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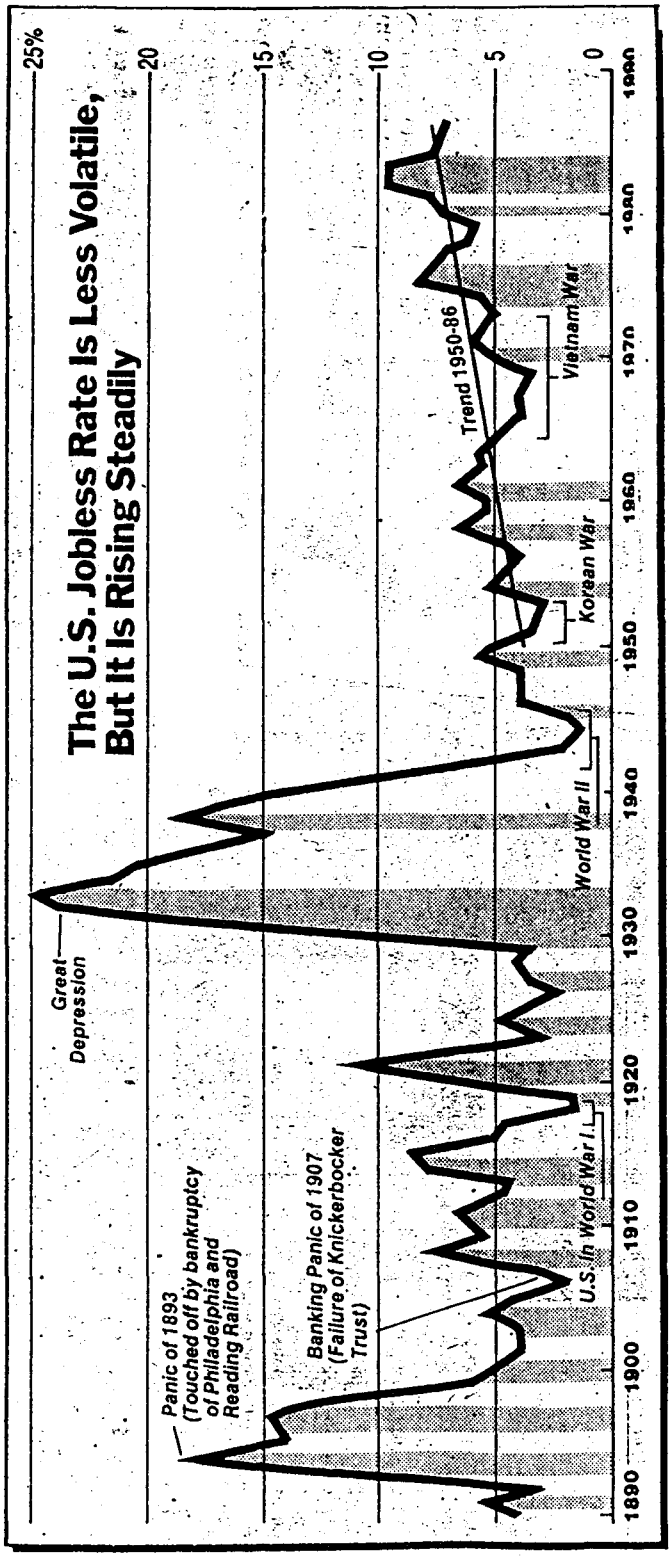
As the world's first technological society, the economy of the United States has often been confronted with the need to adapt to dynamic circumstances. Achieving its independence in the same year (1776) that James Watt introduced his steam engine, the United States was literally "born running" with the Industrial Revolution. While the mechanization of production did not begin in the United States, it was the first country to capitalize on its revolutionary potential.

From its beginnings until the early 20th Centuries, the nation was primarily an agriculturally-based economy. Even as the economy began to mechanize during the last half of the 19th Century, the employment requirements of both the agricultural and non-agricultural sectors demanded little in the way of skill or knowledge from its work force. Most job seekers possessed little of either. It was simply assumed that the labor force could somehow adjust to the technologically imposed requirements of the job. An essentially open-door immigration policy (except for Asians) provided an abundant number of unskilled workers.

With the coming of the second decade of the Twentieth Century, the historic development of the continuous process production techniques (associated with the advent of the assembly line in the automobile industry in 1914 and its subsequent replication in the 1920s by other manufacturing

industries) only served to exacerbate the prevailing employment patterns. It did not alter them. The economy of the United States was still in its adolescence. Mass production provided a means to produce goods and to offer them at low cost to a consuming public who at the time largely possessed very few material goods. Millions of unskilled blue-collar production jobs were created largely in manufacturing, mining and construction. Agriculture remained a significant employing sector even though its historic dominance was finally eclipsed by manufacturing in 1920. Most of these newly created jobs still required little in the way of human capital endowments from most job seekers.

A review of Table 1, for the period 1890 to 1930 shows, however, that the labor force adjustment to mechanization and continuous process was far from painless. Unemployment rates fluctuated wildly and the economy of this era was subject to frequent swings of the business cycle. It was a period of prolonged instability. But it was in the 1930s that the nation was beset by the worst economic depression in its history. Immigration, which had been restricted from Europe in 1924, essentially ceased from all sources. With an abundance of unemployed citizen labor available, there was no need to be concerned about human resource development. The most enduring policy accomplishment of this period was the recognition of the necessity of the federal government to manage the aggregate level of employment of the economy. The support for this position was provided by the English economist, John M. Keynes. He criticized the prevailing academic teachings of self-correcting labor markets for not reflecting the reality of prevailing circumstances. In a world of large corporations, trade unions, tariff barriers, and social welfare policies, the assumptions of classical economics



Source: U.S. Department of Labor

Note: The average annual unemployment rate (unemployed as a percentage of the civilian labor force); shaded areas indicate recessions

were simply irrelevant. Aside from criticism, however, Keynes offered a new approach. He showed that the only way for an advanced capitalist economy to avoid the periodic dislocations associated with the swings of the business cycle was for the federal government to use its massive powers to alter taxes and spending levels. These prescriptions were called fiscal policy. They have been pursued by all political administrations ever since. Since the 1940s, the U.S. economy has been free of the extreme volatility that characterized the preceding eras of its economic history (see Table 1).

As revolutionary as were the assumptions and policy prescriptions of Keynes, his analysis had nothing to say about the qualitative nature of the supply of labor. The macroeconomic theory that has evolved from Keynes' initial analysis was and is premised upon the singular importance of labor demand. It refers only to the application of fiscal policy to manipulate the aggregate purchasing power of society.

Ironically, Keynes was fully aware of the limitations of his proposals. He stressed the fact that his analysis was purely a short run diagnosis. He once quipped that "in the long run we are all dead." His theory, therefore, was based on the assumption that the size of the labor force, the capital stock (both human and physical), the state of technology, the degree of competition, (domestic and foreign), and the consumer tastes for goods and services are <u>all assumed to be constant</u>. In the short run, such assumptions may be acceptable; but over the long run they clearly are not. He described these other factors as composing the "social structure" that "determines the distribution of national income." In other words, Keynes recognized that unemployment can be caused by changes in the structure of the economy and that such changes would require policy responses other than

fiscal policy.

The 1940s and the 1950s were dominated by the events associated with World War II and its aftermath. The massive military spending by the federal government during the war became the applied fiscal policy of this era. Full employment was achieved. Government spending was responsible for a dramatic increase in the capacity of the U.S. economy to produce output. The scale of mass production techniques increased dramatically. But the employment requirements of the past were not changed. The bulk of the jobs that were created were of an unskilled and semi-skilled nature. Indeed, it is alleged that the hiring philosophy of the automobile industry during this era was that "if the job applicant is warm and breathing we will hire him (or her)". Its hard to imagine a lower threshold to employment.

One new element, however, was added during the World War II era. It was the commitment to research and development to find new military weapons by all of the nations who were participants. In the U.S., the scale of the research build-up created a scientific and technological base that was carried over to the post-war economy. The Cold War that began with the Soviet Union in the late 1940s meant that the high level of military expenditures continued as did the commitment by the government to support scientific research. On the domestic side, fully one-third of the U.S. population moved into the middle class during the war years. As a result, a new consumer class emerged after the war to buy the expanded output of these newly acquired productive capacities and technological capabilities and to perpetuate temporarily the employment patterns of the past.

By the late 1950s and early 1960s, however, there were signs of problems with the ability of the labor force to adjust to emerging changes in the

economy. Unemployment rates began to rise (see Table 1). Unlike the general unemployment of the 1930s that affected workers across industrial, occupational and regional lines, however, the new pattern of unemployment was more selective. Workers in manufacturing industries, blue collar occupations, and certain geographic regions seemed to be most affected. Fears of the effects of recently introduced automatic control types of production techniques -- called automation -- were cited as being a probable culprit. Spawned also in part by the launching of Sputnik I in 1957 by the Soviet Union, the United States took the first tentative steps toward a national human resource development policy. Major legislature and administrative policies were initiated in the employment area pertaining to federal government support for occupational training, on-the-job training, federal aid to education (from pre-school to graduate school), assistance for industry relocation, social rehabilitation, vocational education, apprenticeship, direct job creation and aid for regional economic development.

