



National Income Accounting and Public Policy

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Abstract. Modern national income accounting was designed in the early 20th century for the purpose of providing improved indicators about the performance of the economy so that government policy makers could better control the economy. The way that performance is measured affects the types of policies used to try to accomplish policy goals. Two attributes of national income accounting are analyzed for their effects on economic policy. First, government production is included in the national income accounts at cost, rather than at market value as private sector output is measured. This biases policy toward a larger public sector. Second, output is measured as a homogeneous dollar amount. This biases policy toward focusing on increasing quantities of inputs and outputs in the production process, rather than on innovation and entrepreneurship, which are the true engines of economic progress. Economic policy could be improved by focusing less on national income as an indicator of policy, and more on the underlying processes that foster economic progress.

Key Words: national income accounting, macroeconomic policy, public finance

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The unprecedented worldwide economic progress in the nineteenth century was led by the United States, which began the century as an agrarian economy and ended it as the world's industrial leader. Nineteenth century economic progress was not without its setbacks, however. Big economic issues toward the end of the nineteenth century included the growing concentration of economic power among a few individuals, monetary standards and bank credit, and banking panics and the increasingly severe economic downturns that periodically plagued the economy. By the early twentieth century, national economic policy had addressed these issues in several ways. Antitrust laws, beginning with the Sherman Act in 1890, were enacted and being enforced; various segments of the economy, from transportation to food and drugs, were being increasingly regulated; and the Federal Reserve Act, passed in 1913, created monetary institutions that began a substantial transformation of the nation's monetary system. Still, economists and government policy makers thought that more could be done to effectively manage the economy. Economists were actively engaged in business cycle research with the hope of designing policies that could dampen the increasingly violent economic fluctuations, and principles of scientific management, which had spilled over from the private sector into government early in the twentieth century, suggested some promise that the macroeconomy could also be managed if effective policies could be designed. However, there was widespread agreement that more effective management of the economy would require better methods for measuring and assessing economic performance. Thus, a system of national income accounting was designed in the 1920s to better measure the performance of the economy, but with the significant secondary

purpose of providing policy makers with performance indicators that they could use to better manage the national economy.

Modern national income accounting was developed through a cooperative venture among academics, the business community, and government. The National Bureau of Economic Research was established for the purpose of furthering business cycle research, which led to the development of a system of national income accounting that could monitor the performance of the economy so that policy makers would have good information on which to base their economic policy decisions. The result was the national income and product accounts that remain in use, largely unmodified, at the beginning of the twenty-first century. The challenge in measuring economic performance is formidable, because the economy produces a diverse array of goods and services that are difficult to aggregate. However, money serves as a natural common denominator. In the same way that individuals can aggregate their money incomes as a measure of the value of their production in terms of all goods and services, nations could do the same thing by measuring national income in dollar terms. Gross National Product (GNP), and later, Gross Domestic Product (GDP) became the preferred measures of total national income. Along the lines of the way an individual's income would be measured, GNP is the market value of all final goods and services that are produced in an economy during a period of time (typically, a year).

When designing the national income accounts, many conventions for the measurement of income had to be devised, and every beginning student in economics learns that the compromises that went into the design of the national income accounts means that GDP cannot be accepted as a measure of the well-being of a nation. Many of the problems and shortcomings of national income accounting are well-understood by economists, and this paper will not rehash them here. This paper will first describe the development of national income accounting in the United States to show how from the beginning, its development was linked to public policy, and then will focus on two of the more obscure problems of national income accounting.

One problem with national income accounting is the way that government is treated in the national income accounts. This has been discussed by others, but raises some obvious problems. The second problem is more subtle, but perhaps more important for purposes of economic policy. That problem is that by treating economic output as a homogeneous aggregate, economic policy focuses on increasing the quantity of goods and services and tends to ignore the changing nature of goods and services. Economic progress comes partly from increases in the amount of output, which GDP measures, albeit imperfectly, but economic progress mostly is the result of changes in the nature of the goods and services the economy produces. This is completely unmeasured by GDP. Thus, the indicator of economic growth leaves out the most important element of growth. This, in turn, has had a substantial negative impact on the way that economic policy is undertaken.

This paper begins by discussing the difficult problem of trying to measure national income. Then, the history of the development of the concept is recounted to show that national income accounting and public policy have been intimately related from the beginning. The paper then considers appropriate goals of economic policy, and the way that the actual system of national income accounts affects these goals. After some analysis, it is apparent

that the use of national income accounting has resulted in many types of public policy that have worked against the nation's best interest.

