

For release on delivery
2:15 p.m. E.S.T.
March 17, 1989

Remarks by

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Chairman, Board of Governors of the Federal Reserve System

at a

Convocation

at

Wake Forest University

Winston-Salem, North Carolina

March 17, 1989

It is a special privilege to be here to accept an honorary degree from this great university and to see so many old friends from the Winston-Salem area. One of the advantages of being a private citizen was the ability to visit a number of associates in North Carolina and exchange sharply focused insights.

In convocations such as this, I usually spend a good deal of time discussing what central bankers usually talk about--short-term movements in output, budget deficits, interest rates, inflation, foreign exchange, trade balances, and international trade adjustment. On this occasion, however, I think it would be useful for a change to step back and try to discern the more deep-seated, longer-term forces that are driving the world economy in general, and the American economy, in particular.

One little noticed structural change that has had a profound impact on the world economy and world politics in recent decades has been the marked downsizing of economic output. Economic value creation has shifted increasingly toward conceptual and impalpable values with decidedly less reliance on physical volumes.

A half century ago, for example, our radios were bulky and activated by large vacuum tubes. Today, owing to the insights that developed into modern electronics, the same function is served by pocket-sized transistor packs. Metal beverage cans are now rolled to thinner tolerances than was conceivable only a couple of decades ago. Thin fiber optics is replacing vast tonnages of copper. Advances in architecture and engineering, and the development and use of lighter but stronger materials, now give us the same working space in newer

buildings, with a lot less concrete, glass, and steel tonnage than was required in an earlier era. Space heating technology has allowed reduction in the fabric weight of apparel, which in turn was fostered by major advances in chemical technology.

Even the physical quantity of goods consumed in creating economic services has been affected. Financial transactions historically buttressed with reams of paper are being progressively reduced to electronic charges, though the sheer volume of activity has kept paper usage higher. The transportation services industry, as a result of conceptual advances, now moves more goods with greater convenience, while consuming substantially less fuel per ton. In addition, passenger-miles have expanded greatly relative to the physical materials required to build large modern jet aircraft.

The considerable increase in the economic well-being of most nations in recent decades has come about without much change in the bulk or weight of the gross national product. In fact, if all the weight of materials--the tons of grain, cotton, ore, coal, steel, cement, etc.--we produce were added up, their aggregate volume might not be much greater today than it was, say 50 or 75 years ago. This would mean that increases in the conceptual components of GNP--that is, those reflecting advances in knowledge and ideas--would explain by far the major part of the rise in real GNP in the United States, and presumably the industrial world as a whole.

In recent years, the conceptual contribution to economic activity has largely reflected the explosive growth in information gathering and processing techniques, which have greatly extended our

analytical capabilities of substituting ideas for physical volume. These trends almost surely will continue into the twenty-first century and beyond.

In the years ahead, telecommunications and advanced computing will take on an even greater role. By facilitating the transfer of ideas, they create value by changing the location of intellectual property, much like the American railroads in an earlier time created value by transferring physical goods to geographic locations where they were of greater worth. At the turn of the century, for example, we created economic value by moving ore from the Mesabi Range down to the Pittsburgh district where it was joined with coking coal to produce steel. In today's environment, economic value is increasingly created by moving the conceptual part of GNP--not coal or ore but data, analyses, and insights--from one location to another through increasingly sophisticated electronic means.

The purpose of production of economic value does not change. It still serves human needs and values. But the form of output is becoming increasingly less palpable.

One clear implication of economic product downsizing is a somewhat lessened concern over the depletion of finite natural resources in the face of growing populations. But of more immediate consequence is the implication of downsizing on international trade, which is having a profound effect on the policies of the world's economies. International trade in construction gravel and fiberglass insulation, for example, is limited by weight and bulk. High value computer products, on the other hand, are major and increasing factors in world

trade. Obviously, the less the bulk, and the lower the weight, the easier it is to move goods; specifically, the easier it is to move them across national boundaries.

It is not surprising, therefore, to find that after adjusting for average export price change, pounds shipped per real dollar of exports have fallen an average of almost 3-1/2 percent per year since 1970. Pounds shipped per real dollar of U.S. imports declined even more, an average of 4.7 percent per year. Reflecting the downsizing of tradable goods, the share of U.S. foreign trade carried by air has doubled since 1970. On a global basis, the real value of trade has grown at a 5 percent annual rate over the past two decades, significantly outstripping the growth in world domestic demand. In tonnage terms, of course, the increase has been far less.