The movement toward institutionalizing human resource development as a permanent feature of national economic policy, however, soon was snipped in the bud by two separate happenings. One was the coming of the Vietnam War. The worrisome employment patterns that had caused the initial concern for new policy interventions were temporarily reversed. Both the manufacturing sector and blue collar occupations -- which had been declining for over a decade -- were revived due the sharp increase in defense and defense-related spending. The original clientele for many of these endeavors -- the displaced semi-skilled worker with work experience -- appeared to have vanished. In addition, the military draft was increased tenfold between 1964 and 1965 -- the exact year that the postwar baby boom hit the major

labor force entry age of eighteen. Sharp declines in the overall unemployment rate occurred in the late 1960s (review Table 1). The second diversion was, ironically, the legislative success of the civil rights movement as manifested by the passage of the Civil Rights Act of 1964. After the initial euphoria associated with its enactment had passed and once the political and social barriers to black participation in American society quickly dissipated, the monumental challenges to the achievement of economic equality became starkly vivid. The concept of equal employment opportunity embodied in the Act and subsequently pursued by affirmative action policies assumed that minorities were already qualified for available jobs. Some were. But too often, the legacy of past denial of opportunities to acquire sufficient human resource preparation had left many unqualified, uninformed, unaspiring and disproportionately concentrated in declining industries and occupations. In the wake of the massive human resource development deficiencies that had been forced upon the black population by past de jure and de facto discrimination, the Johnson Administration shifted the thrust of the new human resource programs to serve the employment needs of the "economically disadvantaged." This was an historic policy turning point.

When U.S. involvement in the Vietnam began to wane in the early 1970s, the pre-Vietnam trends in employment re-surfaced. Aggregate unemployment increased (review Table 1). The publicly supported employment and training programs, however, continued to focus on the needs of "economically disadvantaged" workers. Ostensibly, they were for persons from low income families without regard to race. But as minorities were disproportionately concentrated in the low income population, they had become disproportionately the clientele. In the process, the publicly supported training programs

acquired a stigmatizing image that implied that such human resource programs were only for those people unable to help themselves. As a consequence, when the Reagan Administration came to power in 1981 with a determination to reduce federal spending on social programs, these undertakings did not have a politically powerful enough constituency to withstand the assault. The programs were drastically reduced in both their substance and in their level of financial support. These efforts even included an attempt to abolish the U.S. Department of Education. In their place, fiscal policy measures in the form of dramatic across the board tax cuts for consumers and business became the preferred approach. It has been this path that has been followed in the 1980s. Even as late as 1987, the Administration's budget proposals called for a total withdrawal of federal support for vocational education. Fiscal policy, however, does not do anything to make unemployed people employable. It assumes that the problem is essentially one of lack of jobs. Given the stimulative spending effects of tax cuts, it is assumed that the private sector will take the responsibility for training and retraining the work force to meet the added demand provided by tax cuts for their output. Indeed private industry does spend in the neighborhood of $40 billion a year on training but virtually all of this is earmarked from upgrading people who have already been hired. Seldom is private support given to the equally important need of preparing people to qualify for jobs or for retraining or relocating those who have lost their jobs for employment elsewhere.

Unfortunately, the labor market problems of the 1980s are not those of the 1930s. Unemployment did not go down in 1981 when the tax cuts were adopted or in 1982 when they were enacted. To the contrary, it went up to the highest levels sustained since the 1930s. Even when they began to

decline in 1983, they have remained in a range higher than the levels sustained throughout most of the post-World War II era (see Table 1). Moreover, the numbers of discouraged workers (1.2 million for the first quarter of 1987) and involuntarily part-time employed people (5.5 million for March, 1987) have also followed this worrisome pattern.

The long term indicator that something is seriously awry is the continuing upward drift of the unemployment rate -- especially during periods of general prosperity. (See the secular trend line in Table 1 for the period 1950 to 1986). It appears that the economy is encountering stiff resistance to its adjustment capabilities. Indeed, careful study suggests that the labor market is being transformed.

The Nature of the Transformation

The shifting structural changes in the labor market of the United States are to be found in the continuing decline of employment in the goods producing sector (manufacturing in particular) and the growth of employment in the service sector (see Table 2); the occupational shift from production and non-supervisory jobs toward non-production and supervisory employment in every industrial sector (see Table 3); and the geographic shift in employment and population from the Northeast and Midwest toward the selected urban areas of the South and West (see Tables 4 and 5 respectively). These emerging patterns are but the symptoms of the transformation of employment opportunities. The data in these tables show that the goods producing sector now accounts for only 25 percent of the employed persons in non-agricultural jobs in the United States; the proportion of non production or supervisory jobs in every industrial sector is increasing substantially; employment growth is occurring disproportionately in the West and the South; and the population

Table 2: Nonagricultural Industrial Employment, Selected Years
(in thousands of persons)

Year	1950	1960	1970	1980	1986
Industry					
Goods Producing					
Mining	901	712	623	1,027	792
Construction	2,364	2,926	3,588	4,346	4,961
Manufacturing	15,241	16,796	19,367	20,285	19,961
Service Producing					
Transportation and Public Utilities	4,034	4,004	4,515	5,146	5,285
Wholesale Trade	2,635	3,143	3,993	5,275	5,853
Retail Trade	6,751	8,248	11,047	15,035	17,976
Finance, Ins., Real Estate	1,888	2,629	3,645	5,160	6,304
Personal Services	5,357	7,378	11,548	17,890	23,073
Government	6,026	8,353	12,554	16,241	16,738

Sources: Economic Report of the President, 1986.

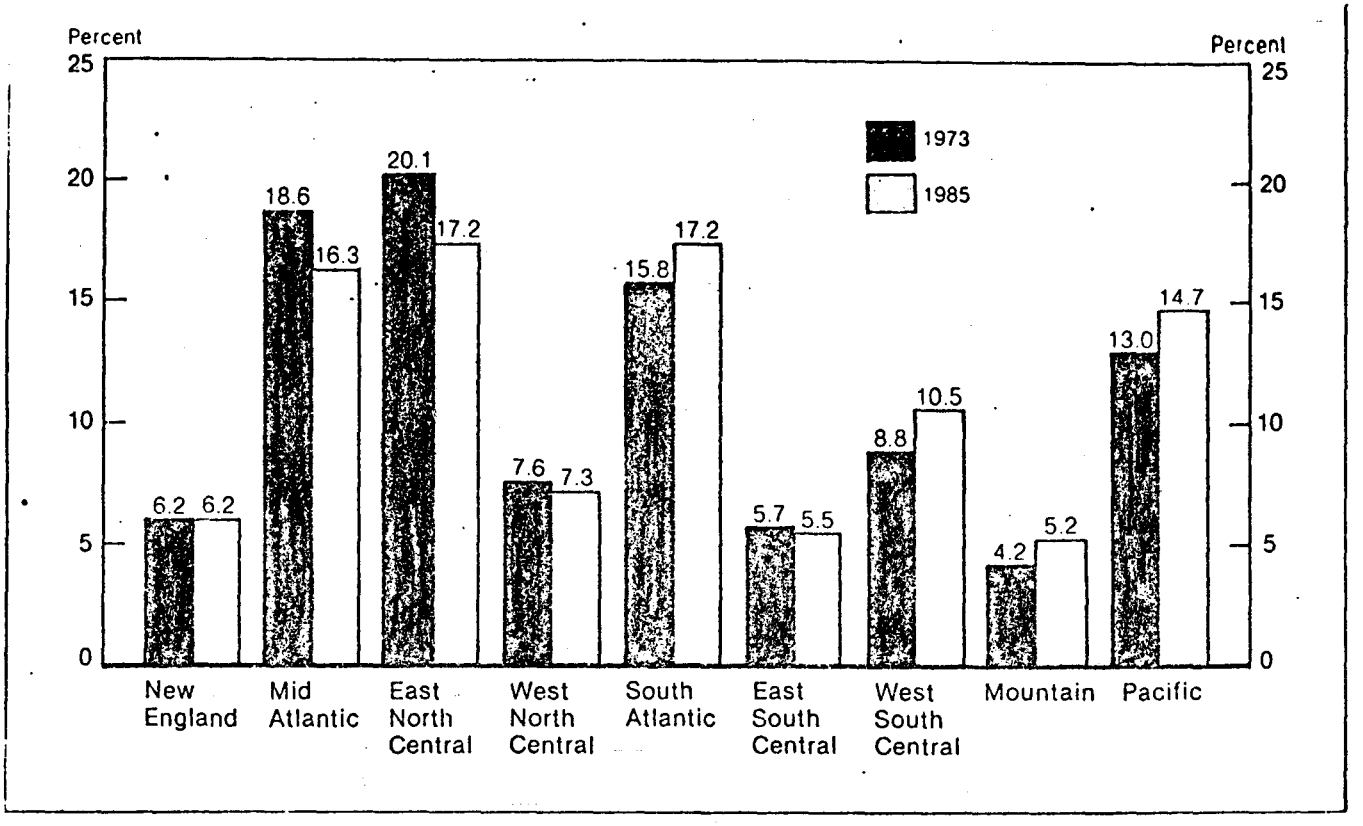
Table 3: Percentage of Employees in Private Sector Who Are Employed in Non-Production or Supervisory Occupations (percentage terms)

Year	1950	1960	1970	1980	1986
Industry					
Goods Producing					
Mining	9.4	19.9	24.1	25.8	29.0
Construction	11.1	14.7	16.7	21.3	17.0
Manufacturing	17.8	25.1	27.5	29.9	32.0
Servicing Producing					
Transportation and Public Utilities	N.A.	N.A.	13.3	16.6	17.0
Wholesale Trade	9.6	13.9	16.6	18.2	19.8
Retail Trade	5.6	7.5	9.1	10.2	11.1
Finance, Ins., Real Estate	17.1	18.4	21.0	24.3	26.2
Personal Services	N.A.	N.A.	9.2	11.0	12.2

N.A. = Not Available

Source: Employment and Training Report of the President, 1982 and Employment and Earnings, (January, 1987).