Measuring Output and Income

The ultimate goal for an economy is to produce value for those who inhabit it. There are many stories about problems in the economy of the former Soviet Union that arose because output was measured in physical terms rather than in terms of value. For example, a factory making nails was given a quota in terms of tons of nails produced, and produced only very large nails because it is cheaper to produce a ton of big nails than a ton of small nails. Planners, recognizing that there was a shortage of small nails, changed the factory's quota to produce a certain number of nails rather than a certain weight, with the result being that they produced lots of small nails but no large ones. A similar story recounts a Soviet factory producing roofing metal that had its output measured as the number of square yards of roofing metal produced. The resulting roofing metal was so thin that it could be damaged by a heavy rain. Again seeing their mistake, the planners changed their measure of output to tons of roofing metal, and the result was that roofs made with the output of that factory were so heavy that they caused structural damage to the buildings they were placed on. The lesson of stories like this is that a market economy, in which firms have an incentive to maximize profit, works better to produce output that enhances the well-being of people, because output in the market is judged by its market value, not its physical characteristics. In a market economy, factories have an incentive to produce output that adds as much value as possible to total output, rather than producing output that is as heavy as possible, or as big as possible.

This lesson extends only imperfectly to national income accounting. First, national income accounting measures the market value of output, not profit or total value to consumers. A better measure of the value of an economy's output would be total consumer surplus produced, but measurement of consumer surplus is not feasible, whereas measurement of the dollar value of output is.¹ Firms can increase their profits by raising the market value of their output or by lowering their costs, and lower costs are difficult to capture in national income accounts, even though they exert a substantial influence on economic well-being. If lower costs are manifested in higher output, that may partially capture the welfare enhancement from cost reduction, but if an increase in the supply of the good results in a lower price, the impact on the market value of output of higher output is offset—perhaps partially, perhaps fully or even more—by a lower price per unit. National income accounting attempts to adjust for this either through adjustments in the price level, which is an imprecise procedure, or in an even more *ad hoc* manner by directly trying to factor in changes in the quality of output.

Simply looking at the market value of output is problematic, because market prices are the result of the interaction between supply and demand, making market value a poor measure of total value. The real problem is that there is not a good aggregate measure of economic performance. The economy is a complex set of interactions among economic activities of a large number of individuals. Any attempt to reduce the performance of the economy to a single number must leave out a great deal. Within that context, the next section considers

the political and economic environment within which national income accounting was presented, to see how those designing the national income accounts were able to grapple with these problems.

The Creation of National Income Accounting

National income accounting was created for the purpose of producing a more scientific measure of the performance of the economy. The concept is an old one, having been originated by William Petty (1623–1687) and refined continually since. The way in which national income is measured has always had policy implications. Petty's conception of national income included the total production of goods and services, but the mercantilist idea developed in the seventeenth century displaced Petty's ideas, and viewed a nation's wealth as embodied in its stock of gold. In contrast, physiocrat Francois Quesnay's (1694–1774) development of his "Tableau Economique" depicted agriculture as the only productive activity. Adam Smith partially accepted Quesnay's vision, but included manufacturing as a part of productive labor. Smith called labor used in the production of services, which did not increase the stock of national wealth, unproductive labor. From a policy standpoint, one can see that a mercantilist vision of national income would focus on increasing a nation's gold stock, whereas a physiocratic vision would focus on developing agriculture. Using Smith's concept, one can enhance the wealth of nations by channeling labor into productive (agriculture and manufacturing) rather than unproductive (service) activities.²

Modern national income accounting has overcome many of the shortcomings of these early attempts from centuries ago, but although these specific shortcomings have been remedied, the same types of shortcomings remain. Some of the problems were mentioned in the previous section, but two other problems will be considered in more detail below. One is the accounting for government output at cost, which is an obvious problem, and the other is treating aggregate output as a homogeneous quantity, which has more subtle policy implications. But while national income accounting has a long history, it was not closely integrated into economic policy until the 1930s. One reason is that statistics on national income were not very comprehensive until that time, and another is that in the early twentieth century governments became much more interested in taking an active role in managing the economy.

