 million nonprofit organizations and religious congregations in the United States.

Philanthropy is at an important crossroads in its development. As our nation becomes more diverse, women and minorities will likely play a more prominent role in charitable giving. Technology is also changing philanthropy, with the Internet providing new ways to give. Moreover, new strategies are being used to increase the efficacy of charitable work, such as path-breaking partnerships between nonprofits, government, and business, as well as new concepts in giving such as those embraced in "venture philanthropy."

In October 1999 the President and the First Lady hosted the White House's first Conference on Philanthropy to highlight these trends in giving, and to emphasize the importance of our philanthropic tradition and the responsibility of all Americans to teach and sustain that tradition. At the conference the President asked the Council of Economic Advisers to prepare a report on the role of philanthropy in the economy and on ways to encourage Americans to give more.

This report provides that assessment. It begins with an overview of recent trends in giving, pointing to the rise in giving relative to the size of the economy in recent years. At the same time, however, the report provides a cautionary analysis of individual giving, suggesting that Americans may not be inherently more generous than they have been in the past. In particular, the amount that people give at any particular level of income and wealth appears to be about the same as in the past, but the sheer amount of wealth has increased dramatically, leading to an increase in charitable donations. The New Economy and the explosion of wealth have also fostered new methods of giving that may result in even greater contributions in the future. To ensure that the current high levels of giving continue even in times of slower economic growth, it is important that we invest now in strategies that encourage future philanthropic behavior.

## RECENT TRENDS IN GIVING

As background for further analysis, this section provides a concise overview of important recent trends in charitable giving.

### Overview

*Philanthropic giving rose by over 40 percent between 1995 and 1999, to \$190 billion. This was faster than aggregate economic growth, and giving as a share of GDP has increased to levels close to those last seen in the 1960s.*

Total philanthropic giving has risen strongly in the past 5 years, increasing over 40 percent from \$134.7 billion in 1995 to \$190.2 billion in 1999, using inflation-adjusted 1999 dollars (see Chart 1).<sup>1</sup> This increase is equally impressive when compared to measures of economic growth. Since 1995, growth in charitable giving has outpaced even our strong economic growth with the aggregate level of giving rising relative to the Gross Domestic Product or GDP (see Chart 2). This recent increase has reversed a decline in the early 1970s that left charitable giving fluctuating in a range roughly around 1.75 percent of GDP for two decades. At a ratio of 2.1 percent in 1999, giving as a share of GDP has nearly returned to the highest levels of the 1960s.

Chart 1. Total Giving, 1960-99

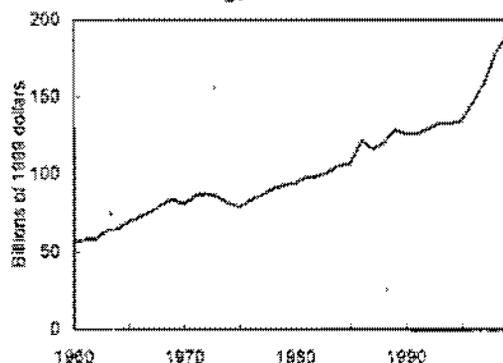
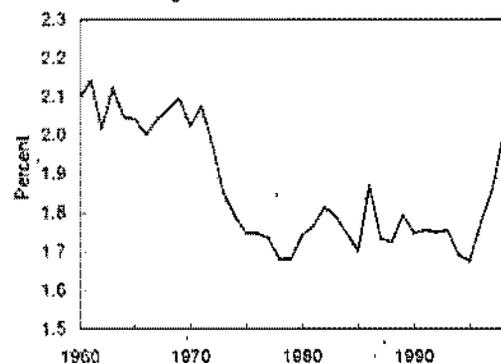


Chart 2. Giving as a Share of GDP, 1960-99



### Sources of Giving

*Individual giving remains the primary source of American philanthropy, while gifts by foundations have shown the fastest growth.*

<sup>1</sup> AAFRC Trust for Philanthropy, *Giving USA, 2000*. Giving by individuals and corporations in the years 1998 and 1999 is based on projections from *Giving USA*. Projected values are functions of the levels of personal income and the value of the stock market at the end of the year. Conclusions based on these numbers should therefore be viewed with caution. For our calculations in this report, nominal figures were inflation-adjusted using the CPI-U-RS series where available (1977 to 1999) and the CPI-U series for prior years. *Giving USA* uses the CPI-U series only, so the inflation-adjusted figures presented in that report differ somewhat from those presented here. When citing other research, we use the CPI-U in an attempt to be consistent with the assumptions of these studies.

Including both *inter vivos* gifts and bequests, individuals accounted for nearly 85 percent of all giving in 1999, with the rest coming from foundations and corporations (see Chart 3). Total individual giving also accounted for the majority of the \$55.5 billion increase in giving in between 1995 and 1999, rising by \$44 billion over this period, or approximately 40 percent. However, the fastest-growing component of giving was giving by foundations, which increased by 73 percent from \$11.47 billion in 1995 to \$19.8 billion in 1999.<sup>2</sup> Since 1960, giving by foundations has increased fivefold.

There has also been a large increase in giving by corporations, which increased by more than 38 percent between 1995 and 1999 (see Chart 4).

Chart 3. Sources of Giving, 1999

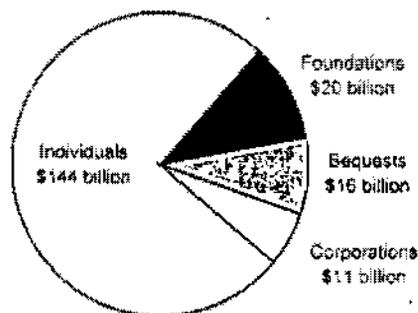
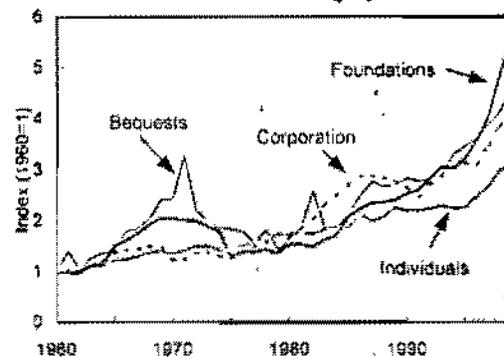


Chart 4. Trends in Real Giving by Source



### Explanations for the Increase in Foundation Giving

Several economic factors have contributed to the growth in foundation giving. First, stocks comprise a large share of foundations' portfolios, particularly among foundations with the greatest assets. As the value of stocks increased sharply during the 1990s, the assets of foundations did as well. Because private foundations must donate 5 percent of the value of their assets each year to maintain their tax-exempt status, as the value of their endowments grew, the amount given by foundations also increased. Second, the continued low inflation rate helped maintain the real value of multi-year grants denominated in nominal dollars. Third, a substantial number of new foundations were established. Over half of all large foundations currently in existence were founded after 1980, and 30 percent were created after 1990. These newly active foundations were responsible for 20 percent of the growth in foundation giving between 1997 and 1998.

<sup>2</sup> Of course, all philanthropy can be traced back to individuals. In addition to providing direct gifts to nonprofits and charities individuals provide the seed money for foundations, and employees or other stakeholders provide the resources for corporate giving. To the extent that foundations redistribute the funds received from individuals in the same year in which they are received, there will be a double-counting of donations—both the donation to the foundation and the foundation's subsequent donation to a charitable cause will be included in total giving. An approximation of the extent of this over-counting can be derived by assuming that foundations give away 5 percent of any increase in endowment. Subtracting 5 percent of the value of individual gifts to foundations from the total giving by foundations yields a reduction in giving by foundations in 1998 of approximately \$1 billion.

## Implications

Philanthropic activity as a percentage of GDP increased sharply in the second half of the 1990s with the majority of this growth coming through increases in individual giving. This rapid increase has allowed the nation to match the generous rates of giving as a fraction of GDP last observed in the 1960s. If we are to maintain these rates and avoid the declines experienced in the 1970s, it is critical that we learn more about both individual giving and the increasing prominence of foundations.

As subsequent sections of this report will show, the strong economy is a key determinant of these trends. During the 1995-99 period, the economy grew at an annual rate of 4.1 percent, the unemployment rate averaged 4.9 percent, and inflation remained low. Wealth also increased dramatically. Adjusting for inflation, the average net worth of American families increased from \$224,800 in 1995 to \$282,500 in 1998. These factors helped give Americans greater financial resources to spend, invest, and donate to the causes they support. The rising stock market also increased the assets of foundations, and because of legal requirements on distributions, the amount foundations have given.

In addition to assessing the extent to which the growing economy has contributed to the increase in philanthropy, we also examine the possibility that the increase in giving may reflect, in part, a new, more generous attitude towards philanthropy. We find little evidence to support this hypothesis. Because this enormous increase in giving was accomplished with little if any change in individual generosity, initiatives designed to instill a greater desire to give remain a potentially fruitful avenue to explore in an effort to increase giving further.

## THE CHARACTERISTICS OF INDIVIDUAL GIVERS

### Economic Means and Household Giving

*Personal giving is broadly based, with generosity displayed by families at all levels of income and wealth. In terms of the total value of charitable giving, however, a disproportionate share comes from those with high incomes or considerable wealth.*

Charitable giving in the United States is a tradition practiced by a broad segment of the population. In 1998 an estimated 70 percent of households reported making a charitable contribution. Even among those with incomes under \$10,000, almost half (48 percent) made a donation and the proportion of givers reached nearly 90 percent for families with incomes greater than \$100,000.

The breadth of charitable activity and the variation in the resources of the donors suggests that charitable giving can best be understood by examining behavior on an individual level. To do so, we draw on the Federal Reserve Board's Survey of Consumer Finances (SCF) using data

from the years 1989, 1992, 1995, and 1998.<sup>3</sup> We find that a small number of Americans are responsible for much of the giving. The 10 percent of respondents making the largest gifts were responsible for 74 percent of the total of all philanthropic contributions.

Not surprisingly, families in the SCF with higher incomes are both more likely to give and give greater dollar amounts than lower income families. In 1998, 70 percent of families in the top 20 percent of the income distribution made a contribution of \$500 or more, and among those who gave, the average gift was \$5,204. Because the survey limits reported gifts to those over \$500, the fraction of families making a contribution is underestimated. This omission is likely to be particularly severe for the lowest quintile where gifts are expected to be smaller on average. We find that just 9 percent of families in the lowest 20 percent of the income distribution reportedly made contributions, but given the \$500 cut-off, the average amount was substantial at \$1,287.

Although many studies of charitable giving have focused on the role of income, a family's financial ability to make transfers is obviously determined by other factors as well. In particular, one would expect giving behavior to be strongly related to wealth. Because of data limitations, this relationship has been ignored in many studies. By using the SCF we can address this issue. We find that when examined across wealth quintile, very similar patterns to those for income exist for both the probability and amount of transfer: 69 percent of those in the highest wealth quintile made a contribution, and the mean amount was \$5,299; 10 percent of those in lowest category gave, and gave \$1,686 on average.

Chart 5. Giving as a Share of Income and Wealth

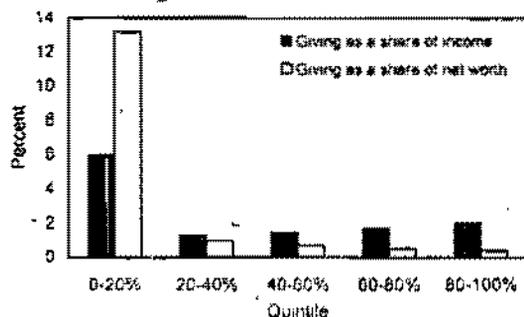


Chart 5 assesses giving relative to a family's financial means. Both families making a positive contribution and those making no transfer are included in the chart. Excluding the large spike for the lowest income quintile, the ratio of contributions to income rises consistently with income. Families in the 20-40 percent range of the income distribution on average contribute 1.3 percent of their income; those in the highest quintile contribute 2 percent. If families are instead grouped based on their position in the wealth distribution,

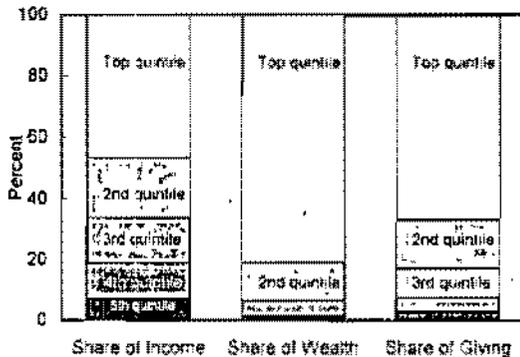
we surprisingly find the reverse pattern, the share of net worth contributed to charities actually falls as net worth increases. Among those with positive net worth, families in the 20-40 percent range of the wealth distribution gave 1 percent of their wealth to charitable organizations, while the wealthiest gave just 0.4 percent.<sup>4</sup> Much of the wealth held by the highest quintile is likely to

<sup>3</sup> The Survey of Consumer Finances is a national survey conducted every 3 years by the Federal Reserve Board. The data set contains information about household income, wealth, and demographic characteristics. It also contains information about whether the household made contributions totaling \$500 or more in the previous year, and if so, the amount. The survey has the unfortunate drawback that this \$500 minimum on reporting misses contributions from families who gave less. However, it does allow us to examine the effects of both income and wealth for a representative sample of the U.S. population, an important advantage. Contributions below the \$500 limit are estimated to account for 5-10 percent of total giving.