Table 4: Distribution of Non-Agricultural Employment
By Census Divisions, 1973 and 1985



Census regions and divisions

Northeast
- New England
  - Maine
  - New Hampshire
  - Vermont
  - Massachusetts
  - Rhode Island
  - Connecticut
- Middle Atlantic
  - New York
  - New Jersey
  - Pennsylvania

Midwest
- East North Central
  - Ohio
  - Indiana
  - Illinois
  - Michigan
  - Wisconsin
- West North Central
  - Iowa
  - Missouri
  - Nebraska
  - Kansas
  - Minnesota
  - North Dakota
  - South Dakota

South
- South Atlantic
  - Delaware
  - Maryland
  - District of Columbia
  - Virginia
  - West Virginia
  - North Carolina
  - South Carolina
  - Georgia
  - Florida
- East South Central
  - Kentucky
  - Tennessee
  - Alabama
  - Mississippi
- West South Central
  - Arkansas
  - Louisiana
  - Oklahoma
  - Texas

West
- Mountain
  - Montana
  - Wyoming
  - Colorado
  - Utah
  - Idaho
  - Arizona
  - Nevada
  - New Mexico
- Pacific
  - California
  - Hawaii
  - Washington
  - Oregon
  - Alaska

Source: U.S. Department of Labor

Table 5: Population Growth by State, 1980 to 1985

A STATE-BY-STATE BREAKDOWN

	1985 population	% change 1980-85		1985 population	% change 1980-85
NEW ENGLAND	**12,549,332**	**1.6%**	**WEST SOUTH CENTRAL**	**26,711,505**	**12.5**
Connecticut	3,160,280	1.7	Arkansas	2,345,431	2.6
Maine	1,156,539	2.8	Louisiana	4,553,903	8.3
Massachusetts	5,764,125	0.5	Oklahoma	3,427,371	13.3
New Hampshire	980,841	6.5	Texas	16,384,800	15.2
Rhode Island	958,151	1.2	**SOUTH ATLANTIC**	**39,630,108**	**7.2**
Vermont	529,396	3.5	Delaware	605,711	2.4
MIDDLE ATLANTIC	**37,081,754**	**0.8**	District of Columbia	621,251	-2.7
New Jersey	7,509,625	2.0	Florida	11,071,358	13.6
New York	17,676,828	0.7	Georgia	5,878,225	7.6
Pennsylvania	11,895,301	1.2	Maryland	4,342,562	3.0
EAST NORTH CENTRAL	**41,539,910**	**-0.3**	North Carolina	6,178,329	5.0
Illinois	11,502,433	0.7	South Carolina	3,321,520	6.4
Indiana	5,489,287	None	Virginia	5,642,183	5.5
Michigan	8,992,766	-2.9	West Virginia	1,968,969	1.0
Ohio	10,763,309	-0.3	**MOUNTAIN**	**12,770,740**	**12.3**
Wisconsin	4,792,115	1.8	Arizona	3,086,827	13.6
WEST NORTH CENTRAL	**17,555,598**	**2.2**	Colorado	3,253,425	12.6
Iowa	2,894,273	-0.7	Idaho	1,004,071	6.4
Kansas	2,453,581	3.8	Montana	826,933	5.1
Minnesota	4,199,749	4.0	Nevada	933,451	16.6
Missouri	5,004,162	1.8	New Mexico	1,446,347	11.0
Nebraska	1,606,779	2.4	Utah	1,684,942	15.3
North Dakota	692,027	6.0	Wyoming	534,744	13.9
South Dakota	705,027	2.1	**PACIFIC**	**34,428,014**	**8.3**
EAST SOUTH CENTRAL	**15,098,605**	**2.9**	Alaska	514,819	28.1
Alabama	4,004,435	2.8	California	25,816,590	9.1
Kentucky	3,747,769	2.4	Hawaii	1,050,270	8.9
Mississippi	2,623,069	4.1	Oregon	2,680,087	1.8
Tennessee	4,723,332	2.9	Washington	4,366,248	5.7

Sources: Dun & Bradstreet, Census Bureau

Source: New York Times, April 28, 1985, p. 30 [based on U.S. Census Data]

is growing in a very uneven pattern (e.g., Texas, California and Florida account for half the total population growth between 1980 and 1985 while farm belt states like Iowa and former manufacturing oriented states like Michigan and Ohio have experienced absolute declines of population over this time span). In most regions, the greatest population growth is taking place in areas around big-cities -- i.e., in the suburbs and in small metropolitan areas. The urban city centers appear to be in a state of chronic stagnation or decay.

Careful analysis of the adjustment problems of the U.S. labor force are seriously hampered by the gross limitations of data. There is no official index of job vacancies. Only an index of help-wanted advertisements for 51 labor markets that is calculated by The Conference Board of New York exists. It registered a reading of 139 in 1985 (1967=100) -- the highest such reading since 1978. This at least suggests that filling vacant jobs is a problem. Unemployment rates by occupations (a measure limited to assigning unemployment on the basis of "last attachment", not longest experience) does indicate that the former workers in the lowest skilled occupations had double digit unemployment rates in 1985 (e.g., construction laborers, 21.3 percent; handlers and cleaners, 14.3 percent; and farmworkers, 8.3 percent). The comparable rates for the occupations associated with higher skill and education requirements were very low (e.g., managers and professionals, 2.4 percent; technicians 3.3 percent; mechanics 4.8 percent). These figures, of course, do not include former workers in these industries who have become discouraged from continuing job search nor do they include new labor force entrants or those re-entering after lengthy withdrawals from the labor force. Nonetheless, the extreme differences in these rates does

suggest that there are serious shortages of workers for the skilled occupations and a considerable surplus of workers for the low skilled occupations.

An examination of data on educational attainment of the labor force shows a considerable inverse relationship between unemployment and years of schooling. In 1985, 35.6 percent of the unemployed labor force had completed less than high school and, if those who completed only high school are added, the percentage soars to 79.2 percent of the unemployed. College graduates, in turn accounted for 4.8 percent of the unemployed and those with more than four years of college accounted for only 2.1 percent of the unemployed. Although these figures also have limitations, they do indicate the existence of a substantial number of unemployed workers with limited educational attainment. The educational deficiency problem is much worse when allowances are made for actual educational achievement since it has been recently reported that 700,000 high school graduates in 1986, "could not read the writing on their diplomas." Conversely, those with more years of education are clearly the ones who are most sought. Some of these figures are no doubt reflective of a credentialing effect, rather than necessarily indicative of actual job requirements, but the magnitudes are so great that it is unlikely that they do not reflect the obvious.

Collectively, the economy seems to be generating two types of opposite job creation patterns -- both of which are causing adjustment problems. One trend is a generation of good paying and desireable jobs that require higher skills, more education and some mobility to fill. The other is the creation of more jobs in the low skill end of the spectrum. But, in stark contrast to past experience, even the less desireable jobs require more in

the way of communication, verbal and literacy skills than many would-be workers in this new era seem to possess. Hence, there are imbalances in the labor market. The types of jobs that are increasing most rapidly at both ends of the labor market are those for which a growing number of U.S. workers are either unavailable or unqualified to fill.

The Causal Factors

The transformation of the labor market is the product of a series of unprecedented economic developments that are occurring simultaneously. These happenings include the accelerating influences that science and technology are assuming as determinants of economic change. As Robert Heilbroner has so poignantly written, "the extraordinary predominance of technology is the decisive characteristic of modern times." But they also involve a number of major changes in the domestic and international economic environment of the United States that provide the background against which the new character of labor demand is being shaped. These background forces are influencing -- perhaps even retarding -- the ability of the supply of labor to respond to the new realities of changing labor demand. The influence of these factors requires recognition if the design of public policy is to be appropriate to the challenge of meeting the quantum changes in employment patterns that this transformation in causing. New forces for change will require fresh perspectives that are free from the intellectual and political barnacles of how things use to be done and which societal institutions have historically had the responsibilities for preparing the work force for employment. New roles for government, business, labor, and education will be required. There are few lessons in the past that will help the adjustment of the economy to its new circumstances.

The Changing Economic Background

There are at least four key differences in the economic background of the U.S. economy in the 1980s that represent major departures from past experiences. Each of these developments is a complete subject itself for a conference so it will only be possible to briefly state why each is of vital consequence to an understanding of the nations of the transformation.