As Higgs (1987) notes, toward the end of the nineteenth century, the Progressive idea that government should expand its role beyond simply protecting the rights of citizens to looking out for their economic welfare became increasingly accepted among the American public. Meanwhile, around the beginning of the twentieth century scientific principles of business management began to be developed, and Progressives promoted the idea that scientific principle of business management could be adapted to government. Early in the twentieth century, universities began creating business schools that developed and taught scientific principles of management. Academic influences spread beyond colleges of businesses as the social sciences began developing, with economics, political science, and social work all laying claim as academic disciplines that could be drawn on to improve government policy. Skowronek (1982) describes a push by those in government to adapt those academic

principles of social science and scientific management to more effectively run the government. Thus, there was a general shift in popular ideology toward more government control of the economy, coupled with an academic movement toward the development of principles that could allow government policy to be carried out more effectively.

The result was what Alchon (1985) calls technocratic Progressivism, which was developed through a joint effort of government, academic institutions, and private philanthropic organizations. While the benefits of scientific management had the potential to improve all of government policy, the promise of technocratic Progressivism appeared especially great with regard to the government's management of economic policy. The problems were generally agreed-upon, and ranged from persistent problems like poverty to newly emerging problems related to the new industrial economy. The increasing concentration of economic power was viewed as a problem with the rise of industry, as was the periodic problems of recessions, which appeared to be increasing in severity over time. Yet, if there was general agreement on the problems, and widespread popular support for increased government involvement in the management of the economy, there was not a corresponding body of economic knowledge that gave clear guidance about the way that economic policy could be used to improve the economy.

In 1914 two conferences were held on the problem of unemployment that were attended by leading economists of the day, including John Commons of the University of Wisconsin and Edwin F. Gay, the first Dean of the Harvard Business School. One of the recommendations from that conference was the "Keynesian" idea that the government should engage in counter-cyclical fiscal policy, increasing public works spending during recessions to help boost the economy (Alchon 1985:17). Indeed, as Davis (1971) notes, Keynesian fiscal policy was widely accepted among U.S. academic economists as appropriate macroeconomic policy well before the publication of Keynes' *General Theory* in 1936. Yet one problem with implementing countercyclical macroeconomic policy was that there were not good measures of economic performance. Employment and unemployment might prove to be adequate measures for some purposes, but they are measures of economic input rather than economic output. The concept of national income had been well-known for centuries (Studenski 1958), but there were not good estimates of national income for the United States, nor was there an agreed-upon methodology for measuring national income.

World War I created great demands for scientific management in government to oversee the war effort, and as Higgs (1987) notes, to oversee the economy that became increasingly government-controlled. Wesley C. Mitchell, already well-known for his 1913 book on business cycles, argued that problems that surfaced when trying to manage the war effort showed that the government needed a much stronger apparatus for collecting statistics on the performance of the economy and inventorying national resources (Alchon 1985:26), and in 1918 a Division of Planning and Statistics was created, headed by Wesley Mitchell and Edwin Gay. Mitchell and Gay were not alone in arguing that better statistics could produce better government economic planning, and their wartime organization laid the foundation for the collection of economic statistics after the war. There was much debate about how the statistical efforts begun during the war should be continued, and after the war there was public pressure for government retrenchment, weighing in against the continuation of

wartime programs such as Mitchell's and Gay's. The result was the creation of the National Bureau of Economic Research (NBER) in 1920.

The NBER was created out of a cooperative effort among academic institutions, government, and private organizations. The intellectual foundations for the NBER were laid by Gay and Mitchell, with the cooperation of John Commons, who was president of the American Economic Association, and Allyn Young, president of the American Statistical Association. It had the support of those in government, for obvious reasons, but while it was designed to provide statistics that could be used for government policy, it was also designed to be independent of government. The NBER got its initial funding from the Carnegie and Commonwealth foundations, which not only made it financially independent of government but started the organization as an academic research organization rather than a product of politics. Private funding of NBER as a non-governmental organization was purposefully done with the hope that politics would not set the NBER's agenda or distract from its research mission. Once established, Wesley Mitchell took the lead in setting the NBER's agenda.

This background on the founding of the NBER is crucial to understanding the nature of the NBER's activities, and the nature of national income accounting that was developed by the NBER. Because it was privately funded, the NBER was independent of both academic and governmental institutions, but it was staffed by academic economists who had a desire to make economics more scientific, along the lines of the natural sciences, and who believed that economic policy could be used to improve the performance of the economy. Further, it was supported by those in government who believed that principles of scientific management could be used to manage the macroeconomy. One thing that was lacking for precise management of the economy was good measures of economic performance. The goal of developing an improved method of national income accounting was to create better measures of economic performance so that government could be more aggressive in its management of the economy.