<sup>4</sup> This comparison is based only on those with positive levels of income and positive levels of wealth. A small fraction of families in the sample have negative net worth, but make a contribution. There are also families with

be in stocks. If these gains have not yet been realized, wealthy individuals may not yet have increased their giving in response to their newfound wealth. This hypothesis suggests that the giving of the wealthiest Americans may increase in time.

Chart 6. Income, Wealth, and Giving by Quintile



Despite the smaller share of net worth given to charity by the wealthiest, the vast majority of giving comes from just such families (Chart 6). The wealthiest 20 percent of families in the SCF made 67 percent of all charitable contributions. They held 81 percent of the wealth, and received about 47 percent of the income. In contrast, the bottom 20 percent contributed 3.2 percent of all donations, held 0.4 percent of the wealth, and received 7.4 percent of the income.<sup>5</sup>

### The Relationship between Income and Wealth, and Charitable Giving

*Many factors affect the decision of how much to give. When we take into account a broad array of personal characteristics, we find that changes in both income and wealth play a significant role in defining recent trends in giving. Also, we find no evidence to support the view that increases in giving have been driven by changes in tastes or preferences, leaving open the possibility of future changes in this direction.*

The previous section separately examined the relationships between charitable giving and the income and wealth of families. To obtain a more accurate understanding of the factors that influence philanthropic behavior, it is necessary to take into account simultaneously a broad array of characteristics. Ignoring important determinants of giving will likely lead to incorrect conclusions about the observed relationships. For example, giving as a percent of GDP has risen (Chart 2). Based on this observation alone, one might argue that Americans have become more generous, in that they are giving a greater fraction of their incomes to charities. However, this simple conclusion ignores changes in factors other than income that may have contributed to this rise. In particular, it ignores any effect of the recent increases in wealth.

Beyond income and wealth, giving may also be influenced by factors such as gender, race, age, and education - we control for these factors in our analysis.<sup>6</sup> Furthermore, because the data cover a span of years, we can also examine differences in giving over time, exclusive of changes in these other factors. If there are overall increases in the propensity to give and/or the amount of gifts that are not explained by the observable characteristics, one could begin to

negative income who make contributions. To avoid the difficulties associated with these calculations, Chart 5 uses a restricted sample. The numbers for the lowest quintile should therefore be viewed with caution.

<sup>5</sup> As noted in above, a substantial fraction of total contributions (5-10 percent) are not captured in the SCF because of the \$500 minimum. Thus the fraction of income and wealth donated is underestimated. If these smaller contributions come disproportionately from the lowest income (or wealth) quintiles, then giving as a share of income (wealth) will be even higher fractions among these groups relative to the other quintiles.

<sup>6</sup> The regression analysis uses nonlinear specifications for income, wealth, age, and education, and also includes controls for marital status and number of children.

contemplate the possibility of an increase in generosity. However, any observed changes in giving over time could also be due to changes in factors not included in our statistical model, such as changes in government transfers, tax laws, or expectations about future economic conditions.

One of our key findings is that wealth and income have independent effects on giving; charitable donations increase in response to increases in either variable. Because both income and wealth have increased throughout the period of analysis, some of the observed increase in charitable giving highlighted in Chart 1 is attributable to a "income effect" and some to a "wealth effect."

At the same time, however, we do not find any evidence of an increased preference for giving over time. Rather, we find subtle indications that preferences for giving may have actually decreased slightly between 1989 and 1995, before rebounding in 1998. Thus there remains the potential to build on recent increases in giving by improving attitudes about giving.

Beyond the roles of income and wealth, our findings shed light on the variation in giving by age, education, race and ethnicity, and sex. We find that the relationships observed in our multivariate analysis differ substantially from the conclusions drawn based on simple cross-tabulations of the data. We now discuss these results.

## Age

*Older families (in which the family head is aged 65 or over) at every level of income are generous givers. Holding constant differences in financial resources, they are more likely to make a contribution than younger families, and when doing so, give a larger amount.*

The aging of the American population has been highlighted in discussions about the future of Social Security and the impending difficulty of supporting a large population of retired individuals. For charitable organizations, however, this trend may provide substantial benefit.

Preliminary results from the forthcoming *Giving and Volunteering 1999* demonstrate a substantially lower propensity to give among those under age 35, but no clear age trend thereafter; the probability of making a contribution peaks at 78 percent for the 65-74-year-old age group, but is nearly identical to the 77 percent for those ages 45-54.<sup>7</sup> Similar patterns are found with respect to the amount. While the probability of giving and the levels given are similar across ages, there is a monotonic increase with age in giving as a fraction of income. This figure rises from 1.5 percent for those ages 25-34 to 2.5 percent for those 65-74. Those aged 75 and over contribute an astounding 4.6 percent of their income.

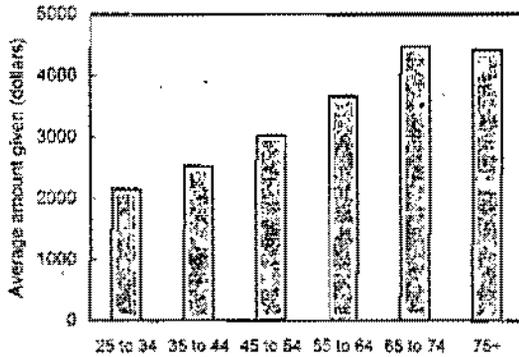
A stronger relationship exists between age and the probability of a charitable contribution in the SCF data. The percent of households making a donation peaks at 40 percent for those ages 45-54 and falls slightly to 34 percent for those ages 75 and over. The difference between the age patterns in the *Giving and Volunteering* data and the SCF data in part reflects

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<sup>7</sup> The Independent Sector, *Giving and Volunteering 1999*.

the \$500 lower limit on giving in the SCF, but also may reflect changes over time.

Chart 7. Amount Given by Head of Household Age



Data from *Giving and Volunteering 1996* show a similar pattern to that in the SCF data.<sup>8</sup> Because our SCF data are compiled from the 1989, 1992, 1995, and 1998 surveys, the patterns in giving for 1996 reported in *Giving and Volunteering* may more closely match the SCF data. Among those who make a charitable donation in the SCF data, the amount increases with age, from \$2,536 for those ages 35-44 to \$4,423 for donors ages 75 and over (see Chart 7).

One would not want to conclude solely from these descriptive results that the elderly are more generous than the non-elderly; there are also large differences in income and wealth by age that need to be controlled for. Few elderly are employed, and they therefore have lower incomes than the working age population, while at the same time they may have more wealth. Conversely, younger people in the early stages of their careers may have relatively high incomes but little wealth. However, even controlling for these and other variables, we find that the elderly do appear to be more generous; both the probability and the amount of giving increases monotonically with age. Those age 65-74 are 24 percent more likely to make a gift than those aged 45-54 and conditional on making a gift, contribute \$460 more on average. Those aged 75 or older are even more likely to give (28 percent more likely than those aged 45-54) and give \$620 more on average. Furthermore, because reported gifts in the survey do not include bequests, the total amount of giving in the older age brackets will be even higher than reported.

Individuals in the age group 25-34 are significantly less likely to make donations than those ages 45-54, but those who do give similar amounts. On the one hand, one would imagine that a 30-year-old with the same levels of income and wealth as a 50 year old should be better off in lifetime terms, having many more years over which to experience growth in earnings and wealth accumulation. On the other hand, this group is also facing many demands on their financial resources, including those of supporting children. Their relative ability to make donations is therefore unclear.

While the elderly do appear to be more generous than other age groups, it is impossible to infer from these statistics whether the current young will be equally generous when they reach their retirement years, or whether the current cohort of elderly has always been exceptionally willing to give. However, the relatively low rate of giving among younger families does suggest that recent initiatives to simulate giving among the young may be well directed.

<sup>8</sup> The Independent Sector, *Giving and Volunteering 1996*.

## Education

*Giving is significantly higher among more educated households in terms of the percentage of households making contributions, the dollar amount of those contributions, and the percentage of household income donated.*

Based on preliminary figures from *Giving and Volunteering 1999*, 61 percent of respondents with a high school degree or less reported making a donation in 1998, up from 59 percent in 1995. Among donors, the average household in this group gave \$584 or 1.7 percent of household income. A higher share (72 percent) of households with some college education, but not a degree, reported making a donation, with an average level of giving among donors of \$963, or 1.9 percent of household income. However, the fraction of this group making a donation was lower than in 1995. Giving was even higher for those with a college degree: 82 percent of households gave an average of \$1,748, or 2.5 percent of household income—nearly 50 percent higher than for those with only a high school degree. An identical trend of higher giving among those with more education is found in the SCF data.

Of course, more educated households also tend to be higher income, higher wealth households. So much of the relationship between giving and education may be picking up the effects of financial status rather than those of education. When holding income, wealth, and other factors constant, we continue to find a strong positive relationship between education and giving. If the head of the household has a college degree, then the family is both more likely to give and tends to give greater amounts. This result indicates that there is a separate effect of education in addition to the effects of income and wealth. Two hypotheses are consistent with this finding. First, education itself may instill a greater “preference” for giving as one learns more about the world. Alternatively, college graduates may have lifetime earnings prospects that are not fully represented by their current income and wealth. Holding income, wealth, and age constant, a college graduate may expect greater future income than a high school graduate and may therefore be more comfortable giving a larger amount. Unfortunately, our data do not allow for a test of either explanation.

## Gender

*Patterns of giving for women differ substantially by marital status. Never-married women give more often and greater amounts than single males, while widowed or divorced women give less.*

Examining differences in giving by gender is complicated by the fact that surveys report a single response for a household. This is true in both the survey used to collect data for the *Giving and Volunteering* reports and in the SCF. In these cases it is impossible to distinguish between the philanthropic behavior of husbands and wives. To identify the relationship between gender and giving we therefore categorize respondents as married couples, single males, or single females, and compare the actions of single males and single females. Our results show that single females are equally likely to make a transfer as married couples, but single males are significantly less likely to do so. With respect to the amount given, single females give less than single males, but the difference is not significant.

Much attention has recently focused on women and philanthropy (see box). We therefore look more closely at the patterns of giving for women. We subdivide the category of single women into two groups, those who are widowed or divorced, and those who have never been married. The results show that never-married women are actually somewhat more likely to give than couples although the estimated difference is not significantly different from zero, while widows are less likely to give. Similar patterns are evident for the amounts: single women give slightly more than widows, but the difference is not significant. While these differences control for the number of children, there may be other factors in family relationships that affect giving for which we do not control. Depending on the underlying cause of the observed difference, outreach programs designed to encourage giving by women might be most effective if targeted at widowed women.

### Women & Philanthropy

American women have the potential to become leaders in philanthropic giving. Currently they control more than 51 percent of the personal wealth in the United States and own a third of all privately held businesses. Furthermore, because women typically outlive their husbands, they are projected to inherit many trillions of dollars in the coming decade. This untapped potential represents an important opportunity for the philanthropic community.

Women's giving patterns have traditionally mirrored those of their husbands; however, a shift in behavior has begun, with women becoming more involved in giving. Younger women in particular are more likely to make their own choices with respect to charitable giving, and there is reason to believe that as older women become more confident in financial management skills, they too will begin to act independently.

Organizations are beginning to reach out to encourage philanthropy among women, with many colleges and universities leading the way. Institutions are expanding efforts to not only encourage women's giving, but also to study, understand, and support women's philanthropy. In 1992 the University of California, Los Angeles (UCLA) established "Women & Philanthropy at UCLA". As part of its mission it encourages women to give, helps women tailor their giving to areas that suit their own interests, and helps women develop the skills necessary to assume leadership positions on campus. Members of the Women & Philanthropy program are provided opportunities to meet with UCLA researchers and to attend special campus events. The program has been a success, raising over \$20 million in the 1999 fiscal year alone. Many other institutions, including Oklahoma State University, the University of Missouri at Kansas City, and Purdue University, have similar programs.

Anecdotal evidence suggests that women are motivated to give by different factors than men, in particular, women appear to be less interested than men in giving publicly. A recent survey by the Committee of 200, a group of successful business women, found that just 3 percent of women donors indicated that they would be interested in having a building named in their honor or even a plaque engraved with their name, while 40 percent preferred no recognition.