The Mature Stage of Economic Development. Walt Rostow has pointed out that in mature technologically-oriented societies, people take for granted the type of societies into which they are born. Hence, there is a tendency to overlook the fact that the current stage of U.S. economic development represents an economy that is a far cry from what existed in the past. As Adali Stevenson once said, "people forget that the light of our founding fathers was the candle and the means of transportation was the horse." One of the key differences, as Rostow notes, of post-industrial societies is an expansion of personal consumption beyond the provision of basic food, shelter, and clothing requirements into a vast array of new economic wants that are provided by non-tangible service production. In its first century as a nation, the expenditure patterns of the economy of the U.S. were primarily focused toward providing non-durable goods (food and fiber); by the end of the 19th century and throughout the first half of the 20th Century, the economy shifted its expenditures toward durable production. By the mid-1950s, however, the change toward an emphasis on the production of services was pronounced and it has clearly been the case since that time. The shift in consumption patterns (i.e., consumer tastes) has meant a shift in employment patterns. There are very few subjects about which one can place trust in the ability of economists to predict, but there is one sure bet.

Namely, the sectors where money is spent are those where employment will increase (and visa versa). Hence, there has been a marked shift in employment patterns away from durable and non-durable sectors toward the service sector. In 1986, 75 percent of the U.S. employed non-agricultural labor force was in the service sector and the U.S. Department of Labor predicts that this pattern will continue to accelerate. Indeed, it predicts that 90 percent of the jobs to be created in the U.S. between now and 1995 will be in the service sector.

The shift to employment in the service sector is a distinctive feature of the transformation of U.S. economy. There is, however, a pervasive myth that needs to be debunked: it is that service sector jobs are dead-end and low paying. Some are, of course, but so are some in the goods producing sector (e.g., those in agriculture and textile manufacturing). The reality is that 80 percent of the professional and managerial jobs in the entire economy are to be found in the service sector. While it is true that there are growing service employment opportunities in such low paying industries as fast-foods and nursing home care, there are also substantial employment increases being realized in high-paying jobs in computer services, legal services and advertising as well as in average-paying jobs in insurance, wholesale trade, and auto repairing.

In its projections of occupational growth to the year 1995, however, the Department of Labor forecasts a considerable departure from past trends. The managerial, professional, and technicians occupations -- all of which require post-secondary levels of education -- are expected to growth much faster than the projected average growth rate for total employment. Indeed, of the 20 occupations projected to be the fastest growing, half are related

to the growing computer and health fields. In general, the shift to a service-based economy will lead to an upgrading of the skill and educational requirements of the labor force from what hitherto ever existed before. Of particular consequence is the fact that the upgrading in the job requirements will affect all types of jobs -- high, intermediate, and low skilled.

It is in this context that the recent revelations about the prevalence of adult illiteracy are especially ominous. These studies have reported in that as many as 23 million adults are totally or functionally illiterate and that another 23 million adults are only marginally literate at best. Other studies released have placed these numbers even higher. The situation is believed to be so severe that the National Commission on Excellence in Education, appointed by President Ronald Reagan, concluded its 1983 comprehensive report by saying that the future welfare of the nation is "in peril" and chose to entitle its report as A Nation at Risk.

The economic consequences of mounting adult illiteracy are much more severe in the emerging service-oriented society than was the case when the goods producing sector dominated the employment generation process. The bulk of employment opportunities provided by the goods producing industries in the first half of the Twentieth Century did not require much in the way of educational and verbal skills from its job seekers. Thus, the literacy gap has emerged at a time when changes in the labor market are placing a premium on communication abilities. Service industries and technologically-oriented businesses in the goods producing sector require workers to handle comprehensive tasks which are often based more on reading, writing, listening and speaking than on manipulative skills. Thus, there is an inherent threat

to the evolving viability of the economy due to widespread adult illiteracy. It entails more than a loss in potential worker productivity due to the limited availability of employment opportunities even in a service-oriented economy. Adult illiteracy also contributes to the incidence of work place accidents; the provision of poor quality products and services to customers; and the loss of valuable management and supervisory time.

As if the number of functionally illiterate adults were not bad enough, it is estimated that their ranks in the mid-1980s are actually swelling by about 2.3 million persons a year. One cause of growing adult illiteracy has been attributed to the declining standards of the nation's educational institutions from elementary through college levels. Another has been the epidemic of teenage pregnancies over the past decade which markedly contributes to the school "drop-out" problem. Whatever the reasons, it is estimated that about one million teenagers leave schools each year without sufficient literacy skills. But the largest source of growth in the ranks of the functionally illiterate is from the new wave immigrants who are overwhelmingly coming from less economically developed nations. Many cannot speak English and are often illiterate in their own native language. The new immigration law (the Simpson-Rodino Act) that is being implemented this year guarantees with its liberal amnesty provisions that this number of adult illiterates will swell even more.

Thus, there is an urgent need to undertake a national program geared to the attainment of educational competency. It is estimated in 1985 that about 75 percent of the unemployed persons in the United States have inadequate reading and writing skills. Until these basic deficiencies are addressed, it is very difficult -- if not impossible -- to provide the related

skill acquisition needs of this significant segment of the adult population in the newly developing U.S. labor market.

It was the recognition that United States does have serious literacy and educational deficiency problems associated with its labor force that led the Prime Minister of Japan, Yasuhiro Nakasone to make his infamous remarks in 1986 that Japan is "an intelligent society" and that the U.S. is not. While it was wrong of him to explain the difference purely in racial terms (since most educational experts explain the performance differences between the races more on environmental disadvantages that have confronted certain minority groups than on inheritable genetic traits), statistically speaking he was correct. There are marked differences in the performances of different racial groups on educational tests; in the number of school drop-outs; and in the incidence of adult illiteracy.

Indeed, another study of U.S. industrial competitiveness in 1983 stressed the fact that knowledge accumulation is the key to the future development of the U.S. economy. It too raised the spector that, unless major strides are taken to improve educational performance in the United States, that "we may consign our nation to the role of [becoming] the first great post-industrial agrarian society."

The Agricultural Revolution. Although much of the attention on technological change has focused on the factories and the offices of the nation, a major revolution in applied technology and science has been occurring in the agricultural sector for several decades. At the beginning of the 19th century (1820 is the first year that such data is available), 72 percent of the labor force were employed in agriculture; by 1920, that figure was 33 percent and by the mid-1980s it had fallen to less than 3

percent. Not only is the United States essentially self-sufficient in agriculture, but agriculture has been a mainstay of U.S. export business -- ranging in the neighborhood of $40 billion a year in the 1980s. So productive has the agricultural sector of the economy become that it is in real danger of wiping itself out. In the agricultural sector, free enterprise principles have long ago been abandoned. Indeed, in 1987, 72.4 million acres of land will be put under government production controls whereby the farming industry will be paid not to use this land. (This is an amount of land equal to the size of the entire state of Arizona). Even this program, plus the on-going agricultural price support programs, is not expected to have much impact on agricultural prices. Other nations have replicated the highly capital intensive agricultural techniques of the United States. Even countries like India and Saudi Arabia are now food exporters. As a result there in a world-wide glut of food staples.

Food production in the U.S. has become a form of agribusiness. It has become a hi-tech industry. The number of farms continues to fall dramatically (from 5.6 million farms in 1950 to about 2.2 million farms in 1986) while the size of farms continues to increase (up from 213 acres in 1950 to 455 acres per farm in 1986).

The factors contributing to the productivity surge in agriculture have come primarily from three sources. The first has been accumulative effects of supportive government policies. Of particular continuing importance has been the land grant university system that has had as one of its principle missions the support and dissemination of research pertaining to virtually every aspect of agricultural production. This system also accounts for almost 100 percent of the college degrees granted in agriculturally related fields

of study and veterinary medicine. In addition to training and research, government policy has supported virtually every other aspect of the agricultural industry -- from providing land to settlers in the 19th century to the provision of loans, subsidized electrification, irrigation projects, and land reclamation in the 20th Century. The second source of agricultural productivity gains has been derived from the development of advanced production methodologies (i.e., the development of chemical fertilizers, pesticides, hybrid plants, breeding programs, as well as new ventures into genetic engineering). The third factor has been the advances in the mechanization of agricultural production, (e.g., milking machines, picking machines, incubators, tree shakers, and storage facilities).

With respect to employment, the number of agricultural workers has fallen consistently since the end of World War II (from about 8 million in 1948 to fewer than 3 million in 1986). The decline has been the greatest for those in the unskilled farmworker occupations. With the onset of agribusiness, the employment patterns in agriculture -- except for the labor intensive farming methods still used in the nation's perishable crops industry -- have mirrored the trends that are operative in the remainder of the economy. The surviving agricultural labor force is increasingly composed of workers with skills and education.

As a consequence, this critical sector of the economy -- once the haven for the employment of mass numbers of unskilled and poorly educated workers -- has not produced a single net new job in over 40 years. In fact, it has been a negative source of employment over this entire period. The displaced agricultural workers -- who far out number those displaced to date from manufacturing but for whom no publicly supported displaced worker policy

was ever enacted -- have been forced to seek employment on a catch-as-catch-can basis in the non-agricultural sector. Relatedly, the decline of agricultural employment has had a ripple effect that has contributed to the decline of the non-agricultural sectors of many rural economies.

Most rural communities have either not been inclined or been financially unable to provide quality educational and training opportunities. Hence, many of the displaced farm and rural workers have been ill-prepared for other than those jobs on the lowest rungs of the non-farm economy.