Among the questions that national income accounting was supposed to address were measuring the aggregate money income of the nation, and generating a time series so that its performance could be tracked over time; developing a method for determining how much of the changes in aggregate income were caused by fluctuations in prices and how much were due to fluctuations in output; determining how income was distributed among individuals, and what proportion went to labor; determining how output and wages varied across industries, and how these variations changed over time; and developing a method for comparing income in the United States with income in other nations (Alchon 1985:61). By generating this data, government would be in a better position to accurately assess the performance of the economy, thus giving them a better opportunity to undertake policies that could improve its performance. From the standpoint of the academic economists who were instrumental in creating the NBER, and who did the NBER's work once it was created, their motivations were to elevate economics to be a more scientific discipline, and to enable the government's economic policy be more active and more effective.

Government supporters had much the same motivation, but came from the perspective of engineering rather than social science. The greatest supporter in government was Herbert Hoover, an engineer by training who worked in President Wilson's administration during

World War I, and was Secretary of Commerce throughout the eight years of the Coolidge and Harding administrations in the 1920s, before being elected president himself in 1928. Hoover saw the potential of extending engineering principles to the management of the economy, and supported the NBER as an organization that could provide support for more active and precise government economic policies. As Alchon (1985:63–64) notes, engineers looked at this as a great opportunity for them to allow their education and experience to be used to improve social conditions.

All parties who were cooperating to develop the national income accounts had consistent goals. Private sector businesses looked at this as an opportunity to create a better business environment by extending the same principles of scientific management that they had been integrating into their businesses, and private sector foundations were willing to fund the endeavor because of its potential to enhance the public welfare. Those in government saw an opportunity to apply engineering principles to the management of the economy, and economists saw the opportunity to make their discipline more scientific, and to be more influential in the determination of public policy. Alchon (1985:67) refers to this cooperation as “a bargain between technocratic social science and managerial capitalism,” and notes that while everyone had worthy motives, they were also motivated by the enhanced power and prestige that would come to participants. Economists could not only become full-fledged scientists, but could have a hand in the management of the economy, while those in government would gain more power over economic affairs.

The desirability of this activity was reinforced when a severe recession hit the economy in 1920. Prices plummeted, and unemployment stood at about 12 percent. When Herbert Hoover began his tenure as Secretary of Commerce in 1921, he was given considerable influence over economic policy, and pushed the idea of Keynesian-style counter-cyclical fiscal policy a decade and a half before the publication of *The General Theory*. Hoover asked Wesley Mitchell to join him in the Department of Commerce, but while Mitchell declined, he worked closely with Hoover through the NBER to advise the government on macroeconomic policy. The economy recovered from the 1920 recession and the remainder of the decade was prosperous, giving Hoover further reason to see the merits in his engineering approach to managing the economy. When the economy again turned down in 1929, Hoover again thought that active government intervention could smooth the recovery, and by that time, a decade’s worth of work had been done toward better understanding the economy.

The crowning achievement of the research at the NBER was the development of the national income and product accounts in cooperation with the Department of Commerce. After the nation plunged into the Great Depression, it became apparent to those who wanted to engineer the economy back to health that the existing statistics on economic performance were woefully inadequate. In 1932 the Department of Commerce began cooperating with the NBER to develop a comprehensive set of national income and product accounts. By this time the NBER’s work was being directed by Simon Kuznets, and the result of this cooperative venture between the federal government and the NBER was the first official statistics on national income, published in 1934, which gave measures of national income back to 1929 (Palmer 1966:31). While the concepts have been updated

periodically, the current national income accounts used to direct macroeconomic policy go back to this work done by the NBER, and the fundamental underlying principles have not changed.

Modern national income accounting began in the 1930s as a cooperative venture among academicians, government officials, and private sector organizations, as a way of developing better measures of economic performance so that the government could more actively involve itself in managing the economy. Thus, it is entirely reasonable to examine national income accounting in terms of the impact that it has had on public policy. The concept of national income was refined so that it could be used as an indicator of the economic health of the nation, and economic policy has been designed to produce GDP growth. As the examples discussed earlier in the paper have illustrated, the way in which economic output is measured can have real and substantial impacts on the nature of that economic output. The remainder of the paper considers two specific issues regarding the measurement of national income: the way in which government expenditures are accounted for, and the implications of measuring national income as a single homogeneous quantity.