Also implicit in the downsizing of product is the increased integration of some of the world's production facilities. Inflationary bottlenecks tend to emerge when domestic productive facilities are pressed to capacity by burgeoning demand. But if additional supplies from other world producers can be made readily and quickly available, such pressures can be significantly allayed. The cost of moving construction gravel across continents makes it difficult to envisage foreign gravel pits as backup for excess domestic demand. But the ease with which downsized electronic components can be moved essentially integrates much of the world's electronic component capacity. Thus, as we progress toward general downsizing of economic output, worldwide production and inventory controls become far more feasible and inflationary dislocations less likely.

But the increased ease with which economic goods and services can spill over national borders creates a major dilemma for the political structure of a country inclined to inhibit such movement. The political leadership must increasingly accelerate the protectionist blocking of goods and services, or open up their economy to a more market oriented, and less domestically regimented, system.

Advancing technology is clearly creating pressure on autarkic political systems in areas beyond the realm of international trade in economic values. The development of satellite technology, for example, and the ability to transmit television pictures across national boundaries undercuts political censorship of the media. Governments must then either acquiesce in new political freedoms or produce increasingly harsh regimes.

To date, however, the political response to the technological impact on trade has been, to a surprising extent, liberal (with a small "l"). Glasnost has a foothold in eastern Europe and Perestroika worldwide. The increasing international economic pressures of recent decades have exposed the economic inadequacies of the centrally directed economies of the Eastern Bloc and, to only a somewhat lesser extent, the partially centrally planned economies of the West.

The breakdown of political barriers to the inexorable pressures of cross-border movements of economic goods is especially visible on the European continent. And the evolving newly industrialized countries of the Far East, capitalizing on their ability to exploit the downsizing technologies of the 1980s, have flourished beyond expectations. These models, in turn, have had a profound effect on the less developed

countries of the world where discarding of centrally planned economies has accelerated, and the old heated so-called north-south political debates of a decade earlier have faded.

The choice of the European community to move toward further integration by 1992 is reflecting international economic pressures. The unwinding of intra-common market capital controls will accelerate the free movement of capital across European borders. This in turn will require increasing coordination of monetary policies or risk major destabilizing capital flows should central banks' policies diverge. But coordination of policies presupposes the foregoing of full sovereignty over a nation's affairs. Thus, implicit in the movement toward economic integration is increasing adherence of domestic European economic policies to international economic pressures generally.

Countries, however, can eschew international economic cooperation. They can move in a severely protectionist direction. But the extraordinary downsizing of goods will make protectionism increasingly difficult to sustain in the years ahead, in the same sense that repressive national governments will have difficulty in blocking the satellite transmitted flow of ideas to their people.

Certainly, a major world economic disruption could induce a hasty resurrecting of the protectionist walls of an earlier era. But technology is irreversible. The downsizing of goods will continue. As a consequence, the ability to suppress worldwide trade will become progressively more difficult in the decades ahead.

By spurring the growth of trade and the linkage of world commercial and financial markets, technology-led forces are altering

international economic relationships. One obvious consequence has been the emergence of an ongoing institutional structure to deal with the problems of a more interdependent world economy. Since the mid-1970s, the leaders of the seven major industrial countries have been holding annual economic summit meetings, and the finance ministers and central bank governors of the Group of Seven now meet frequently to deal with current issues. This process is bound to expand and become ever more pervasive as the cross border trade in goods and services grows as a proportion of world domestic demand. Indeed, the benefits of increasing trade will likely be a major underlying force galvanizing productivity and economic growth as the world moves towards the new century.

But in this new evolving environment can America maintain the preeminence in the next century that it has had during the past century? In the world of physical materials, America in the past has been associated with the skyscraper and huge hydro-electric complexes. The vast industrial complexes of Middle America were characterized at mid-century by our unquestioned dominance of the quintessential industry of the physical materials age, namely, steel.

But can the United States make it in the world of down-sized products in the 21st century? The challenges are great, but history suggests we will meet them.

Obviously, to the extent that economic value added is going to become increasingly conceptually oriented, the major "capital" of the next century is going to be minds that produce ideas. I certainly don't want to say to you, even in this institution of higher learning, that formal education is synonymous with the creation of a conceptually

oriented work force. American history is strewn with examples of great inventors with less than impressive formal education credentials. Nonetheless, more and higher quality education must be presumed to be crucial in America's competition with our industrial partners for economic world leadership.

But there are disturbing signs in education. Many thoughtful observers are concerned that our students are not being prepared adequately to meet the demands of an increasingly sophisticated society. Test scores and survey results alike point to a deterioration over time in the quality of American pre-college education. Moreover, the performance of our secondary school students falls far short of the norms for other advanced countries, especially in the relevant technical subjects like mathematics and the sciences.

Various studies have underscored the need for substantial improvements, with respect both to the strengthening of basic skills: reading, writing, and mathematics; and to the development of higher analytical and technical capabilities. Various studies, I am told, have concluded that students are not being challenged adequately--either in the classroom or in their homework assignments.