Instead of publicity, women often cite personal gratification or having an impact as the motivation for giving. In accordance with these principals, women prefer to maintain contact with the projects they fund and with the people involved. They also tend to direct their gifts towards specific purposes such as athletic teams, women's scholarships, and specific facilities (a new concert hall or a women's gymnasium, for example) rather than to endowment campaigns. However, as women take on new roles in the business world and learn more about philanthropy, this distinction between men and women appears to be fading. In a 1999 follow-up to a 1992 survey, UCLA's Women & Philanthropy group found that women are becoming less likely to give solely because they are interested in the cause, and are beginning to treat philanthropy in a more business-like manner.

### Race and Ethnicity

*Evidence suggests that contributions differ by race and ethnicity. When adequately accounting for differences in economic status, African Americans are more likely to give than whites, and the amounts given are similar for the two groups. This conclusion contrasts sharply with results obtained when differences in financial resources are ignored.*

Despite significant increases over the past 8 years in the household incomes of minorities, there remains a substantial gap between the economic resources of African Americans and Hispanics and those of whites. This gap is likely to be reflected in the amount of donations that families can afford to make. When ignoring these important differences in resources it does appear that both African American and Hispanic families are less likely to give and give less than white families. Preliminary results from *Giving and Volunteering 1999* show that 75 percent of whites reported making contributions in 1998 compared to 52 percent of African Americans and 63 percent of Hispanics. Because African Americans and Hispanics on average have lower income and wealth than whites and are therefore likely make smaller donations, one would expect the \$500 minimum on giving in the SCF to miss more minority giving.<sup>9</sup> In fact, giving by all groups is lower in the SCF than in *Giving and Volunteering 1998*, and the percentage change is the largest for Hispanics. Thirty-five percent of whites in the SCF made a donation, compared to 21 percent of African Americans and 12 percent of Hispanics. The dollar amounts given in the SCF also differ by race/ethnicity. Whites gave an average of \$3,356, African Americans gave \$2,459, and Hispanics \$1,627.

When differences in income, wealth, schooling, and other observable characteristics are taken into account, these conclusions change dramatically. With adequate controls for economic status, our analysis shows that African Americans are actually significantly *more* likely to give than whites. Hispanics remain significantly less likely than whites to have made a contribution.<sup>10</sup>

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<sup>9</sup> We caution the reader that our conclusions about racial and ethnic differences are based on analyses of relatively small samples.

<sup>10</sup> However, because the difference between the SCF and the *Giving and Volunteering* numbers for the fraction of the population making a gift is significantly larger for Hispanics than for whites or African Americans, it appears that measures of Hispanic giving are more sensitive to the \$500 cut-off, and giving may be substantially underreported. Therefore, we view the results for Hispanics with caution.

Among those who do give, African Americans give slightly larger amounts than whites, but the difference is not statistically significant. This dramatic change in the pattern of giving by race when a broad array of characteristics is controlled highlights the importance of multivariate analysis. In particular, if we ignore the differences in wealth levels in our analysis, as is done in many studies, but control for the other variables, the slight difference between African American and white giving is attenuated.

Factors other than differences in financial resources and schooling are also likely to be important in explaining the difference in giving across racial and ethnic groups. Differences in exposure to opportunities to give and the desired beneficiaries of charitable giving are also likely to matter. *Giving and Volunteering 1996* reports that African Americans and Hispanics are asked to give much less often than whites. One study reported that Hispanics receive an average of 15 to 20 requests for donations per year compared to 300 for other groups. And yet, another study found that when asked, African Americans and Hispanics were more likely to respond positively to a request than whites. If solicitations serve to increase giving, then organizations are overlooking an important resource by not soliciting donations from African Americans and Hispanics at greater rates.<sup>11</sup>

Experts on philanthropy in minority communities have also argued that minority giving is less likely to be included in existing data on giving because much of it is done informally. For instance, many Hispanics send remittances to extended family in other countries; estimates are that Hispanics living in the United States send at least \$3 billion per year to Mexico alone. By excluding this type of giving, the survey data used in published studies may underestimate giving by Hispanics relative to other groups.<sup>12</sup>

Even within the formal philanthropic sector, minorities choose different recipients than do whites. They are less likely to contribute to endowment campaigns, and instead focus their giving on religious institutions and organizations or on efforts that meet pressing needs. The low participation of minorities in formal philanthropic giving is potentially a result of the services provided by many charitable organizations. In 1997 just under 8 percent of all foundation grants went to minority concerns. Thus one way to motivate minorities to give more is to provide increased opportunities to give to organizations that more directly address their concerns. One organization that does appear to attract a significant amount of gifts from minorities is the United Way. In a 1996 survey 26 percent of whites, 30 percent of African Americans, and 24 percent of Latinos reported making contributions to the United Way in the previous 12 months.<sup>13</sup>

Minorities, like women, have less of a history of giving to formal philanthropic organizations. This implies that outreach activities aimed particularly at these communities, like those discussed earlier that target women, may yield increases in giving. Some organizations are beginning to understand the potential. Fundraising programs using Spanish language materials and foundations using their grants to fund programs in Hispanic communities have had

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<sup>11</sup> The direction of the relationship between solicitations and giving is not clear. As noted later in the paper, it may be that organizations ask for contributions from those who are more likely to give (perhaps because of financial capabilities) or who have given generously in the past.

<sup>12</sup> *Giving USA Update*, Issue 2, 1999.

<sup>13</sup> *Ibid.*

increasing success. These efforts indicate that by addressing the needs and concerns of minorities, charitable institutions can substantially increase the contributions of these groups.<sup>14</sup>

## Bequests

*Among the very wealthy a large fraction of charitable giving is done through bequests.*

Because the statistics in the previous section are derived from survey respondents, there is no information on the distribution of bequests. We therefore know much less about trends in charitable bequests for representative samples of the population than we do about *inter vivos* giving. Instead of surveys, past studies of bequests have drawn on data from estate tax returns. These tax returns are filed only by estates that have made bequests and taxable gifts which total to more than the tax-exempt limit (\$675,000 in 2000). While these estates are not representative of the estates of all decedents, they are likely to be responsible for the vast majority of charitable bequests.

For many wealthy individuals, bequests are an important mode of philanthropic giving. In 1992 only 19 percent of estates filing tax returns made a charitable bequest, but the total amount given was \$10.0 billion (inflation-adjusted 1999 dollars), equal to 8.5 percent of the total net worth of the estates and significantly higher than the fraction of income or wealth given in a particular year. Furthermore, among those who did make a charitable bequest, a significant fraction of the estate was donated with bequests equal to 27 percent of net worth.<sup>15</sup>

The magnitude of charitable bequests made by the wealthy often surpasses their *inter vivos* giving in magnitude. Using estate and income tax return data, a recent study finds that, on average, wealthy decedents gave \$8.9 million (inflation-adjusted 1999 dollars) to charities at death, compared to just \$3.1 million during the 10 years prior to their death. For the wealthiest segment of the population, those with estates valued at more than \$100 million, bequests accounted for 78 percent of charitable giving over the final 10 years of life.<sup>16</sup>

As with *inter vivos* giving, there are differences in bequest behavior by gender. Because wives typically outlive their husbands, female decedents are much less likely than male decedents to be married at the time of death, and to leave assets to a surviving spouse. Likely because of this difference, females leave a greater fraction of their estates to charity. In 1992 female decedents left 10.1 percent of their net worth to charity on average, compared to 7.5 percent for males. This difference in philanthropic behavior between males and females reverses when one examines only the behavior of those who have already lost their spouse; widows left 12.1 percent of their net worth to charity while widowers left 12.6 percent.<sup>17</sup>

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<sup>14</sup> Henry Ramos, "Latino Philanthropy: Expanding US Models of Giving and Civic Participation," 1999.

<sup>15</sup> Internal Revenue Service, "Statistics of Income Bulletin," Winter 1996-97.

<sup>16</sup> David Joulfaian, "Charitable Giving in Life and Death," forthcoming in William Gale and Joel Slemrod, editors, *Rethinking Estate and Gift Taxation* (2000).

<sup>17</sup> IRS, Winter 1996-97.

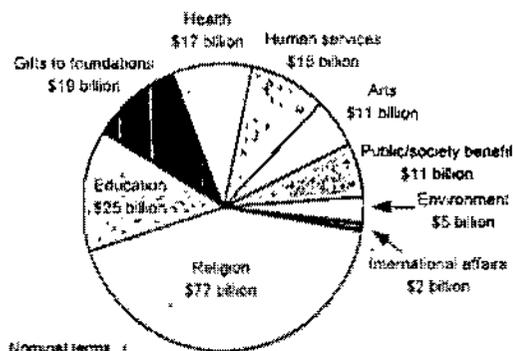
## Summary

Income and wealth are important determinants of charitable giving. Over the past decade income and wealth have increased substantially with charitable giving following suit. Because we cannot guarantee equally strong economic growth into the indefinite future, further increases in philanthropic behavior can perhaps best be attained by tapping under-used groups: encouraging giving among the young, widows, single men, and minorities. We return to this issue in the final section of the paper.

## RECIPIENTS OF CHARITABLE GIVING

Contemporary philanthropy supports a wide range of activities and causes. As the amount of charitable giving has grown, there have also been changes in the way in which money is distributed to the various types of philanthropic organizations.

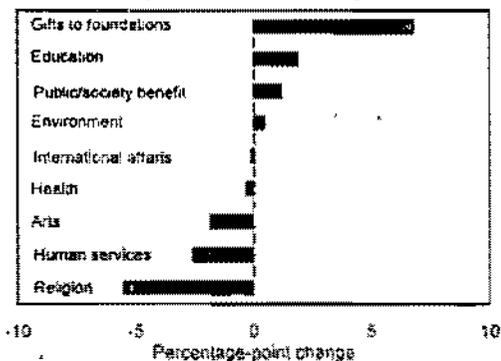
Chart 8. Recipients of Giving, 1998



*Religion is by far the single largest recipient of contributions, while gifts to foundations are the fastest growing.*

Based on data from *Giving USA 1999*, Religion is by far the single largest recipient of charitable giving, with about 44 percent of giving in 1998 going to religious organizations.<sup>18</sup> Education is the second largest recipient but trails religion significantly, with receipts of \$27 billion in 1999, compared to \$82 billion for religion in the same year.

Chart 9. Change in Share of Giving, 1990-98



Although the amount given to religion remains large, its relative importance has diminished recently. In contrast, gifts to foundations have experienced tremendous growth, increasing by 313 percent in real terms between 1990 and 1998. Indeed, 29 percent of the rise in total giving between 1990 and 1998 came from greater gifts to foundations, while such gifts were responsible for only 6 percent of the increase during the 1980s. In 1998 approximately \$10 out of every \$100 donated in the United States went to foundations, up from less than \$4 in 1990. As a result of the relatively slow growth rate in religious

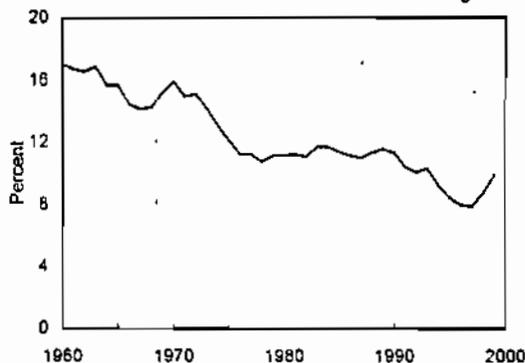
<sup>18</sup> Little of what is given to religious congregations is redistributed elsewhere. While approximately 86 percent of the revenue of religious congregations is derived from contributions, 82 percent of expenditures are for operating expenses or capital improvements.

giving and the rapid growth in other categories, religion's share of total giving fell over 5 percentage points in the 1990s, while the share going to foundations increased about 8 percentage points.

In addition to foundations, the shares of giving to two other categories—education and public benefit organizations—had significant but less dramatic increases. Giving to education rose from approximately 11 percent of total giving in 1989 to just over 14 percent in 1999. A sizable share of giving to education goes to higher education, and such giving tends to track the performance of the stock market in the short run and the overall economy in the longer run. Thus, strong economic growth and sharp increases in the stock market likely explain the increased prominence of education as a beneficiary of philanthropic giving.

An important longer-term change in philanthropy has been the decline in the share of giving going to human services (Chart 10). This category typically includes many social welfare agencies, although it also includes activities not necessarily focused on the poor (for example, disaster relief). In 1960 human services was the second largest recipient category (religion again was the largest). By 1999, however, human services was only the fifth largest, behind giving to religion, education, foundations, and health. The steady decline in the percentage of giving earmarked for human services appears to have halted; the share of giving going to this category increased by 1 percentage point from 1997 to 1999.