Government Expenditures and National Income

GDP is defined as the market value of all final goods and services produced in an economy during a time period (usually, one year). However, government expenditures are included in GDP at cost, rather than at market value. The justification for this is that public sector output is part of the nation's output just like private sector output, but typically it is not sold on the market, so in contrast to private sector output, there are no market prices at which it can be evaluated. Therefore, it is added in at cost. However, following the conventions of national income accounting, there are at least two reasons why government output should not be included in GDP at all. The first reason is that national income accounting conventions value private sector output at its market value, and if government output is valued using the same standard, it should also be included at its market value, which is zero. The second reason is that government output is almost always an intermediate good, and intermediate goods are not included in GDP.

A number of economists have argued either that government expenditures should not be included in GDP, or that including government expenditures distorts the measurement of national income. Forte and Buchanan (1961) make the arguments given above, as does Rothbard (1970) and Skousen (1990). Higgs (1992, 1999) examines the impact of including government expenditures during and after World War II, showing that measures of national income including government expenditures present a severely distorted picture of the economy's performance. The idea that including government expenditures in national income distorts its measurement is not new, nor a fringe idea. Kuznets (1945) also finds that the inclusion of government expenditures has a distortionary effect on income measurement. Kuznets, one of the developers of national income accounting does not recommend eliminating government expenditures from total income, but others, like Forte and Buchanan (1961) and Skousen (1990) do. With this in mind, the arguments against including government expenditures in GDP should be reviewed.

Most government output consists of intermediate goods. If the total output of steel were to be added to the total output of automobiles in accounting for income, the steel would be double-counted. It would be counted once when the steel was originally produced, and again when the value of the steel in the automobiles was added in. In the same way, adding the cost of government services that are intermediate goods double-counts income. If a store hires a security guard, that is included in the cost of production and not as a part of final output. The same should be true when a community hires a police officer. The police services are valuable, as are other intermediate goods, but intermediate goods are not counted in total GDP, and for consistency, governmentally-produced intermediate goods should be treated the same as private sector intermediate goods. Most of what government produces is intermediate goods and services, not final output, so government output should be excluded from GDP.

A second wholly different reason for excluding most government output is that it is typically given away rather than sold. One might argue, for example, that as public sector investments, government-owned highways should be included in any accounting of national income. Even if highways have some value to those who use them, the market price of the highway is zero, unless a toll is charged, so the highway should be included at its market price of zero. Some government output, such as toll roads, water sold by government waterworks, and so forth, should be included in GDP because those goods do have a market price,³ but most government output does not fall into this category. Because it is given away, its market value is zero and it should not be included in GDP. This would treat government output consistently with the way that private sector output is treated in the national income accounts.

Whether government output has any value to those who receive it is completely irrelevant to the arguments just given. GDP is not a measure of the value of output to those who consume it. GDP is not a measure of consumer surplus, or some related concept of consumption value, and when applied to the private sector, is specifically designed not to be a measure of the cost of output. Much final output in an economy has value but is excluded from GDP because it is not sold. Home production is probably the most significant example. Highways have may have value, but like personal home repair projects and home cooking, that output is not sold on the market.⁴ For consistency, highways, police and fire services, and national defense should not be included in GDP for the same reason home production is excluded: they are not sold in the market.⁵

Policy Implications of Government Expenditures in the National Income Accounts

One implication of including government production in GDP is that the level of income is overstated, but a larger problem is that changes in government expenditures result in changes in measured national income under the current system. Thus, if government grows, this government growth is added to the income statistics measuring income growth. If an economy shifts resources from the private sector into the public sector to increase its military forces, the increase in military expenditures is added to national income. If, unrealistically assuming away the excess burden of taxation, the dollar decline in the production of final private sector goods is just offset by the same dollar increase in military expenditures, it

appears that the nation's income has remained unchanged. More realistically, the excess burden of taxation will cause private output to fall by more than the increase in military expenditures, but even here the decline in national income will be understated due to faulty national income accounting conventions.

In some European nations—Sweden is a good example—government expenditures as a share of GDP soared between 1960 and 1990, and much of the increase was government provision of social services such as pre-school care for children and nursing home care for elders. Prior to the increase, families would have cared for their own children and their own elders at home; after the increase, what was once home production became government production. Gwartney, Holcombe, and Lawson (1988) note that big government reduces an economy's productivity and slows its measured GDP growth rate, and because of the increase in the size of the public sector, economic growth as measured by GDP declined in Sweden and other nations with substantial government growth. However, that slower measured GDP growth actually understates the decline in national income because as GDP is currently measured, the substitution of government expenditures to produce what once was home production counts as an increase in income.