A Presidential report in 1988 found that the situation has started to improve. Inflation-adjusted outlays for education, which had been flat on a per pupil basis in the second half of the 1970s, have turned around. Since 1980, they have increased roughly 30 percent; class size and teacher loads have been reduced; and steady increases in salaries should be attracting better teachers into the schools. However, with the children of the baby-boomers now entering school,

education budgets will be under pressure from rising enrollments, as well as from competition with other public activities for scarce dollars.

I do not underestimate the difficulty of turning the education system around, and I am sure that dollars alone are not enough. The issues are extraordinarily complex, and there are no clear-cut answers. President Bush has made education a priority of his Administration, and his budget proposals contained a number of initiatives to widen the pool of teachers, to recognize and reward quality in the schools, and to combat the drug and health problems that undermine efforts in many areas. His proposals seem to me to be pointing in the right direction.

While we may view idea-generating minds as the new economic capital of the next century, the old forms of capital--plant and equipment--will still play a significant role in the nation's ability to add conceptual value to an ever increasingly down-sized array of products. We must maintain a high level of business investment, in order to equip our production facilities with the most up-to-date technology and machinery. But here too, as in education, recent trends have been disturbing. Investment net of depreciation--that is, the portion of investment spending that actually increases the nation's capital stock, rather than merely replaces wornout equipment and structures--declined perceptibly as a share of GNP in the 1980s. The effect this had on our productive capacity has been offset, to some extent, by increased productivity of certain short-lived capital such as computers; nonetheless, the quantity and quality of investment has been inadequate to speed the growth of productivity.

Prospects for investment in coming years will reflect many factors, but ultimately will depend in large part on the amount of saving available for capital formation. In the 1980s, a large inflow of capital from abroad has made it possible to finance both the federal budget deficit and a high level of gross private (as distinct from net) investment without untenable pressures on credit markets. However, a country cannot depend forever upon foreign saving; at some point, we shall have to rely more fully on our own resources.

The enactment of sizable reductions in the federal budget deficit is the surest way to raise domestic saving. I am mindful that, because of significant efforts by the Executive Branch and the Congress in past years, coupled with strong economic growth, the deficit has shrunk from 5 or 6 percent of GNP in the mid-1980s to only a bit above 3 percent today. Nonetheless, the deficit is still unacceptably large, and action is vital.

Ideally, private saving should pick up as well. It is difficult to explain why saving by households and business has fallen to such low levels recently. Some arguments, such as the association between reduced saving and the surging stock market between 1982 and 1987, suggest that the extremely low saving rate is a temporary aberration. Indeed, the personal saving rate has moved up some since the stock market crash; though remaining well below historical norms, it was a full percentage point higher in 1988 than in 1987. Other factors believed to have depressed saving out of current income, such as the buildup of readily accessible homeowners' equity and more widespread disability and life insurance coverage, are likely to persist.

Meanwhile, "big-ticket" items are increasingly easy to finance; terms on loans for new cars, for example, have become more flexible, and the advent of home equity lines of credit has made it much simpler to borrow against the value of one's house.

In any event, public policy actions that will boost private saving have yet to be designed. Studies suggest that the numerous tax changes over the years that were intended to encourage saving have merely shifted saving from one pile to another, without much impact on the total.

Fortunately, while the recent experience has been discouraging, our history suggests that in the past we have saved and invested at much higher rates and hence can presumably do so again. Indeed, it would be difficult to explain how the United States evolved into the world's leading economic power if we did not outsave and outinvest our competition in decades past.

In the period following the Civil War, when the United States began to emerge as an economic power, our saving and investment rates, as conventionally measured, were much higher than those in Europe and Japan. For example, between 1870 and 1910, domestic saving in the United States averaged close to 20 percent of GNP. The best available estimates for Japan and Germany during that period place their saving rates at 15 percent or less. The saving rate in Great Britain, which was fading in pre-eminence, was closer to 10 percent.

The shift toward a relatively and absolutely low U.S. saving rate began during the Great Depression, when it fell dramatically. In the decades after World War II, it stabilized at a level slightly below

its pre-Depression average, and it has fallen further in the most recent period. Saving rates in Japan and Germany have declined some in the past two decades, following their surge in the post-World War II recovery period, but they remain substantially above those in the United States. The high saving rates in these countries have been mirrored in rapid rates of capital formation, which have helped them improve their competitiveness relative to the United States and close much of the gap in living standards.

Clearly we are being challenged as we have numerous times in the past. I was brought up in an age when Americans could seemingly do anything one put one's mind to. The current generation of younger Americans seem if anything more determined and skilled than those of us who reached adulthood at mid-century. Our heritage suggests that whatever the challenges the next decades of downsized output and international competition and cooperation bring, Americans will prevail.