Chart 10. Human Services' Share of Giving



Similar patterns of reciprocity are observed for charitable bequests. Religious organizations are the most common beneficiaries in terms of the number of estates making a donation. With respect to the amounts of the bequests, however, foundations are a primary recipient, second only to the category "other." In 1992, 28.8 percent of charitable bequests, or \$2.4 billion, went to foundations. Educational and scientific organizations received a similar amount equal to \$2.3 billion.<sup>19</sup>

*The types of organizations to which donors contribute differ systematically by income level, with top earners focusing more on higher education and lower earners focusing more on religious giving.*

Donors with different income levels tend to support different types of nonprofit organizations. For example, in comparison to other tax payers, the wealthy devote a much larger share of their contributions to education, health, and the arts and culture, with a much smaller share going to religious organizations than those with less wealth.

Because the very largest givers provide a substantial fraction of total contributions, it is worthwhile to examine the recipients chosen by these individuals. Such a study is provided by

<sup>19</sup> IRS, Winter 1996-97.

Slate, a web-based publication. Relying largely on newspaper accounts, Slate compiles lists of the largest gifts. In 1996 the top 90 gifts (worth about \$1.5 billion in total) went primarily to fund higher education and medical research: 56 percent of the total value to higher education and about 17 percent to medical research institutions or medical centers. Eight percent of total giving was dispersed to private foundations, and the remainder funded other types of recipients.

*Men and women support different types of organizations: women are more likely to give to social services and males are more likely to leave bequests to foundations.*

The limited evidence on the subject suggests that women donate to different causes than men. A recent small-scale study of the giving patterns of wealthy donors found that women are much more likely to support social services than men, with almost half of women respondents reporting a contribution in this area, compared to only about a fifth of men. In contrast, men were more likely to support education, with three-fourths making a donation to education, compared to only 57 percent of women. The study also found that women were more likely to support cultural activities and the environment, while men were more likely to donate to religion. Both sexes supported health about equally.

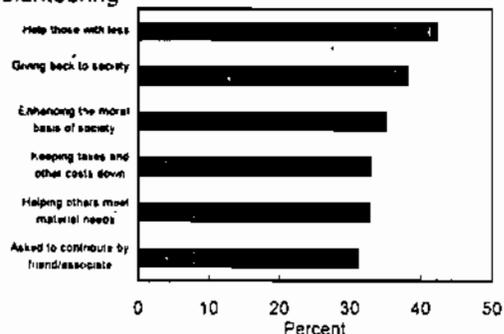
Differences in giving also exist for the distribution of charitable bequests. Women are more likely to bequeath assets to educational, medical, scientific, and religious organizations and less likely to leave their wealth to private foundations. In 1992, 35 percent of charitable bequests by female decedents went to educational, medical and scientific organizations, and 14 percent to religious organizations, compared to just 22 percent and 5 percent for males. In contrast, only 19 percent of the charitable wealth bequeathed by females went to private foundations, while this figure was twice as large for males.

## MOTIVES FOR PERSONAL GIVING

### Motives for Giving

Beyond these demographic and economic characteristics, a more complicated set of issues relates to the personal motivations for giving. While any analysis of the motivations of givers is necessarily speculative, here we draw on both responses to survey questions about reasons for giving and analyses of economic behaviors to address the issue.

**Chart 11. Major Motivations for Giving and Volunteering**



*Survey evidence shows that important motives for giving include a desire to help others and to give back to society. Financial incentives arising from tax law are also important.*

The most direct way of examining donors' motivations is by asking individuals why they give. To examine responses to such a question, we again turn to data from *Giving and Volunteering*

1996 (see Chart 11). The survey question used in this analysis asks for the reasons behind both financial giving and volunteering and provides a list of eight possible explanations. (It does not ask separately about motivations for financial giving.)<sup>20</sup> Respondents are asked whether each motive was a major or minor reason for their giving, or not a factor at all. "Feeling that those who have more should help those with less" was the most frequently cited "major motivation" for giving and/or volunteering, and almost 80 percent of respondents cited it as either a major or minor motivation. Other important motives included "Giving back to society some of the benefits it gave you" and "Enhancing the moral basis of society." Financial considerations were also important to many; a third of respondents cited "Keeping taxes and other costs down" as one of their major motivations and two-thirds cited it as either a major or a minor motivation. Because the value of time spent volunteering is not tax deductible, this motivation should relate solely to financial contributions and indicates that tax considerations likely play an even more important role in financial giving than is indicated in the Chart.

Helping those "with less" and those with "material needs" are important motivations based on responses to the survey question. However, the prevalence of these explanations is in stark contrast to the relatively low level of giving to organizations benefiting the poor (Chart 10). However, consistent with the sharp decline in giving to human services, the fraction of donors reporting "helping those with less" as an important reason for giving declined from 55 percent in 1992 to 42 percent in 1996. It may also be that "helping those with less" and "giving back to society" are more important explanations for volunteering than for making cash contributions, or alternatively that individuals report these as motivations because they believe they are the most socially acceptable reasons.

*Survey evidence also shows that certain events or circumstances may tend to influence donors to give. These include being asked to give, being a volunteer, participating in religious activities, and participating in certain events during youth.*

Individual attitudes towards giving will likely also be influenced by experiences. Evidence from *Giving and Volunteering 1999*, confirms an obvious impetus for giving among many donors: being asked to give. Over 80 percent of households who reported being asked to make a contribution actually did make a contribution, whereas only 50 percent of those who were not asked contributed.<sup>21</sup> However, it is important to note that this relationship need not be causal. Those identified by charitable organizations as likely givers, perhaps because of past contributions or other factors, may be more likely to be solicited for donations and more likely to give again.

There are also strong correlations between volunteer work and religious involvement, and making financial contributions, suggesting underlying differences in a willingness to help others or perhaps indicating that volunteer work can expose one to the seriousness of financial need.

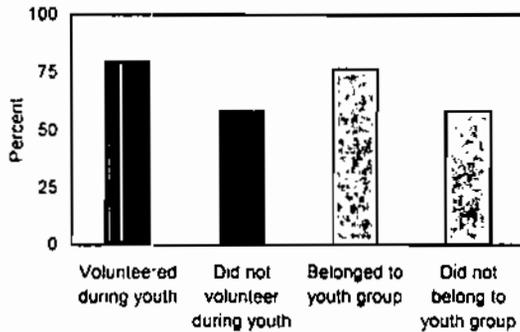
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<sup>20</sup> Although not analyzed in this paper, Americans are generous with their time as well as with their money. In 1998 an estimated 20 billion hours were spent volunteering for charitable organizations. In fact, over half (56 percent) of adults volunteered that year, the highest percentage in at least a decade.

<sup>21</sup> The Independent Sector, *Giving and Volunteering in the United States: Finding from the National Survey 1999 Edition; Executive Summary* (2000).

Contributing households with at least one member who does volunteer work gave a higher percentage of their household income than households where the respondent did not volunteer. Furthermore, 84 percent of those attending religious services weekly made a household contribution in 1998, compared to about 70 percent among the general population. Childhood events related to community or school involvement, such as belonging to a youth group, being

**Chart 12. Percent of Adults who Donated in 1998, by Participation in Activities during Youth**



active in a religious organization, and being active in student government, appear to encourage later philanthropy (see Chart 12).

*Economic factors can influence charitable giving through various channels.*

Researchers are often suspicious of direct responses to questions such as those listed above. Individuals may report one answer because they believe that is the way in which they should behave,

when they are actually motivated by some other factor. For example, individuals may think it is “better” to report that they give to “help those with less” than to report that tax incentives are driving their behavior. As an alternative to direct questioning, an analyst can attempt to infer the underlying motivation by examining actual behavior. Economists have used this method to focus on the role of several factors that have the potential to affect charitable giving. One important factor is the financial resources of the potential donors. This relationship was examined in detail in a previous section. A second factor is the cost or price of giving. Because households who itemize their income tax deductions can deduct charitable contributions, a one-dollar donation actually reduces the disposable income of the donor by less than one dollar. Through this mechanism the government in effect subsidizes charities. Holding income and wealth constant, charitable giving would therefore be expected to rise when tax rates rise. The third economic factor can be thought of as the “demand for charitable contributions,” or the perceived needs of potential beneficiaries. For example, if poverty rates rise, giving to human services may increase as donors see a greater need for their contributions.

*Economic research shows that tax incentives encourage charitable giving, although the long-term effects are smaller than the short term.*

In 1999 over 32 million taxpayers took advantage of the itemized deduction for charitable giving, costing the federal government \$26.5 billion in lost tax revenue.<sup>22</sup> This deduction serves to subsidize the activities of private organizations that may provide alternatives to direct government transfers. This tax-based subsidy is an efficient way of funding the activities of recipient organizations if the total given to these charities is greater than the cost to the government in terms of foregone tax receipts. If the subsidy is not efficient, the government could cease providing the tax deduction and transfer that amount directly to the organizations.

<sup>22</sup> U.S. Joint Committee on Taxation, “Estimates of Federal Tax Expenditures for Fiscal Years 2000-2004,” December 22, 1999, p. 27.

The literature on the effect of taxes on charitable giving has concluded that individuals do give more because of the deduction, but there remains substantial disagreement about the magnitude of the response. While earlier studies typically found that the deductibility of charitable donations was an efficient method of distributing resources to philanthropic institutions, more recent studies analyzing the effects over a longer period of time have concluded that it is not. These studies suggest that changes in the tax law may affect the timing of giving, but are unlikely to have a large effect on lifetime contributions.

One ought not to infer from these results that the charitable deduction should be eliminated. Research does indicate that it is efficient for some forms of charitable giving - such as giving to social welfare organizations - and for giving by higher-income individuals. Furthermore, the charitable deduction often benefits causes such as religious organizations, which cannot obtain government funding.

The tax code also encourages charitable bequests. Such bequests are deducted from the value of an estate before calculating the estate tax owed. Because the estate tax affects only the very wealthiest of decedents, this deduction affects few individuals. However, for those whom it does affect, the potential tax savings are large.<sup>23</sup> Evidence suggests that the responsiveness of charitable bequests to this deduction is large. Several studies based on data from different time periods have found that the deductibility of charitable bequests is efficient, encouraging more in giving than is lost in tax revenue. Given the responsiveness of charitable giving to the estate tax deduction, it is likely that if the estate tax is eliminated, charitable bequests will fall substantially.

*Donations do respond to changes in the need of the recipient, but increases in contributions do not appear to offset fully increases in need.*

The extent to which individuals respond to changes in the need of potential recipients has important implications for the effectiveness of government transfer policy. If a significant amount of charitable giving is driven by the needs of potential recipients, then a decrease in government spending towards the poor or other recipients can be offset by an increase in private giving. It is difficult to verify these effects from direct observation. Government spending on education, social services, and the environment has increased in real terms during the 1990s while remaining a relatively stable fraction of federal outlays. Individual giving in support of education and the environment increased as a share of total private giving, while the share of contributions going to health decreased. In contrast, government spending on the arts and humanities has fallen both in absolute terms and as a fraction of spending, while private giving to the arts has gone up since 1990, but fallen as a share of total giving.

Economic analysis specifically addressing the relationship between public and private spending has found that private contributions do respond to changes in public spending on welfare programs, but that the response is far from dollar for dollar. One study reports that individual giving to social services declined by 38 cents for every extra dollar of federal spending. Similar effects would be expected in the opposite direction; decreases in federal

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<sup>23</sup> Marginal estate tax rates can be as high as 55 percent. Thus, a bequest of one dollar to a charitable institution can reduce the amount available to other heirs by just 45 cents.

spending for the poor should be expected to increase private contributions by 38 cents for each dollar in cuts. Thus while the evidence is not particularly strong, it does appear that giving responds to need.

## THE FUTURE OF PHILANTHROPY

Recent trends and patterns in giving suggest remarkable opportunities for growth in the philanthropic sector. In the coming years philanthropy will likely be shaped not only by increases in foundation giving, but also by changes in the pool of potential donors, the organizational structure of foundations, and the means by which organizations reach out to potential contributors.

### Demographic Trends

*The aging of the baby boomers and the high levels of accumulated wealth among this group may yield a substantial windfall for philanthropic organizations in the coming years.*

As demonstrated earlier, the elderly are substantially more likely to make contributions than the non-elderly, and when they do, they donate larger amounts. Other evidence clearly indicates that giving increases with wealth. As our population ages and wealthier cohorts reach their peak giving years, significant increases in charitable giving are likely to follow.

Between 1999 and 2020 the fraction of the American population ages 65 and over is forecasted to increase from 12.6 to 16.5 percent. Ignoring any increase in the overall size of the population, simply shifting 3.8 percent of the distribution from middle age, to ages 65 and over, will yield an increase in the number of givers and in the average amount given.

Along with the change in the age distribution, there are also significant differences in lifetime wealth across cohorts. Median household net worth for those ages 61 and over was \$48,738 in 1962, \$95,458 in 1984, and \$111,385 in 1994 (inflation-adjusted 1999 dollars).<sup>24</sup> Based on these trends, it is likely that the baby boom generation will reach age 65 with more wealth than preceding cohorts. Thus not only will the aging of the baby boom result in an increase in the number of generous givers, but it will also mean that those with the highest probability of making a donation will have more to give.

