

Remarks by

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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 total volume per capita 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 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.

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. 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 other developing 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 ago have faded.

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.

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 downsized 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 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 American education. Many thoughtful observers are concerned that our students are not being

prepared adequately to meet the demands of an increasingly sophisticated society. 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 I wish there were clear-cut answers. But there are not.

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 downsized 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 worn-out equipment and structures--declined perceptibly as a share of GNP in the 1980s.

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, 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.

I was brought up in an age when Americans could seemingly do anything we put our minds to, though in retrospect the circumstances at the time were somewhat special. The current generation of younger Americans appears to me if anything to be more determined and skilled than those of us who reached adulthood at mid-century. However, they face important challenges to that determination and those skills. Among them is the challenge of a world economy that is increasingly complex and integrated. In meeting that challenge, we must stand together with our trading partners to ensure a continuation of the kind of constructive cooperation that contributes to the stability of the world economy and, thereby, to the prosperity of all.