Rapid Growth of the Labor Force. Unlike the labor force experience of the other major industrial with whom the United States is a major competitor, the labor force of the United States has since the mid-1970s been expanding by about 2 million job seekers a year.

As shown in Table 6, the U.S. labor force increased from 93.7 million to 115.4 million workers from 1975 to 1985 -- or by about 2 million net additional workers a year. In terms of those actually able to find employment, their numbers increased from 85.8 million to 107.1 million over this same time span. But what is particularly noteworthy about this astounding growth is that it has been a singular feature of the United States economy. These trends are not to be found in comparisons with any of the other major industrial powers of the free world (see Table 6). Of the nine other countries, only Canada and Japan have shown any appreciable absolute increases in the size of their labor force over the 11-year period. Of far greater significance is the fact that, with the exception of Japan, the other nations have found it very difficult to convert labor force growth into increasing employment opportunities. In the cases Germany and Great Britain, the absolute sizes of their respective employed labor forces were actually

Table 6: Civilian labor force, employment, and unemployment approximating U.S. concepts, 10 countries, 1975-85

[Numbers in thousands]

Year	United States	Canada	Australia	Japan	France	Germany	Great Britain	Italy	Nether-lands	Sweden
Labor force:										
1975	93,775	9,974	6,169	52,530	21,600	26,130	25,130	20,080	4,820	4,123
1976	96,158	10,203	6,244	53,100	21,840	25,900	25,290	20,300	4,890	4,149
1977	99,009	10,500	6,358	53,820	22,100	25,870	25,430	20,530	4,950	4,168
1978	102,251	10,895	6,443	54,610	22,290	26,000	25,620	20,630	5,010	4,203
1979	104,962	11,231	6,519	55,210	22,470	26,240	25,710	20,910	5,100	4,262
1980	106,940	11,573	6,693	55,740	22,570	26,500	25,870	21,210	5,290	4,312
1981	108,670	11,904	6,810	56,320	22,640	26,610	25,870	21,410	5,500	4,326
1982	110,204	11,958	6,910	56,980	22,900	26,640	25,880	21,450	5,560	4,350
1983	111,550	12,183	6,997	58,110	22,800	26,640	26,010	21,610	5,720	4,369
1984	113,544	12,399	7,133	58,480	22,290	26,880	26,530	21,680	5,740	4,365
1985	115,461	12,639	7,272	58,820	23,330	27,090	26,960	21,800	5,690	4,418
Employment:										
1975	85,846	9,284	5,866	51,530	20,700	25,230	24,000	19,480	4,570	4,056
1976	88,752	9,477	5,946	52,020	20,850	25,010	23,810	19,600	4,630	4,083
1977	92,017	9,651	6,000	52,720	21,030	24,970	23,840	19,800	4,700	4,093
1978	96,048	9,987	6,038	53,370	21,110	25,130	24,040	19,870	4,750	4,109
1979	98,824	10,395	6,111	54,040	21,110	25,460	24,360	20,100	4,830	4,174
1980	99,303	10,708	6,284	54,600	21,120	25,730	24,100	20,380	4,960	4,226
1981	100,397	11,006	6,416	55,060	20,950	25,520	23,190	20,480	4,990	4,218
1982	99,526	10,644	6,415	55,620	20,980	25,060	22,820	20,430	4,930	4,213
1983	100,834	10,734	6,300	56,550	20,840	24,650	22,680	20,470	4,890	4,218
1984	105,005	11,000	6,490	56,870	20,980	24,790	23,100	20,390	4,880	4,249
1985	107,150	11,311	6,670	57,260	20,910	24,960	23,420	20,490	4,890	4,293
Unemployment:										
1975	7,929	690	302	1,000	900	890	1,130	610	250	67
1976	7,406	726	298	1,080	990	890	1,480	700	260	66
1977	6,991	849	358	1,100	1,070	900	1,590	740	250	75
1978	6,202	908	405	1,240	1,180	870	1,580	760	260	94
1979	6,137	836	408	1,170	1,360	780	1,350	810	270	88
1980	7,637	865	409	1,140	1,450	770	1,770	830	330	86
1981	8,273	898	394	1,260	1,690	1,090	2,680	920	510	108
1982	10,678	1,314	495	1,360	1,920	1,580	3,060	1,020	630	137
1983	10,717	1,448	697	1,560	1,960	1,990	3,330	1,140	830	151
1984	8,539	1,399	642	1,610	2,310	2,090	3,430	1,280	860	136
1985	8,312	1,328	602	1,560	2,420	2,130	3,540	1,310	800	125
Unemployment rate:										
1975	8.5	6.9	4.9	1.9	4.2	3.4	4.5	3.0	5.2	1.6
1976	7.7	7.1	4.8	2.0	4.5	3.4	5.9	3.4	5.3	1.6
1977	7.1	8.1	5.6	2.0	4.8	3.5	6.3	3.6	5.0	1.8
1978	6.1	8.3	6.3	2.3	5.3	3.4	6.2	3.7	5.2	2.2
1979	5.8	7.4	6.3	2.1	6.1	3.0	5.3	3.9	5.3	2.1
1980	7.1	7.5	6.1	2.0	6.4	2.9	6.8	3.9	6.2	2.0
1981	7.6	7.5	5.8	2.2	7.5	4.1	10.4	4.3	9.3	2.5
1982	9.7	11.0	7.2	2.4	8.4	5.9	11.8	4.8	11.3	3.1
1983	9.6	11.9	10.0	2.7	8.6	7.5	12.8	5.3	14.5	3.5
1984	7.5	11.3	9.0	2.8	9.9	7.8	12.9	5.9	15.0	3.1
1985	7.2	10.5	8.3	2.6	10.4	7.9	13.1	6.0	14.1	2.8

Note: Data for other nations have been adjusted to approximate U.S. labor force definitions. For details, see source below.

Source: Joyanna Moy, "Recent Trends in Unemployment and the Labor Force, 10 Countries", Monthly Labor Review (August, 1985), pp. 13-14. The data for 1985 was provided from Table 46, page 89 of the December 1986 volume of the Monthly Labor Review.

smaller in 1985 than they were in 1975, i.e., they have sustained negative growth in employment over the 10 year period with the result being soaring unemployment. For France, Italy, the Netherlands and Sweden, their employment changes were barely positive over this lengthy time period and the ranks of their unemployed also swelled. Canada and Australia have been able to provide more jobs for their growing labor forces but not at sufficient rates to keep their unemployment rates from significantly increasing. Even Japan has sustained increases in unemployment but, because its unemployment rate remains below what would be considered to be full employment by other countries, there is no immediate cause for alarm about its economy's ability to generate jobs.

While it is true that the U.S. economy has generated an enormous number of jobs over this period, it has not been able to create enough jobs to reduce its unemployment rate to levels that would have been deemed acceptable in previous post-World War II periods.

The explanations for the rapid growth of the U.S. labor force are complex but essentially they boil down to three developments. The first pertains to the unprecedented increase in the female labor force participation -- especially by married women. The labor force participation rate of all women has increased from 33.9 percent in 1950 to 54.4 percent in 1986; but it is the growing participation rate of married women in general and married women with children in particular that is the key new phenomenon. Single adult women were usually in the labor market while married women and women with children were not. But the participation rate of married women has risen from 23.8 percent to 54.7 percent from 1950 to 1986 and the labor force rate of women (married or not) with children under 18 years of age has grown from

45.9 percent in 1975 to 54.7 in 1986 (for women with children under 3 years of age it has risen from 34.1 percent to 50.8 percent over this same span). Representing a social revolution in its own right, more women in both absolute and relative terms have been entering and staying longer in the labor force than at any previous time in the nation's history. Two out of every three new labor market entrants over the past decade have been women and the same percentage is forecast through 1995. No one can predict what the normal labor force participation rate for women will be under these circumstances of rapid social change. While there have been changes in female labor force participation rates in other nations, it is common knowledge that no one would want to be a female job seeker in two of our major competitors: Germany and Japan.

Secondly, the rapid growth of the labor force is in part caused by the fact that the age distribution of the U.S. population has a big bulge in its distribution. This bulge is presently in the age range of between 25 and 44 years of age. It is a direct result of the labor force entry of the post-World War II "baby boomers" (those born between 1946 and 1964). Of the nation's population in 1986 of 241,596,000 people, a total of 76,127,000 were in this age cohort (or 31.5 percent of the total population). More specifically, the age 25 to 34 cohort totals 42,984,000 persons. It grew by 15.4 between 1980 and 1986. The age 35 to 44 cohort contains 33,143,000 people and it grew by a whopping 29.0 percent between 1980 and 1986. Regardless of gender or race, these cohorts of the population have the highest labor force participation rates of the entire labor force (i.e., all persons age 16 and over). If ever a person is going to seek work, it is most probable they will do so between the ages of 25 and 44 years. Fortune magazine has

dubbed this population distribution as being "demography's glad tidings" for the economy. The age distribution of the population currently affords the U.S. economy the potential for a significant productivity bonus. Thus, the bulge is a "good" problem to be confronted with -- especially when its implications are compared to the time when this bulge was in its youth (pre-1980) or what lies ahead when it enters its retirement phase (post-2001).