A recent study has attempted to quantify the growth in *inter vivos* giving and charitable bequests in the coming years. By their very nature these forecasts are speculative, and the results uncertain at best. However, they do point to a dramatic increase in both *inter vivos* contributions and charitable bequests, with each estimated to grow by several hundred percent over a 20 year horizon.<sup>25</sup>

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<sup>24</sup> Juster, Lupton, Smith and Stafford, "Savings and Wealth: Then and Now," *mimeo.* (University of Michigan, December 1999).

<sup>25</sup> Paul Schervish, "The Modern Medici: Patterns, Motivations, and Giving Strategies of the Wealthy," presented at the "What is 'New' About New Philanthropy" University of California Nonprofits Studies Center Conference (Boston College Social Welfare Institute, March 2000).

## The Role of the New Economy

*A new group of venture philanthropists is taking a hands-on approach to the not-for-profit sector, using lessons-learned from their experiences in private enterprise.*

The term "venture philanthropy" refers to a new and burgeoning form of grant-making that uses strategies from the for-profit investment world to help grantees improve the efficiency of their organizations and ensure their viability. It is argued that by better monitoring the success of funded projects and the investment of capital, and by providing organizational assistance to recipient organizations, foundations can make more effective use of their own endowments.

To these ends, many wealthy donors are now applying their business skills to their own charitable giving, in particular by establishing new instruments known as social venture funds. These funds apply for-profit techniques (especially venture capital practices) to the nonprofit realm in an effort to maximize investor value and impact. While there are relatively few social venture funds currently, the model they set forth presents itself as a strong precedent for future innovative efforts.

In addition to these social venture funds, established foundations are also revealing interest in incorporating venture philanthropy into their grant making. Some have argued that these concepts are not new to the foundation world, but harken back to the close personal interest philanthropists such as John D. Rockefeller, Andrew Carnegie, and Walter Annenberg, took in the way in which their money was distributed. What does appear to be new, however, is the more formal mentoring roles established and the increased number of foundations fielding such techniques. This trend does raise some concern that the grantees' ability to control their own missions and agendas could be compromised.<sup>26</sup> Clearly, achieving the proper balance between foundation involvement and nonprofits' independence needs to be an important goal if venture-style funding is to succeed.

### At the Forefront of Venture Philanthropy

*Social Venture Partners* is a social venture fund begun in Seattle in 1997. Its focus is on children's and education programs. It consists of a network of young professionals and technology leaders who each invest a minimum of \$5,400 each year for at least 2 years and provides a variety of hands-on assistance to grantees. It currently has more than 250 partners. The fund is being replicated in four other locations – Austin, Phoenix, Dallas, and Denver.

Since the establishment of the *Social Venture Partners* fund, many similar funds have been established. *The Silicon Valley Social Ventures Fund* and the *New Schools Venture Fund* also promote active giving to nonprofits by young professionals. Investors in the Silicon Valley fund

<sup>26</sup> For an example critique, see Pablo Eisenberg, "The 'New Philanthropy' Isn't New – or Better," *The Chronicle of Philanthropy*, January 28, 1999.

provide advice and assistance to grant recipients and also continually monitor the progress of supported projects. In each grant cycle a particular funding area is chosen. Education was targeted during the summer of 2000, and children and youth will be emphasized in the fall of 2000. The New Schools Venture fund works by supporting nonprofit and private companies that work to improve public K-12 education. Other examples of social venture funds abound.

*The Internet provides a new avenue along which individuals can participate in philanthropy. Through on-line donations, volunteer placement, and information dissemination, the Internet has made it easier for many Americans to engage in charitable behavior.*

Just as the Internet is transforming the way we work, shop, and communicate, it is also changing the way we give. While the existence of “e-philanthropy”—that is, on-line philanthropy—was hardly noticeable a year or so ago, today it has national visibility and is increasing in importance. Nonprofits have established web sites to communicate with members, provide information, and raise funds. The Red Cross, in particular, has been highly successful in their efforts to raise large sums of money through the Internet during major disasters.

In addition to websites run by individual charities, other types of sites provide information about a wide number of organizations. For example, *Guidestar*, provides a searchable database of more than 640,000 nonprofit organizations in the United States to help donors seek out and compare charities, monitor their performance, and better target their own giving. Similarly, *helping.org*, launched by the AOL Foundation, provides a full spectrum of services, opportunities, and information related to philanthropy and volunteerism.

As Americans become more accustomed to the Internet, it is likely that e-philanthropy will grow significantly. The fraction of Americans with Internet access has increased substantially; currently more than 40 percent of households have access to the Internet. Furthermore, a study conducted for a conference sponsored by the White House Millennium Council reported that those likely to get involved on-line are younger and more politically diverse than the population reached through direct mail. Given these differences, the Internet is likely to reach those who have not previously been active in philanthropy and thereby further increase national giving. Although not anticipated to be a panacea for organizations’ fundraising needs, e-philanthropy is viewed by many as a useful resource for disseminating information, reducing the transaction costs of giving, and providing an alternative means for raising funds - important benefits in a fast-paced world.

## ENCOURAGING GREATER GIVING

Philanthropy in the United States reached a record high in 1999, following a dramatic 41 percent increase since 1995. Nonetheless, relative to GDP, total giving currently falls short of the levels that existed in the 1960s, and the fraction of Americans making a charitable donation has not increased. These trends indicate that Americans have the potential to give more. Furthermore, because much of the recent increase in giving has been driven by the dramatic

gains in wealth, an economic slowdown could result in a significant cutback in charitable contributions. It is therefore prudent to invest now in strategies to encourage greater giving in the future.

### **Ensuring a Tradition of Philanthropy**

*Programs that encourage youth to participate in philanthropy provide assistance to needy communities and sow the seeds for future giving in adulthood.*

The evidence on individual giving showed that, holding income and wealth constant, giving increases with age. It is not clear whether this trend represents generational differences in attitudes towards philanthropy or if the younger generation will increase their giving as they age. Regardless of the source of the difference, an effective policy for future giving ought to include programs to involve the young.

Parents and religious communities play a central role in developing a habit of giving, and community groups, foundations, and schools are increasingly supporting their efforts. A few specific examples will help highlight the types of activities being undertaken. Sisters Empowering Sisters is a 2-year old program for teenage girls run by the Girl's Best Friend Foundation in Chicago. Each year the program works with a small group of girls ages 14 through 18 to teach them about grant making. As part of their training, the girls design request-for-proposals (RFPs), review grant applications, make site visits, and decide where the money should go. They are then given money to award to programs developed by and for the benefit of girls. Other efforts along these lines include the Michigan Community Foundation's Youth Project that encourages community foundations to train and involve teenagers in fund raising and grant making and "The Cool Rich Kids' Movement," which helps affluent youth reach out to work on social causes.

Schools have also begun to teach students about the importance of giving. In New York State, public schools are offering a curriculum focused on volunteerism and philanthropy. In a program at the Latin School in Chicago, students learn to write RFPs, review grant applications, and make site visits to prospective grantees as part of the grant making process. They are also provided with a small amount of funding to disburse to nonprofit organizations.

While these programs help students learn more about philanthropy, most community service programs for young people focus on volunteering. As illustrated in Chart 12, data show that adults who did volunteer work during their youth are over 30 percent more likely to make a charitable donation than those who did not are.

High schools in particular are placing a growing emphasis on "service learning"—integrating community service with classroom instruction. In 1999, 83 percent of high schools offered community service opportunities to their students, and 46 percent offered service-learning, up dramatically from 1984 levels of 27 percent and 9 percent. Schools in cities such as Chicago, Washington, D.C., and Louisville, as well as the state of Maryland are introducing community service requirements for graduation.

Efforts to encourage volunteering have also come at the national level. In 1993 President Clinton outlined a vision for a national service program that would allow young people to serve their country while earning funds for a college education. The resulting AmeriCorps brings together people of different racial, ethnic, and economic backgrounds to solve community problems. Since the program's inception 5 years ago, over 150,000 AmeriCorps members aged 17 and over have served as tutors, mentors, and disaster-relief workers, among other roles. Today there are more than 350 AmeriCorps programs nationwide serving an estimated 4,000 communities. These various volunteer opportunities may both encourage current charitable activities and serve as an investment for future increases in giving as these young people grow-up with an understanding of the importance of giving.

### **Increasing Economic Incentives to Give**

*President Clinton's proposed new tax incentives to promote philanthropy.*

Because individuals have been shown to respond to the economic incentives to give, the Administration has developed proposals that use the tax code to benefit charitable institutions. In his State of the Union Address, President Clinton unveiled a package of new tax proposals to encourage philanthropy.

The widest reaching of these proposals allows individuals to claim a deduction for charitable giving, even if they do not itemize their deductions on their federal income tax returns. When fully phased-in, the President's proposal will allow the 70 percent of taxpayers who do not itemize the opportunity to claim a 50 percent deduction for charitable contributions above \$500 a year.

The second proposal will make it easier for foundations to vary their giving over time and thereby respond effectively to the changing needs of those they benefit. Foundations currently face a two-tier excise tax: a 1 percent tax on investment income, and an additional 1 percent tax on investment income if they fail to maintain their average rate of giving over a 5-year period. This mechanism is complicated and can reduce giving in certain situations. If a foundation wishes to increase giving in response to a particular need in one year, it could risk higher future taxes if, after the need has passed, their rate of giving drops back to earlier levels. The President's new proposal will eliminate the two-tier system and set the excise tax rate at 1.25 percent on investment income.

The President's budget will also make it easier for individuals to donate appreciated assets like stocks, art, and real estate. Under existing law, individuals donating appreciated assets can take a tax deduction that is limited to 30 percent of adjusted gross income (AGI); for gifts made to private foundations, the deduction is capped at 20 percent of AGI. Amounts above these limits can be carried forward and deducted against income in future years. However, these caps on yearly deductions may limit the amount individuals choose to give in any particular year, and needlessly complicate tax preparation through the carryover provisions. The President's budget eases these restrictions and simplifies the necessary accounting by increasing the limit on

appreciated property to 50 percent of AGI, and the limit for donations of appreciated property to private foundations to 30 percent.

These new tax proposals provide a straightforward mechanism for promoting greater participation in charitable activities. Stimulating philanthropic giving by increasing both the incentives to give and the ease of giving is constructive in this time of economic prosperity where there clearly exist the resources to help. Furthermore, by refusing to abolish the estate tax the President has helped to ensure that charities continue to benefit from the generosity of individuals at their deaths.

## CONCLUSION

The strong economy has provided benefits to the country in many dimensions. More Americans are working than ever before, poverty rates are down, and home ownership has hit record highs. The dramatic increases in wealth have also brought increases in giving. Total charitable giving in the United States reached a record high in 1999 as many Americans shared their financial gains. Yet despite this generosity, Americans have the potential to give more. The task set before us now is to build on this level of generosity and ensure that the benefits of the New Economy continue to be widely shared.

The New Economy has also spurred new avenues for giving that will likely improve the efficiency of philanthropic sector. E-philanthropy is in its infant stages but promises to provide opportunities for giving to a broad range of individuals. It also allows for the efficient dissemination of information about philanthropic organizations and their needs, allowing donors to contribute to charities that reflect their particular interests. Similarly, venture philanthropy draws on the techniques developed by venture capital firms to ensure that contribution dollars are wisely invested and distributed. The changes in giving resulting from these developments are yet unknown, but offer the hope of increased participation in philanthropic activities. The increasingly widespread use of the Internet provides another avenue along which to spur charitable giving. Access to information about charities, the ability to match individual interests with the goals of particular charities, the ease of on-line donations, and the breadth of the on-line audience all point to the tremendous potential to increase giving.

Finally, policies offering tax-incentives for giving and programs that reach out to women, minorities, and young people, appear to be promising avenues for developing future giving.

Testimony of Dr. Janet L. Yellen,  
Chair, Council of Economic Advisers  
before the  
Senate Judiciary Committee

June 16, 1998

Mr. Chairman and members of the Committee, it is a pleasure to be here this morning to talk about some of the economic issues raised by the current merger wave. My testimony contains four sections. The first puts the current merger wave into historical perspective. The main message from that section is that merger activity has certainly increased substantially in the past few years, but it is not clear that the level of merger activity is "unprecedented." The second section examines the question of what the current increase in merger activity means for the economy. Here the main message is that mergers affect economic performance primarily through their impact on competitive conditions in specific markets rather than on broader macroeconomic conditions. The third section looks at the causes and consequences of mergers. Here there is no simple conclusion. Many, if not most mergers are motivated by the desire to achieve greater operating efficiencies and lower costs. But it is impossible to rule out anticompetitive motives or simple managerial hubris as explanations for mergers. The final section provides a summary and tentative evaluation of the current merger wave.

#### I. Mergers: A Historical Perspective

The United States is in the midst of its fifth major merger wave in a hundred years. The previous four merger waves provide background and perspective for assessing today's merger activity.

- The Great Merger Wave of the 1890s. The first great merger wave at the turn of the last century was the culmination of the trust movement, when numerous small and mid-sized firms were consolidated into single dominant firms in a number of industries. Examples include Standard Oil and U.S. Steel. One estimate is that this merger wave encompassed at least 15 percent of all plants and employees in manufacturing at the turn of the century. An estimated 75 percent of merger-related firm disappearances occurred as a result of mergers involving at least five firms, and about a quarter involved 10 or more firms at a time. The sharp decline in merger activity during 1903 and 1904 was probably related to the onset of a severe recession and the legal precedent for prohibiting market-dominating mergers under the antitrust laws that was established by the Northern Securities Case.
- The Roaring Twenties. The merger movement of the 1920s saw the consolidation of many electric and gas utilities as well as manufacturing and minerals mergers. Some of the most prominent manufacturing mergers (such as the one that produced Bethlehem Steel) created relatively large number-two firms in industries previously dominated by

## II. Mergers, Concentration, and Aggregate Economic Performance

What does this merger activity mean for the economy? I think it is fair to say that economists have found little reason to think that broad economic indicators like the rate of economic growth, inflation, or unemployment are much affected by changes in merger activity or the share of aggregate economic activity accounted for by the largest 100 or 200 firms (so-called aggregate concentration)—at least on the order of those that have typically been observed in the United States. Economic analysis suggests that the main route by which mergers affect economic performance is through their impact on competitive conditions in specific markets.

Let me elaborate a little on these points. Heightened merger activity tends to call attention to the importance of large firms in the economy and raise popular concerns that economic power is becoming increasingly concentrated in a few mega-corporations. In 1976, for example, the business journalist Andrew Tobias wrote an article in *New York* magazine entitled, "March 3, 1998: The Day They Couldn't Fill the FORTUNE 500." Well, needless to say, Fortune magazine continues to publish its Fortune 500 with all the spots filled. Indeed, Statistics of Income data from the IRS show that in 1994, there were about 4.3 million incorporated business enterprises operating in the United States. Of course, most of these were relatively small (Exhibit 3.)

About 7,000 corporations (0.2 percent of the total number) had assets of \$250 million or more. These large corporations held \$19.5 trillion of the \$23.4 trillion in assets in the corporate sector (83 percent) and their receipts of \$7.2 trillion represented 54 percent of the \$13.4 trillion aggregate corporate receipts. (Aggregate corporate receipts are larger than GDP because of double counting—steel sold to automobile producers shows up as sales by steel manufacturers, but it is also reflected in the price of automobiles.) And companies at the top of the Fortune 500 are extremely large.

- General Motors topped the 1998 list with revenues of \$178 billion and assets of \$229 billion (about 1.5 percent of total corporate revenues and about 1 percent of total corporate assets). Three other firms (Ford, Exxon, and Wal-Mart) had revenues in excess of \$100 billion.
- Fannie Mae topped the list of Fortune 500 companies ranked by assets, with \$392 billion of assets. Five other companies (Travelers Group, Chase Manhattan Corp., Citicorp, General Electric, and Morgan Stanley Dean Witter Discover) had assets in excess of \$300 billion. (The merger of Travelers and Citicorp would move CitiGroup to the top by a wide margin).
- Wal-Mart Stores is by far the largest employer among the Fortune 500, with 825,000 employees. General Motors is second with 608,000 employees, and Ford and United Parcel Service each have employment in excess of 300,000.

We found no comprehensive recent research on trends in aggregate concentration (the share of total assets or some other measure of size accounted for by the largest 50, 100, 150, or

through office superstores.” Because such careful analysis is more likely to be done for particular industries (often as a result of an antitrust investigation), there is no reliable comprehensive study of whether U.S. markets are generally becoming more concentrated or more competitive. One analyst has suggested however, that dominant firms account for less than 3 percent of GDP.

Thus, large firms, and the merger of large firms, are an important feature of the American economy. But they have been for over a century and there is little evidence of any alarming trend toward greater concentration of economic power in the aggregate. The analysis of how mergers affect economic performance should probably therefore focus on the impact of mergers in specific, well-defined markets.

### III. Causes and Consequences of Mergers

Keeping that perspective in mind, let me now turn to the causes and consequences of mergers. The main reason managers give for undertaking mergers is to increase efficiency. And studies show that, on average, the combined equity value of the acquired company and the purchasing company rises as a result of the merger. However, an increase in shareholder value can arise for reasons other than greater efficiency—such as increased market power and the resulting ability to increase profits by raising prices. And the separation of ownership from control in the modern corporation means that mergers may serve the interests of managers more than shareholders (e.g., empire building, increased salary associated with running a larger firm). Finally, even if mergers are designed to enhance efficiency, they often don't work and can instead create inefficiencies (some see the merger of the Union Pacific and Southern Pacific railroads in 1995 as a notable example of such an outcome.)

There are numerous ways that mergers can contribute to economic efficiency. One is by reducing excess capacity (this justification has been invoked in hospital, defense, and banking mergers). Another is by achieving economies of scale or network externalities (the hub and spoke system that emerged following the deregulation of the airline industry is one example, though it is one that raises questions of increased concentration as well) or economies of scope (“synergy”) as in the case of investment/commercial banking, where similar risk management techniques and credit evaluation skills are utilized in a wide variety of financial services. Mergers may also improve management (studies suggest large differences in efficiency among seemingly similar firms like banks.)

Most mergers probably are undertaken with the expectation of achieving efficiencies, though the outcomes may sometimes be disappointing and divorces are not uncommon (such as the unraveling of AT&T's 1991 acquisition of NCR). Studies of bank mergers suggest that, in spite of the potential for improved efficiency, in general, they have not improved the efficiency or profitability of banks.

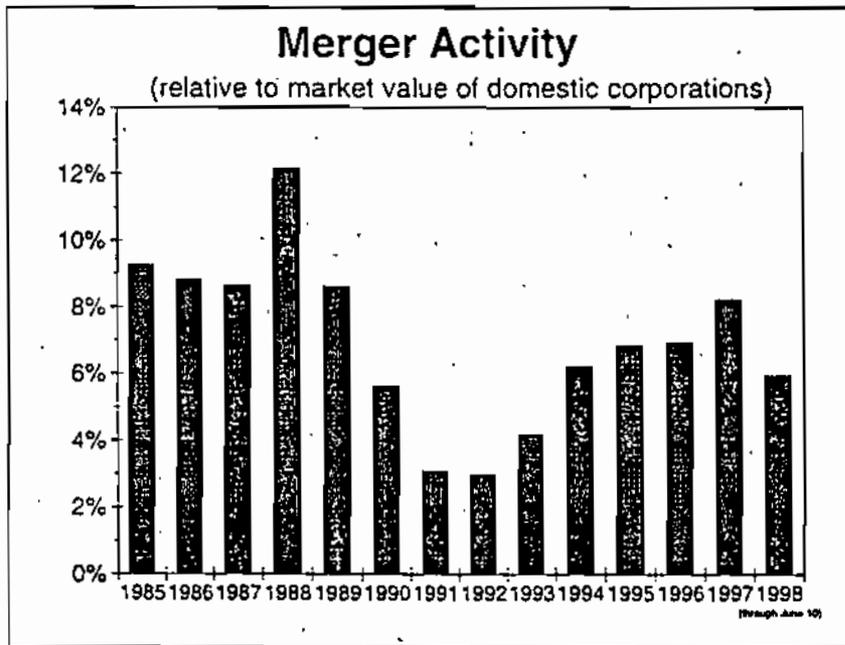
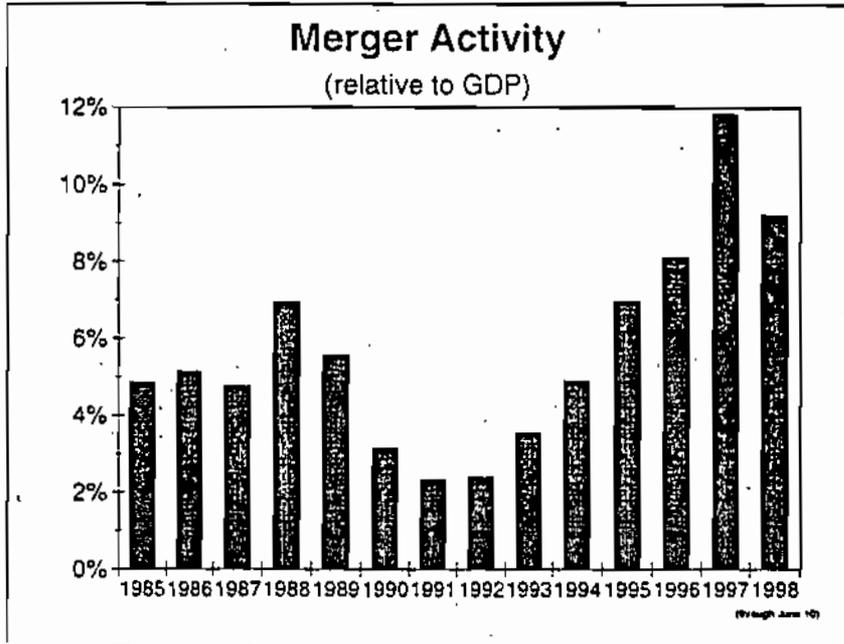
- (4) High stock market. Price-earnings ratios have increased to near-record levels during the current merger wave, and some analysts feel that the market may be overvalued. Such high stock market values may make it seem attractive to fund an acquisition with stock (this is the dominant funding source in the current merger wave). But an overvalued stock market should not necessarily lead to more mergers, because if other firms are also overvalued then there are fewer attractive targets to acquire.

As I mentioned earlier, in evaluating the consequences of mergers we should focus on particular well-defined markets. In this regard, it is important to recognize that mergers do not necessarily increase concentration in any well-defined market. Merging firms may be in different businesses, non-competing regions, or in supplier-buyer relationships. In banking, for example, national concentration has increased dramatically due to mergers, but concentration measures for local banking deposits have been extremely stable because most mergers have been between banks serving different regions. Even when the merger is among competitors, increasing global competition or domestic entry could be simultaneously reducing concentration. In addition, the entry of new firms or the threat of entry can offset the potentially anticompetitive impact of a merger. And finally, the structural characteristics of markets, and not just the number of firms, influence the nature of competition in a given market. We cannot automatically conclude that markets with 2 or 3 competitors will be less competitive than those with 20 or 30.

#### IV. Conclusion.

To wrap up, the United States is currently in the midst of its fifth major merger wave in the past hundred years. Industries that are particularly prone to mergers include telecommunications, banking, and financial services. These are sectors in which the regulatory environment has been changing rapidly, opening up new opportunities and challenges. This merger wave is taking place in a strong stock market, and stock rather than cash is the preferred medium for making acquisitions. Many of the prominent mergers are neither purely horizontal (in general large horizontal mergers would raise antitrust issues) nor purely conglomerate. Rather, they represent market extension mergers (companies in the same industry that serve different and currently non-competing markets) or mergers seeking "synergy" among companies in different industries. Analysis of the economic impacts requires careful analysis of particular markets and defies easy generalizations.