The combined effects of the growth in female participation and the population bulge in the prime labor force participation age cohort have contributed to a singularly important characteristic of the contemporary U.S. labor market. Namely, the overall labor force participation of the noninstitutionalized population over age 16 hit an all time high of 64.6 percent in 1986. The comparable rate for 1950 was 59.7 percent; for 1960 it was 60.0 percent; for 1970 it was 61.0 percent; and for 1980 it was 64.1 percent. Never in the country's history have so many persons -- in both percentage and absolute terms -- sought to work. Moreover, it is likely that both are going to continue to increase even more in the decade ahead. It means for policymakers that this country must run just to keep even in the need to create job opportunities.

There is, however, one very frightening counter-trend that is buried in the euphoria over the rising labor force participation rate of the overall U.S. population. It has been the persistently lower labor force participation rate of black males relative to white males. Historically through the 1940s, the black male labor force participation rate consistently exceeded that of white males. But since the 1950s, the white male rate has passed the black rate and the gap between the two has widened considerably. By 1985, the white male rate exceeded the black male rate by 6.2 percentage points

(77.0 percent to 70.8 percent). The gap exists for every age cohort (see Table 7). All things being equal, there is no reason why white males should have significantly higher participation rates for every age cohort than do black males or should have a considerably higher overall rate. But, of course, all things have not been equal. Blacks are clustered disproportionately in the inner cities of about 12 major cities plus being scattered over large areas of the rural South. Jobs in general have frequently become scarce in these areas. But jobs are especially hard to find if one has few skills and little education and if there are limited opportunities available to acquire or to develop latent abilities. Qualifying for the jobs that are available is made more difficult if there are lingering practices and practitioners of racial discrimination. Under these conditions, an inordinate number of black males apparently have despaired from seeking work in the regular economy. There is, of course, an ominous societal implication to these low black male participation rates. Namely, if adult black males are not at work, or in school, or in the military, what are they doing to survive? It certainly seems that an urban sub-class of minority adult males who function outside the regular labor market has formed and institutionalized its existence through irregular activities such as crime, alcoholism, and drug addiction.

Yet there remains even one more factor that is causing the U.S. labor force to grow at such a rapid pace. It is immigration. Since the mid-1960s, immigration has slowly re-emerged as a key characteristic of the U.S. population and labor force. In vivid contrast to other advanced industrial nations with whom the U.S. competes, the United States stands virtually alone in its willingness to admit each year hundreds of thousands of legal

Table 7: Male Labor Force Participation Rates by Race and Age, 1985

Age Cohort	Race	
	White Men	Black Men
16 years and over	77.0	70.8
16 to 19 years	59.7	44.6
16 to 17 years	48.5	29.8
18 to 19 years	71.2	60.0
20 to 24 years	86.4	79.0
25 to 54 years	94.8	87.8
25 to 34 years	95.7	88.8
25 to 29 years	94.9	88.5
30 to 34 years	96.5	89.2
35 to 44 years	95.7	89.8
35 to 39 years	95.9	91.3
40 to 44 years	95.5	88.0
45 to 54 years	92.0	83.0
45 to 49 years	94.2	86.3
50 to 54 years	89.7	79.4
55 to 64 years	68.8	58.9
55 to 59 years	80.8	68.6
60 to 64 years	56.4	47.7
65 years and over	15.9	13.9
65 to 69 years	24.6	21.0
70 years and over	10.7	9.4

Source: Employment and Earnings, January 1986, pp. 155 and 156.

immigrants and refugees for permanent settlement as well as to tolerate mass abuse of its laws by an even larger annual number of illegal immigrants. Indeed, a 1986 study of contemporary American society commissioned by three large U.S. corporations (i.e., American Express, Sun Oil Company, and Bristol Myers) and conducted by an international team of scholars (i.e., Oxford Analyetica), boldly proclaimed that "America's biggest import is people." Its detailed analysis, which generally documents "the decline in American exceptionalism," found the one feature to distinguish the current U.S. economy from those of other industrialized nations is that "immigration continues to flow at a rate unknown elsewhere in the world." This observation, as significant as it is, was made before the passage of the Simpson-Rodino Act of 1986 whose liberal amnesty and family reunification provisions will guarantee that immigration levels for at least the next decade will soar to still higher heights than have ever been imagined before. Japan accepts no immigrants and very few refugees. Most of Western Europe pursued "guestworker" policies in lieu of seeking permanent immigrants to meet labor shortage in the immediate post-World War II era. Since 1973-4, these questworker policies have largely been abandoned and little encouragement is given for new immigrants. Most of these nations have taken even stronger steps than the United States to discourage illegal immigration. Thus, these competitor nations have not had to accommodate massive numbers of immigrants during the past decade when they too have witnessed the transformation of their economies. It is also certain that they will not be confronted with the massive immigration flows that the United States faces in the coming decade.

The 1980 census revealed that the size of the nation's foreign-born

population had not only reversed its 50-year downward decline but it had also sustained a quantum increase. As a group, the reported foreign-born population rose from 9.6 million in 1970 to 13.9 million persons in 1980 (an increase of 45 percent) after having declined during each previous decade since 1920. No other grouping of the personal characteristics of the population increased by a larger percentage between 1970 and 1980 than did the foreign born. The 1980 Census also disclosed that one of every 10 people in the country spoke a language other than English at home. As it is certain that there was a substantial statistical undercount of the illegal immigrant population by the 1980 census, even these official findings were surely understated. Given the momentus immigration developments since 1980, it is certain that the foreign born population to be recorded by the 1990 census will show another quantum leap -- maybe even as high as an 80 percent increase over the current decade. For this reason, the demographer Leon Bouvier has observed that "immigration now appears to be almost as important as fertility insofar as U.S. population growth is concerned." Since population changes are transmitted to the nation's economy through labor force changes, Bouvier warned that "there is a compelling argument for close coordination between the formulation of employment and immigration policy." So far, his pleas have gone unheeded.

As if the shear numbers of immigrants and refugees entering the United States were not important enough, the composition of this flow is of even greater consequence. The overwhelming majority of the legal immigrants, illegal immigrants, refugees of the past decade have come from less economically developed nations. This trend will certainly continue well into the 1990s and their numbers will swell to even higher heights as a result

of the various amnesty provisions of the Simpson-Rodino Act. The four amnesty programs provided for in this Act will not only allow millions of former illegal immigrants to legalize their status, but it will eventually also allow their spouses, children, and parents to be admitted without numerical limitation. Most of the immigrants from all of these sources are going to be unskilled, poorly educated, and lacking in their ability to speak English. Most will be from minority groups who already have inordinately high unemployment rates. Thus, at the very moment that the nation is confronted with the necessity to launch extensive programs for skill retraining, educational upgrading, and worker relocation for citizen workers caught in the structural transformation of the labor force, it must also face the imperative for massive remedial programs to provide basic skills and literacy training.

Immigration is the one aspect of labor force growth that public policy should be able to control but to date it has not done so. The design of immigration policy -- in all of its forms -- is still dominated by the pursuit of purely political objectives and it has yet to be held accountable for its sizeable economic consequences.

The Internationalization of the Economy

Despite the popular tendency to cite Adam Smith's classic text The Wealth of Nations as the gospel of free enterprise, a review study of U.S. economic history will show that the nation's economy was not built by adherence to his blueprint. In fact, the course has often been diametrically opposed to those principles. Such is especially the case with his advocacy of free trade. Only one year after the federal Constitution was adopted in 1788, the United States adopted its first tariff as a revenue source. Subsequently,

Alexander Hamilton argued in his famous Report on Manufactures for the need for additional tariffs to protect and encourage native industry. His tariff proposals were ultimately adopted following the close of the War of 1812. They continued to be in place and tended to be increased at regular intervals until the protectionist spirit reached its peak in 1930 with the adoption of the infamous Smoot-Hawley Tariff. It raised tariffs to the highest levels ever adopted. In no way can it be said that the U.S. economy was built on the Smith's pre-industrial revolution concept of free trade.

Instead of listening to the followers of Adam Smith, there was a popular school of American economic writers in the 19th Century who openly supported the tariff policies. They provided the intellectual support for the policies that were followed. They vehemently argued against what they called the "imported pessimism" of English laissez faire economics. After all, the teachings of Adam Smith, Thomas Malthus, and David Ricardo promised that, while competition would cause resources to be efficiently allocated, the result would be only subsistence levels of living for the labor force. It was this dismal theme of the eventual pauperization of the population, of course, that Karl Marx adopted as his rationale that free enterprise capitalism was doomed. The influential American writers -- who were not academics--rejected this scenario. Instead, they believed that with its abundant lands, vast natural resources, and low population, it was not necessary for the pessimistic classical views to prevail in the United States -- especially if foreign competition could be kept out.

Fortunately for the United States, only academic homage was paid to Adam Smith during the 19th Century. In actual practice, the industrialization of the U.S. economy proceeded behind the shield of high protective tariffs.

The process was greatly enhanced also by the active support of the federal government in the development of the nation's transportation system and in the construction of the necessary infrastructure for commerce to flourish. The gods of the economic pantheon of the United States are Alexander Hamilton and Henry Clay whose international and domestic economic policies were those that this nation actually followed during its industrialization phase.

It was in the 1930s, the United States began the process of backing away from its protectionism -- which, by all standards, had gone to far with the high rates enacted by the Smoot-Hawley Act. The reciprocal tariff reductions of the New Deal era, however, were carefully negotiated reductions with specific nations. You reduce yours and we will reduce ours. It was not a period of wholesale abandonment of protectionism. World War II interrupted this trend. During the war, the productive capabilities and capacities of the U.S. economy increased dramatically. Moreover, the other major industrial powers of the time were devastated by the destruction of the fighting. The United States emerged from the war as the leading industrial power in the world. In 1950, the United States accounted for 50 percent of the world's total production of goods and services. It was from this position of unrivaled strength that the United States began to abandon its protectionist tradition on a wholesale basis. The United States was the leader in the achievement of the General Agreement on Tariffs and Trade that was signed in 1947 but it was not until the Trade Expansion Act of 1962 that the actual process of general tariff reductions commenced. This led to the "Kennedy Round" in 1964 and later the "Geneva Round" in 1979, that actually produced significant tariff reductions. As a consequence, U.S. exports have increased sharply but so have imports. Manufacturing in

the U.S. has sustained the greatest impact of this new competition. By the 1980s, 70 percent of U.S. manufacturing industries have direct foreign competition. Agriculture has been the biggest beneficiary although it too is now confronted in the 1980s with mounting competition both at home and abroad.

It is not the purpose of this paper to elaborate on the merits or demerits of the new free trade atmosphere that has permeated the U.S. industrial environment. Rather, it is only of consequence to note that most other nations have adopted export driven economies that often are part and parcel of formally adopted industrial policies. Frequently, their exports involve items that receive strong government subsidies and marketing support while they seek to shield their own non-exporting industries from imported goods. Most other nations -- especially the more industrialized nations -- have assumed a more pragmatic strategy. They believe that their own comparative advantages should be created and not be forced upon them by any mystically revealed process provided by of the market place. They seek to control their destinies while the United States seems content to shroud its future in uncertainty and cliches.

In the United States, industrial policy is still opposed on ideological grounds (because it does entail economic planning). Thus, the phemomena of international competition has contributed to the entirely new economic environment. The United States is the largest single market place in the world and it has been the natural magnet for most other nations to seek to penetrate. Without a comprehensive human resource policy in place to meet the readjustment consequences of this new era of relatively freer trade and with no historical experience to provide guidance, many communities and many

workers (white collar and blue collar) have had to fend for themselves.

Thus, the growth of international trade is itself a prominent factor in the transformation of the demand forces that are presently operative in the U.S. economy. While there may be real benefits for free trade to the Americans in their role as consumers, it is doubtful that it is unequivocally good for Americans in their capacity of being workers and managers. In the world of economics, there are always costs as well as benefits associated with actions. If free trade is to continue to be a goal, it cannot be based simply on the nonexistent ideals of textbooks. It must be crafted and modified within the context of an industrial policy that provides some direction as to where the economy is going and accompanied by a parallel human resource policy that can provide the retraining, educational up-grading, and relocation assistance to workers as well as provide the general community readjustment assistance needed to ease the transitional process.

The Impact of Science and Technology

Science and technology are usually assumed to be exogenous influences in the economic analysis of labor market operations and the associated discussions of appropriate public policy options. The longer this naive perspective is retained, the more certain it is that the process of garnering support for the needed labor force adjustment processes will be delayed. To maintain the prosperity that the nation has generally enjoyed since the end of World War II, it is essential to see that technology and science are re-shaping the basic character of this economy and that of most other nations around the world. Referring specifically to the hiatus between theoretical assertions and the reality of events, the economic historian Walt Rostow lamented in 1986 that "there is not one mainstream economist who knows how

to talk about the technological revolution." Given this stark appraisal of the intellectual bankruptcy of the nation's economic profession, it is not really surprising that the American political scene seems baron of leaders capable of understanding the radical changes that are occurring in the labor market or who are prepared to set a policy agenda to meet the challenge of transition.

Suffering from no illusion of being a mainstream economist, I wish to make the case that the United States has entered the age of applied science. Machines are now capable of performing sensory, thought, and control functions and to do them automatically. As opposed to the evolutionary manner in which the United States adjusted both to mechanization in the 19th Century and to continuous process in the early 20th Century, it is doubtful in the age of applied science that the adaptation of the labor force and of the economy can be accomplished with such relative ease. Instead, the labor force is confronted with the actual existence of a major discontinuity. The central character of the evolving new order is the computer and its role in the production of the nation's goods and the provision of its services.

Aside from the unique set of domestic and international circumstances that have previously been discussed, the computerization of the economy is itself a cause of monumental changes. One key difference from the past has been the speed by which the work place is being computerized. It took over one hundred years for the steam engine to come into general usage. For much of that time, enterprises that relied upon windmills and water power were able to overlap and to successfully compete with enterprises that used steam power. Likewise, the introduction of electric power was stretched over at least 50 years. There was time for institutional adjustment.

The first computer was built in 1946; the first non-military sale of a Univac I computer was in 1951 (to the Bureau of Census); and the first commercial sale to private industry was in 1953 (to the General Electric Company). Computers have subsequently gone through four distinct generations of development -- from vacuum tubes, to transistors, to integrated circuits, to the very large scale integrated computers of the present era and is poised to enter the fifth generation of knowledge information processors capable of performing reasoning functions. Even as we talk today, developments are occurring with superconductors that are made from new ceramic materials that may make it possible to connect transistors on a chip in a supercooled computer. If successful, this step forward will be on a par with the historical technological leap that occurred when the transistor was introduced in 1948. These developments in superconductors are illustrative of the unprecedented speed by which technological break throughs are occurring. Just two months ago, the American Physical Society hastily convened a special conference of physicists that was held just across the street at the N.Y. Hilton to report on these new developments in superconductivity. The N.Y. Times described the events of the conference as follows: "No sooner was a breakthrough announced than it was obsolete and only the coming of dawn yesterday ended what participants called the most extraordinary scientific meeting in memory." One attendee was quoted as saying "its a phenomenon itself -- there's never been anything like it in the history of physics." Aside from what is on the near horizon for computer technology, I.B.M. announced its new line of powerful desktop computers on April 2, 1987. At the debut, one of its executives exclaimed: "If the auto industry advanced this fast since 1981, today we would have cars that go from zero to 60 in

three seconds, circle the globe on a tank of gas, and cost half as much as they did six years ago. Of course, they would be difficult to get into because they would be only half the size."

With sales in the computer industry of nearly $100 billion in 1987, no one knows how many computers are in operation in the United States. What is known is that the pioneering Univac I has been in the Smithsonian Museum for over 20 years. There is little if any, room for pre-computer technologies to overlap in this era. It is computerize or perish. The speed of computer development has given society little time to prepare its new labor force entrants. The typical worker entering the labor force in the mid-1980s in the United States can expect to change jobs six or seven times and occupations three times over their working lives. In this environment of accelerating technology, the demand for labor is being reshaped. On the labor supply side, there is essentially chaos. College curriculums everywhere are in turmoil over their mission; vocational education programs cannot keep their faculties or instructional equipment up to date; and primary and secondary schools seem to be at a loss to know whether they should stress teaching basic fundamentals or reasoning, or values, or articulation skills. The same sense of bafflement seems to characterize the business and labor organizations in terms of what they expect education and training institutions to do to prepare their workers and members. In physics there is a law of motion that says, "the greater the speed, the greater the impact." Although there is no formal parallel law in the social sciences, it is likely that the same principle applies. The faster the speed of social and economic change, the more severe the impact on the capacity of society's institutions to adjust.

In addition to speed of development, the computerization of the work place has also brought a breadth of employment impact that is unknown in previous periods of technological change. The steam engine, as revolutionary as it was, exerted its major impact on employment in factories and transportation. Many other advances in mechanization had effects on specific industries. But the advent of computer technology has touched virtually every industry and occupation. Mechanization and continuous process technology were primarily eliminated the physical effort associated with work. Computers, however, have introduced an ability to process information. When properly used, computers can do things faster and more accurately than human beings and they seem capable of infallibly taking into account the countless rules associated with the production process.

In this context, it makes no sense to even try to discuss examples of the breadth of computer applications. For every listing or description is quickly rendered obsolete by new accounts that are often more startling. Suffice it to say, that computer technology is finding its way into virtually every industry and most occupations, in the public and private sectors, and in the military and non-military sheres of the economy. Essentially any job in the entire occupational heirarchy that is based on "yes" or "no" decisions can be computerized. Particularly vulnerable are less skilled jobs but many middle management jobs are also being affected. Moreover, in the high echelons of business and government major decisions are being based more on the statistical analysis that computers make possible and significantly less reliance is given to human intuition. At no time in the history of technology has any previous innovation had such a broad applicability as that of the computer.

Likewise, the momentum for creating new and improving current applications of technology is increasingly dependent on a new source of invention: science. The steam engine of the original mechanization era was not the product of scientific discovery. In fact, it is often said that the development of science owes much more to the steam engine than the steam engine did to science. James Watt and the other mechanically-minded men associated with the perfection of the steam engine had no understanding of the thermodynamics that were involved in the machine they developed. The related physics and engineering all came afterward. Performance came before understanding. Likewise, the introduction of continuous process production as pioneered by Henry Ford had nothing to do with science. It was essentially a revolution in industrial organization. The automobile and the airplane, for example, developed without any real scientific theory during their formative years.