Exhibit 2

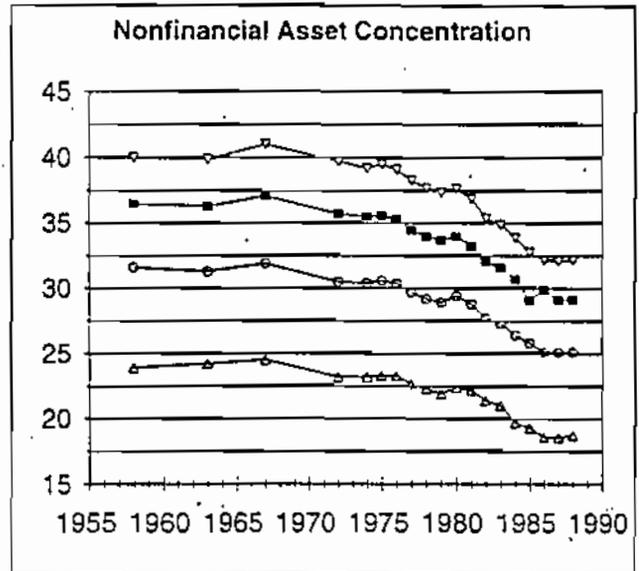


Source: Securities Data Company; Federal Reserve Flow of Funds; Department of Commerce, Bureau of Economic Analysis

Exhibit 4

Concentration in Assets for the Nonfinancial Sector

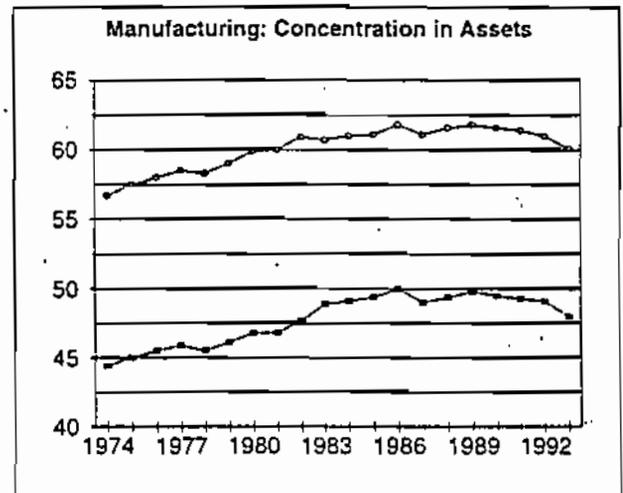
	Top 50	Top 100	Top 150	Top 200
1958	23.9	31.6	36.5	40.0
1963	24.2	31.3	36.3	39.9
1967	24.5	31.9	37.1	41.0
1972	23.2	30.5	35.7	39.7
1974	23.2	30.4	35.5	39.2
1975	23.3	30.6	35.6	39.5
1976	23.3	30.4	35.3	39.1
1977	22.7	29.7	34.5	38.3
1978	22.3	29.2	34.0	37.7
1979	21.9	28.9	33.7	37.4
1980	22.4	29.4	34.0	37.7
1981	22.2	28.8	33.3	36.9
1982	21.4	27.7	32.1	35.4
1983	21.0	27.3	31.6	34.9
1984	19.7	26.4	30.7	33.9
1985	19.3	25.8	29.1	32.8
1986	18.6	25.1	29.9	32.2
1987	18.6	25.1	29.1	32.1
1988	18.7	25.1	29.2	32.2



Source: Bureau of Economics, Federal Trade Commission, based on data from COMPUSTAT (1958-87), Moody's (after 1987) for the largest nonfinancial firms and Internal Revenue Services (total nonfinancial assets).

Concentration in Assets for Manufacturing

	Top 100	Top 200
1974	44.4	56.7
1975	45.0	57.5
1976	45.5	58.0
1977	45.9	58.5
1978	45.5	58.3
1979	46.1	59.0
1980	46.8	59.9
1981	46.8	60.0
1982	47.7	60.9
1983	48.9	60.7
1984	49.1	61.0
1985	49.4	61.1
1986	50.0	61.8
1987	49.0	61.1
1988	49.4	61.6
1989	49.8	61.8
1990	49.5	61.6
1991	49.3	61.4
1992	49.1	61.0
1993	48.0	60.1



Source: Bureau of Economics, Federal Trade Commission, drawn from Quarterly Financial Reports, Department of Commerce

TESTIMONY OF DR. JANET YELLEN  
CHAIR, COUNCIL OF ECONOMIC ADVISERS  
BEFORE THE  
U.S. SENATE  
COMMITTEE ON FINANCE

June 11, 1998

Mr. Chairman and members of the Committee. Thank you for the opportunity to discuss the trade deficit with you today.

The trade deficit is an important economic statistic, but its interpretation is subject to substantial confusion. A country's trade balance is often--wrongly--used as a measure of the success of its market-opening policies or the benefits of its engagement in international trade. The most important idea I would like to express to you today is that the benefits of increased international trade are reflected in higher real income, not in a smaller trade deficit. Indeed, the rising U.S. trade deficit in recent years mainly reflects the strength of the American economy, which has grown rapidly in comparison with the economies of many of our trade partners. In part, the trade deficit reflects the fact that our fast-growing economy is pulling in a lot of imports. But at the same time it also reflects the fact that the U.S. is attracting substantial international capital flows. These have financed increases in plant and equipment investment that have exceeded even the growth in national saving due to deficit reduction since the beginning of the Clinton Administration.

## I. The Benefits of Trade

Going back to Adam Smith, one of the most important insights of economics is that international trade increases the real incomes of all countries that engage in it. Trade is not a zero-sum game in which the gains of some countries come only at the expense of other countries. To the contrary, trade is a positive-sum game in which both sides gain.

For a long time, arguments for trade were based on the principle of *comparative advantage*. When countries specialize in the economic activities for which they are particularly well-suited and rely on trade to acquire other goods, they can achieve a higher standard of living than if they try to produce everything themselves. More recently, economists have argued that trade can also enhance productivity through the effects of greater market size, enhanced competition, and importation of new ideas and technologies.

These benefits from trade are not merely theoretical. A large and growing economics literature has found that those countries that are open to trade tend to grow faster and have higher

levels of per-capita income than countries that close themselves off from international competition and trade. One estimate is that the globalization of the U.S. economy over the last 40 years has added about \$1500 to per-capita income.

Because policymakers in this country have long believed in the benefits of trade for all parties, the United States has long been the world's leading advocate for trade liberalization. U.S. tariffs are among the lowest in the world. While we benefit directly from our own low tariffs--through lower prices to consumers-- we would benefit even more if other countries were to lower their tariffs and other trade barriers. Since U.S. trade barriers are already so low, international trade agreements typically produce much larger reductions in the trade barriers facing American goods in foreign markets than on foreign goods in the United States.

It is often suggested that the major benefit of trade liberalization is job creation. When our economy is operating below its potential, with slack in the job market, export growth can produce job gains, helping the economy move toward full employment. As of January 1993, for example, the economy had substantial unemployment and excess capacity. One could say that the large increase in U.S. exports between 1993 and 1997--roughly 10% per year at an annual rate-- accounted for 38 percent of the increase in output, and a proportionate share of the almost 16 million jobs that were created over that period. In the long-term, however, increases in exports must ultimately pull workers away from other activities. Trade still raises real income, but the boost comes from better jobs and not from more jobs. Studies show that export jobs pay 13-18 percent more than other jobs. Indeed, export jobs are better even after adjusting for worker skills and firm-specific and industry-specific components to wages.

## II. Macroeconomics and the Trade Deficit

Perhaps the greatest source of confusion about trade relates to the interpretation and causes of trade deficits and surpluses.

A trade deficit occurs, by definition, when a country's total domestic spending exceeds its total domestic production. When this occurs, the shortfall is made up by importing more goods than are exported. When the U.S. runs a trade deficit, foreigners buy less than a dollar's worth of U.S. goods for every dollar they earn from their export sales to us. The natural question is, what motivates foreigners to supply us with more goods than we supply to them in exchange? And what do foreigners do with the dollars that they don't use to buy U.S. goods? In practice, foreigners typically use the excess dollars to invest in interest-bearing U.S. assets. Indeed, it is the desire of foreigners to purchase attractive U.S. assets--to lend us the money needed to finance a trade deficit--that makes it possible to run such a deficit. Countries can run deficits only if foreigners want to add to their holdings of the deficit country's assets. In fact, one can as readily argue that the desire of foreigners to acquire attractive U.S. assets is responsible for the U.S. trade deficit as the reverse.

This relationship between spending, production, and the trade deficit can be expressed

another way. I will not bore you with the details but it turns out that in an accounting sense a country's current account balance (a comprehensive measure which comprises not only the balance of trade balance in goods and services but also net investment income and transfers) is equal to the difference between national saving and national investment. The attached chart illustrates this relationship. When the demand for investment in the United States exceeds the pool of national saving, the difference is made up by borrowing from foreigners. Conversely, when saving exceeds investment, the surplus is invested abroad. The United States first experienced large current account deficits during the mid-1980s, when net investment fell as a share of national income and net national saving fell even faster. The deficit shrank briefly as investment collapsed in the 1990-91 recession, but it has reemerged in the current expansion. The good news in this expansion is that investment has been booming. But saving does not appear to have kept pace, despite the improvement due to federal deficit reduction. (The interpretation of current trends in saving, investment, and the current account is complicated by the statistical discrepancy between GDP measured as the sum of all spending on output and as the sum of all income generated in producing that output.)

When a trade deficit is used to finance productive investment, as it is now, it can be viewed as largely benign, because the extra investment raises the productivity of our workforce, resulting in higher future national income. It is that return that should enable us to pay off the foreign borrowing we have undertaken to help finance our investments. We would be *worse off* as a nation, and our interest rates would have been higher if, over the last few years, we had been forced to curtail our investment. Our ability to attract funds from abroad is a vote of confidence in the ability of our high-performing economy to put these funds to good use.

Let me return now to the more immediate causes of our rising trade deficit. A key factor responsible for this trend is strong growth in the United States relative to some of our major trading partners. Our strong growth has resulted in a larger income-induced increase in American demand for foreign goods than in foreign demand for our goods and services. The second key factor is the dollar's appreciation, which has been substantial over the last three years. In a system of flexible exchange rates and high capital mobility, an appreciation in a currency reflects a desire by foreigners to hold that currency. Appreciations very often accompany strong economic expansions like the one the U.S. has experienced over this period, and in that sense the appreciation of the dollar is unsurprising given that the U.S. economy has grown much more rapidly than those of many of our trading partners over the past few years.

More recently we have seen a surge in the trade deficit that reflects the effects of the East Asian crisis. Sharp drops such as those seen in the value of the East Asian currencies lead to an increase in U.S. demand for the goods produced by these countries (which are now much cheaper to us than before). At the same time, the East Asian countries have cut back sharply on imports of goods from the U.S. both because our goods are effectively much more expensive for them, and also because their incomes have fallen substantially.

Our sales to these countries have fallen sharply. Data for the first three months of this

year show that our exports to the five most-affected countries are down between \$17 billion and \$21 billion (annualized) since the crisis began, depending on how one does the seasonal adjustment. Roughly two-thirds of the lost sales were to Korea. Exports to Japan are down another \$6 to \$8 billion over this period. Thus the total adverse movement across all six countries has been \$23 to \$29 billion. We expect the loss in sales to worsen during the remainder of the year, especially if Asian economies continue to contract. Furthermore, we have not yet seen the large increase in imports from the Asian countries that their devaluations are likely to produce.

It is often argued that the Asian crisis, by decreasing U.S. net exports, will diminish U.S. growth over the next year or longer. There is no denying that net exports are exerting, and will continue to exert, a drag on U.S. economic growth. Fortunately, however, the slowdown in exports to East Asia is affecting the U.S. economy at a time when domestic demand growth is extremely robust and labor markets have become increasingly tight. The consensus among forecasters is that the East Asian crisis could serve as the brake that subdues growth toward a more sustainable pace, preventing overheating, and permitting continued job growth with a more moderate path for interest rates and stronger investment spending than we would otherwise enjoy. There is the further side-benefit that the sharp declines in Asian currencies and the consequent decline in the dollar price of imports from that region will provide a dampening influence on inflation.

### III. Are There Reasons for Concern?

My testimony so far has been that the trade deficit largely reflects the strength of the American economy. But I do not want to leave you with the impression that there are no reasons to be concerned about a large trade deficit.