It has only been in the 20th Century -- especially since the end of World War II -- that science has assumed an influential role as a source of inventions. Indeed, the line between science (knowledge) and technology (application) has become blurred. It would, of course, be a mistake to consider science as a substitute for technology. But technology has -- through applied research -- become a virtual science itself. New inventions and discoveries are increasingly the products of the scientific laboratories of universities and private corporations or both working collaboratively. In 1986, almost $120 billion was spent on research and development -- or almost 3 percent of the nations gross national product.

In elementary economics texts, it is taught that what is produced is the result of response to the desires of the consumer. It is called "consumer

sovereignty" and it is alleged to be the ignition device that drives a free enterprise economy. But anyone vaguely aware of the history of the computer, or superconductors, or laser weaponry, or gene splicing knows that these and many other major technological accomplishments are not the product of consumer demands or of venturesome entrepreneurs. To the contrary, they are the fruits of the expenditures of billions of dollars on research and development activities devoted to meeting preconceived goals and specific objectives. They definitely are not the fruits of spontaneous market forces. Often prodded by national defense interests or logical advances in the current state of knowledge in a field, the accomplishments are the results of determined efforts of the government (especially at the federal level) and the oligopolistic private sector. Frequently, they are both involved together. Problems are identified and research is undertaken to resolve them.

During early eras of technological change, the breakthroughs that provided practical applications for the economy were typically "flashes of insights" that came from "talented tinkers." Although it is an oversimplification to give all credit for certain inventions to one person (since frequently they only provided the last critical revision of the work of many unhearlded predecessors), it is clear that most of the technological contributions of earlier periods were made by production-oriented men with little or no scientific training. In the United States experience, it is worthy to note that Eli Whitney (inventor of the cotton gin and a pioneer in the development of interchangeable parts production methods) was originally a private tutor for plantation children; John Deere (inventor of the steel plow and numerous other farm implements) was a blacksmith; Issac Singer

(inventor of the sewing machine) was a machinist; Charles Goodyear (discoverer of the process needed to vulcanize rubber) was a failed-hardware merchant; and Samuel Morse (inventor of the telegraph) was a portrait painter. Thomas Edison, a pioneer electrical inventor, represents the transitional case from the past to the present. Edison, as a child, dropped out of school after only three months. He had a strong distaste for mathematics and no formal scientific training. Nonetheless, though extensive self-study over his lifetime of the scientific literature, he was able to exploit the discoveries of others for practical and commercial applications. It was Edison who set up the first laboratories and promoted the concept of teamwork among his assembled researchers. They produced inventions that received 1,300 patents. In so doing, Edison and his associates set the pattern that is now the practice. Today, instead of relying on the work of a few wise men who were generalists, a research industry has evolved. It is composed of tens of thousands of specialized scientists who work on a scale and to a degree of organization never imagined only a few decades ago. In the 1960s, Robert Oppenhemier once said that 9 of every 10 scientists who have ever lived were alive and at work in their laboratories at that time. If anything, the percentage is likely to be even higher today. A community of scientists has been formed who, through the use of experimental methods that do not need to validate broad principles, have created a host of narrower specialties.

With the financial support of government and industry and relatively free from the opposition of political and religious authorities (that hampered scientific investigation in the past in the Western World and still does in many parts of the Eastern World in the present), there has been a veritable

explosion of knowledge. Illustrative of this growth is the fact that the Library of Congress reports in 1986 that it is adding 40,000 items a day -- or 3 items a second -- to its collection.

There are current estimates that the body of worldly knowledge is doubling every five years. Earlier in this century the famed sociologist Lester Ward could teach a class at Brown University entitled "A Survey of All Knowledge." Today, it has become virtually impossible for any college instructor to even prepare an adequate summary of existing knowledge in any single discipline.

The acceleration of knowledge has been combined with substantial economic incentives to put this information to use. The knowledge is there so why not try to apply it. Often a workable technology can lead to further scientific understanding -- especially when financial gain is possible. Consequently, science has often become an endogenous activity of technologically-driven economies like the United States. Hence, the labor market is expected to adjust to the requirements of rapidly introduction of new technologies and scientific possibilities. It is increasingly unlikely that this adjustment can occur without labor market dislocations. This is because the new technologies place entirely different requirements on the labor force than has historically been the case. The older technologies -- associated with mechanization and continuous process -- created millions of unskilled and semi-skilled jobs. They did not ask very much of the labor force in the way of skills or education. The jobs could be learned in a few moments, hours, or days. Moreover, thanks in part to our labor movement, the gains in productivity associated with these jobs were often rewarded with salaries and benefits that far exceeded what many workers with few skills

and little education could earn elsewhere.

With computer technology, an electronic mind has been created for coordinating, guiding, and evaluating most routine operations. Consequently, the introduction of a vast array of mechanical substitutes for the human neuro-muscular system and it is now possible to link these new computer-driven machines together into self regulating systems that can perform an enormous variety of tasks. Consequently, as Norbert Weiner -- the father of cybernetics -- warned 30 years ago: "Let us remember that the automatic machine, whatever we think of any feelings it may or may not have, is the precise economic equivalent of slave labor. Any labor which competes with slave labor must accept the economic conditions of slave labor." As a consequence, he added, "in all important respects, the man who has nothing but his physical power to sell has nothing to sell which is worth anyone's money to buy."

Thus, the new technology of today means that high paying jobs for poorly skilled and inadequately educated workers are largely a thing of the past. As Secretary of Labor Brock aptly said earlier this year, "the days of disguising functional illiteracy with a high paying assembly line job are soon to be over. The world of work is changine right under our feet." The new technology is creating new jobs -- millions of them -- but the growth is most likely to be in occupations that reward extensive training and education. It is unlikely that there will ever again be an abundance of unskilled jobs -- but, unless things change dramatically with regard to labor force preparation, there is almost certain to be a chronic excess supply of unskilled job seekers.

Concluding Observations

The United States is entering a revolutionary period in terms of an economic transformation in the means of production, the conditions of international competition, and the changing domestic economic environment. Collectively, they have raised question about the ability of the labor force to adjust. The answers to the problems of the past appear to have little relevancy to the present. The same can be said for the past paradigms of the operation of the economy. As the causative factors for this transformation are essentially national in scope, they require a national response. The federal government is the only logical level to provide the leadership that is required. But all societal institutions with a stake in employment must be involved. One of the more insightful explanations for economic progress in industrialized nations during the last half of the Twentieth Century has been the recognition of "human resources as the wealth of nations." Countries with limited physical resources, such as Japan and Germany, have sustained superior economic performances in this new era largely because they have been forced, by lack of alternatives, to develop their human resources. Other industrialized nations have realized that the human resource development of their labor forces is the key to efforts to resolve simultaneously such difficult issues as efficiency, equity, stabilization, and growth. Reliance on tax cuts -- such as has been done in the United States and Great Britain -- are obviously not the proper route. Fiscal policy is important. But without a parallel policy of equal prominence that focuses on the labor supply side, the exercise of fiscal policy remedies is likely to be insufficient and, potentially even harmful to the quest for full employment.

The overarching difference between the state of human resource development policy in the United States and that of other major industrial democracies is philosophical. In other nations, the underpinning of their human resource endeavors is the belief that all accidental victims of social and economic change are a societal responsibility. It is society's obligation to train (or retrain), to educate (or reeducate), to relocate; or to compensate those workers who find themselves unemployed or underemployed through no fault of themselves. In most instances, these nations have adopted some parallel forms of national economic planning and/or industrial policy that includes necessary labor market adjustment policies as key elements. But in the United States, the tendency is to place the responsibility on individuals and local communities to respond to these changing economic conditions on their own. There is little or no national economic planning (except in the special areas of national defense and national highway construction). There is an aversion to economic planning in general and to human resource planning in particular. Reliance upon individual and community adjustment to the conditions of the marketplace remains the policy norm -- especially in the 1980s. There is periodic political talk during election years about the need to re-order national "priorities" (which is the language embodiment of the planning ideal) but there have been no steps at the national level to formalize the procedures necessary to establish an agenda and to rank any such set of national priorities. The political power (or lack of it) of vested interest groups to exert lobbying strength to achieve ad hoc objectives remains the modus operandi for setting and pursuing most non-defense related economic objectives.

Without specifying the details, the broad outlines of the need of human

resource policy for the nation would include three components. They are a salvage role (for those who are still unprepared to find employment); a preventive maintenance role (for those who have jobs but who may lose them do to changing technology or international competition); and a long term educational development strategy (to develope a highly literate work force that is flexible and adaptable to rapidly changing circumstances).

Any serious effort to formulate a national human resource policy that is designed to be congruent with meeting long term economic needs must ultimately be linked to some degree of national economic planning. To this end, there is an implicit need for the adoption of an overall industrial policy for the nation of which comprehensive education and training policies would be a vital component. Although the topic is controversial, there can be little purposeful long term preparation of the labor force for employment if there is little direction provided as to where the economy is thought to be going.

The challenges to public policy formulation in the United States are formidable. But as Oliver Wendell Holmes once said "the mode through which the impossible comes to past is effort." It time to try.