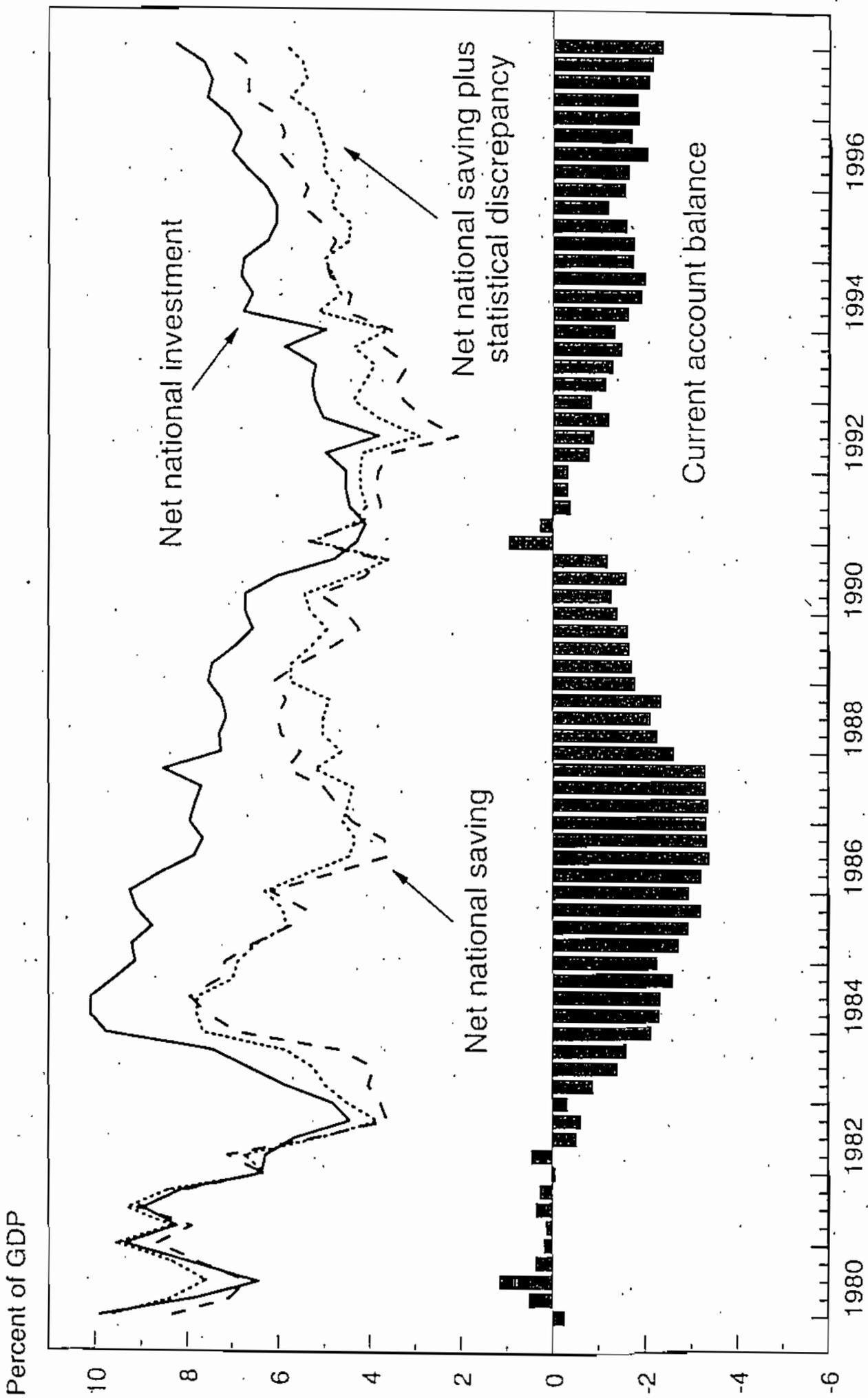
First, even in the absence of any negative aggregate impact on output and employment due to a growing trade deficit, particular sectors have been adversely affected. Before 1997, many U.S. producers enjoyed rapid growth in their exports to East Asia. That has now disappeared. As I have already noted, exports are down sharply to Asia in general, and to Korea, Southeast Asia, and Japan, in particular. They can be expected to continue to fall in the remainder of this year. In addition, we will probably see increased imports from these countries, especially in such sectors as autos, steel, textiles and apparel, and semiconductors and other electronics. The crisis countries have no choice but to shift their trade balances into surplus, since they are no longer able to borrow from abroad to finance the trade deficits that most of them ran before the crisis. It is their inability to borrow in world capital markets that is responsible for the currency depreciations and income reductions that are in turn causing them to buy less from us and sell more to us.

The second reason for concern about our growing trade deficit follows in part from the first. Our rising trade deficit, particularly in such key areas of the economy as manufacturing and agriculture, could undermine support for internationalist principles and for market-opening policies like those outlined by Secretary Rubin in his testimony. If the widening U.S. trade

deficit were to create the false impression that the U.S. stands to lose rather than to gain from continued engagement in international markets, then it would be a costly development indeed.

**Exhibit: Saving, Investment, and the Current Account Balance**

The current account deficit grew in the mid-1980s; saving fell faster than investment. In the 1990s, however, both investment and saving are increasing.



Source: Department of Commerce (Bureau of Economic Analysis).



THE CHAIRMAN

EXECUTIVE OFFICE OF THE PRESIDENT  
COUNCIL OF ECONOMIC ADVISERS  
WASHINGTON, D.C. 20500

Statement before the House Commerce Subcommittee on Energy and Power

Dr. Janet Yellen

Chair, Council of Economic Advisers

Tuesday, July 15, 1997

Good afternoon, Mr. Chairman and members of the Subcommittee. I appreciate the opportunity to discuss with you today the economics of global climate change.

**Introduction**

In his speech to the United Nations Special Session on Environment and Development in June, President Clinton emphasized that the risks posed by global climate change are real and that sensible preventive steps are justified. This assessment accords with the views of the more than 2300 economists, including 8 Nobel laureates, who signed a statement supporting measures to reduce the threat of climate change. The economists endorsed the conclusions from last year's report by the Intergovernmental Panel on Climate Change (IPCC), which said that governments should take steps to reduce the threat of damage from global warming, and went on to argue that market-based policies can slow climate change without harming the American economy.

At this time the Administration has not settled on a particular set of new policies to reduce greenhouse gas emissions. Instead, the President indicated in his U.N. speech that he intends to engage in a discussion with all interested parties about the problems posed by

greenhouse gas accumulations and the costs and benefits of corrective action. To this end, the President will hold a White House conference on climate change later this year, and Members of his Cabinet and other senior Administration officials will meet with Members of Congress, scientific and economic experts, environmentalists, local government officials, and business and labor leaders on a regular basis over the next several months to discuss issues related to climate change. This process is intended to inform the Administration's decision-making process, which will culminate in a U.S. policy position in the international negotiations in Kyoto in December of this year.

An important step in this -- and any -- policy process is determining the impact it will have on the American economy. President Clinton's top priority, since his first days in office, has been revitalizing the U.S. economy, creating jobs and investing in people and technology to enhance long-term growth. And, we have made tremendous progress. The President is not going to jeopardize that progress. Any policy he ultimately endorses on climate change will be informed by his commitment to sustaining a healthy and robust economy.

In my testimony today, I would like to describe some of the principal lessons that emerge from the voluminous literature, much of it relatively recent, on the economic impacts of policies to address global climate change.

## Underlying Uncertainties

Before I begin my discussion of the economic literature, I would like first to acknowledge the uncertainties associated with estimating both the costs and benefits of reducing greenhouse gas emissions. To provide some perspective: as you all know, it is difficult to gauge exactly what impact the balanced budget agreement will have on the U.S. economy's growth rate, levels of employment, interest rates and consumption over the next five years. But with global climate change, it is orders of magnitude more difficult to gauge the effects on the economy: we are concerned with not just the next five years and not just the American economy, but, rather, we are dealing with economic and physical processes that operate globally and over decades, if not centuries.

Although a great many scientists believe that global climate change is already underway, the more serious potential damages associated with increasing concentrations of greenhouse gases are not predicted to occur for decades. This means that the benefits of climate protection are very difficult to quantify. And, while the potential costs of reducing greenhouse gas emissions may be more immediate, they too, as I will discuss below, are difficult to predict with any certainty. Many unanswered questions exist about the biophysical systems, potential thresholds, and economic impacts. In short, if anybody tells you that he or she has the definitive answer as to the costs and benefits of particular climate change policies, I would suggest that you raise your collective eyebrows.

## Lessons from the Economic Literature

Let me now turn to the economic literature and try to summarize what I think we know so far about this difficult topic. Most economists have not addressed the benefits of climate protection, but rather have focused on the costs associated with alternative paths for reducing greenhouse gas emissions. The economic literature includes estimates using many different models to evaluate numerous alternative emission reduction strategies. In fact, because there are so many different models, economists initially faced difficulties in comparing results: they could not sort out the extent to which differences in results stemmed from differences in models and assumptions versus differences in baseline emission paths and policies. To solve this problem, thereby enabling meaningful comparisons, many economists have calibrated the various models by performing a standardized simulation. Specifically, they have assessed the consequences of stabilizing greenhouse gas emissions at 1990 levels by 2010 or 2020.

Within the Administration, a staff level working group -- the Interagency Analysis Team (IAT) -- has attempted to estimate some of the economic implications of climate change policies. They took the emissions scenario most often used in academic literature -- that is, stabilizing emissions at 1990 levels by 2010 -- as the starting point for their own analysis. I would emphasize that this scenario is not Administration policy; instead, it was picked to make comparisons with other models easier. The staff group employed 3 different models -- the DRI model, the Second Generation Model (SGM) and Markal-Macro model, all commonly available in the public sphere. In running these models, the staff adopted a common baseline and, to the maximum extent possible, similar economic assumptions. This modeling effort produced some

useful lessons, but as we found from the peer reviewers' comments, it also suffered from some serious shortcomings. Both the lessons and the shortcomings point to one clear conclusion: the effort to develop a model or set of models that can give us a definitive answer as to the economic impacts of a given climate change policy is futile. Rather, we are left with a set of parameters and relationships that influence estimates of the impacts. In my view, it is more productive to employ a broad set of economic tools to analyze policy options than to seek to develop a single definitive model.

I understand that a draft of the staff analysis was given to the Subcommittee this morning, along with the reviewers' comments. I would be happy to answer any questions you may have about this modeling effort.

**The Lessons.** Modeling efforts both inside and outside the Administration clearly indicate that economic analysis can do no more than estimate a range of potential impacts from particular policies and highlight how outcomes depend on underlying assumptions about how the economy works and the ways in which policy is implemented. However, the economics literature on climate change does point to several important lessons:

**How the economy works.** First, the magnitude of the costs of reducing greenhouse gas emissions in the various models depends crucially on a number of key assumptions about how the economy works. For instance:

- If firms in the economy can shift from high-carbon to low-carbon energy sources quickly, the costs of climate protection will be lower.
- If the economy has significant opportunities, even now, to employ energy-saving technology at low costs, the costs of climate protection will be lower.
- If technological change occurs at a rapid rate, or is highly responsive to increases in the price of carbon emissions, the costs of climate protection will be reduced.
- If the Federal Reserve pursues a monetary policy oriented toward keeping the economy at full employment, transitional output costs will be lower.

In short, the greater the substitution possibilities and the faster the economy can adapt, the lower the costs.

**How the plan is implemented.** Second, costs depend critically on how emission reduction policies are implemented. It boils down to this: if we do it dumb, it could cost a lot, but if we do it smart, it will cost much less and indeed could produce net benefits in the long run. The over 2300 signatories of the economists' statement argued that any global climate change policy should be rely on market-based mechanisms. Such mechanisms allow for flexibility in both the timing and location of emission reductions, thereby minimizing the costs to the U.S. economy. The economists concluded that "there are policy options that would slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run."

- The speed at which emissions reductions are required can have large effects on the estimated costs. It is important to allow sufficient lead-time for orderly investment in new equipment and technology. Alternatively, if emission reduction requirements are too far off in the future, the incentives to adopt energy efficient technologies are weakened because people may not view the policy as credible.
- A “cap and trade” system in which emission permits are issued and then traded among firms can substantially reduce the cost of meeting an emissions target by creating incentives for emissions to be reduced by those firms and in those activities where costs are lowest.
- International emission permit trading substantially lowers costs by applying the same cost-minimizing principle globally.
- So-called “banking” and “borrowing” of permits increases flexibility and lowers costs by allowing firms to change the timing of their emission reductions.
- Joint implementation, whereby US firms would receive credit for undertaking emission reductions in countries with low abatement costs, would also lower the domestic burden.

An additional aspect of implementation that profoundly affects the costs of reducing emissions concerns “revenue recycling.” In many model simulations, emissions are reduced by using various market mechanisms. For many of these scenarios, the Federal government realizes an increase in revenues. Economic growth can receive a

long-term boost if these revenues are used to reduce distortionary taxes that diminish the incentives to invest, save or work, or if the revenues are channeled into deficit reduction, thereby lowering interest rates and boosting investment. In fact, in some models and scenarios, emissions reduction generates a net economic benefit when the revenues are recycled in a growth-promoting fashion.

**Which countries participate.** The third lesson that emerges from a study of the economics of climate protection is that developing, as well as developed, countries must be part of the process. While developed countries are responsible for most of the greenhouse gas currently in the atmosphere, developing countries are starting to catch up. By 2040, the largest fraction of emissions is estimated to come from developing countries. Thus, any comprehensive plan to deal with this global problem must include a mechanism to bring developing countries into the process.

The timetable for the inclusion of developing countries is also important. The sooner that developing countries face incentives to move away from carbon intensive energy sources, the less likely it is that they will become dependent on those types of fuels to spur their economic growth. In short, global problems require global solutions. We must find the technologies and solutions to lead the way.

## Conclusion

Let me conclude. Policies to promote economic growth, create jobs, and improve the living standards and opportunities of all Americans have been and always will remain the top priority of the President and his Administration. In his remarks to the Business Roundtable on global climate change, the President said “[l]et’s find a way to preserve the environment, to meet our international responsibilities, to meet our responsibilities to our children, and grow the economy at the same time.”

Some of the key economic lessons we have learned that will help us achieve the President’s goal include:

- Inherent uncertainty dictates that models should be expected to generate only a range of economic impacts, not definitive answers.
- Key assumptions about how the economy works directly influence the estimated costs of climate protection.
- Implementation of any policy needs to be market-based and flexible over time and space to achieve the lowest cost reductions.
- All nations, both developed and developing, need to participate.

Thank you. I would be happy to answer any questions you may have.