The problem is that government growth is mistakenly accounted for as real economic growth. Thus, if growth in measured GDP according to national income accounting conventions is a goal of economic policy, one way to accomplish this goal of GDP growth is to increase the size of the public sector. While it should be obvious that shifting child care from home production to government production does not increase anybody's income (although it does transfer resources from taxpayers to daycare workers, who may be the same people in many cases), or that buying more military hardware does not increase aggregate income (although it does transfer resources from taxpayers to military contractors), or that it does not increase anybody's income to hire ten bureaucrats to do the job that one used to do, in all these cases measured GDP will rise. Thus, if a nation judges its economic health by its measured GDP, the inclusion of government expenditures in GDP can have severely distorting effects. More significantly, if a nation pursues a policy of trying to increase its measured GDP, this leads policy makers to devote excessive resources to the public sector, and makes it look like they are succeeding in increasing income when, if income were properly measured, it would be apparent that they are not.

The way that income is measured has serious policy implications. Because GDP is used as the measure of the productiveness of the economy, and because increasing measured GDP is a public policy goal, public policy is biased toward devoting an excessive share of resources to the public sector. In the same way that when, in the former Soviet Union, the output of roofing metal was measured in terms of square feet of output, too many square feet of output (that was inefficiently thin) was produced, measuring the output of government as its dollar cost results in too many resources being channeled into government. Nations like Sweden that experimented with democratic socialism in past decades are now seeing the problems that result from excessive government and are reversing some of their policies, but the problems were masked to a substantial degree by the methodology of national income accounting. Because government expenditures are included in measured GDP, the increase in government spending to provide things that people once provided for

themselves hid the decline in actual income that was produced by their the turn toward socialism.

GDP as a Measure of Aggregate Output

A more subtle problem with the use of GDP as an indicator of the economy's performance is that for policy purposes, GDP is equated with real output, and maintaining growth in real output, as measured by GDP, is adopted as a policy goal. The subtle aspect of this problem is that GDP is an aggregate measure, which makes aggregate output appear as a homogeneous commodity. Twentieth century economic theory adds to this impression. In a macroeconomic setting that analyzes aggregate demand, GDP is the sum of consumption plus investment plus government spending, or as economics professors tell their introductory students, $Y = C + I + G$. If Y is too low, macroeconomic policy suggests several ways that monetary or fiscal policy can be used to stimulate C or I , or offers the option of increasing G directly through more government spending. In this simple macroeconomic framework, the idea that there is an optimal mix among these components of Y is rarely considered, let alone the idea that C , I , and G are not homogeneous themselves.

A supply-side emphasis suggests that the way to increase income is to increase productivity, either through an enhancement to the inputs into production or through technological advances that can enable an economy to produce more output with the same inputs. More formally, using a simple production function, f , where output is produced by capital and labor, $Y = f(K, L)$. Within this framework, more output can be produced either by increasing inputs K and L , or by altering the functional form, f , so that the same inputs generate more output. Economists tend to think of changing the functional form as technological progress, and tend to look at increasing inputs both as increasing the quantity of inputs, and increasing their quality, such as enhancing labor through education. Of course, national income accounting recognizes that the production process is more complicated than this, and the national income accounts include both inputs and outputs for hundreds of sectors of the economy, which can be analyzed in an input-output model in which outputs from all sectors can serve as inputs in all others. These quantities of inputs and outputs are measured in detail for the national income accounts. Even though the production relationships may be more complicated, the basic production function approach still holds, where inputs are combined to produce outputs in each sector, and national income is the aggregate of the production of all sectors in the economy. More significantly, changes in the quality of output, or the production of new types of output, shows up only in an increasing quantity in some sector.

The problem with using this framework as a foundation for economic policy, as Mitchell, Kuznets, and the other developers of national income accounting envisioned it to be used, is that the framework makes no allowance for changes in the nature of inputs and outputs. As Holcombe (1999) notes, the essential feature of economic progress is not that larger and larger amounts of output are being produced—although that is indeed a good thing—but rather that the nature of both inputs and outputs are changing over time in ways that are not easy to anticipate. When one compares the standard of living in 1900 with the standard of living in 2000, while it is true that the economy produces more output, the biggest difference

is the changing nature of output. People are riding in air-conditioned automobiles rather than in horse-drawn carriages. People are communicating through e-mail rather than by sending physical letters. In 1900 radio had not yet been developed as a method of mass communication, let alone television and the internet. People have more food, but they also have different kinds of food, and progress in the types of health care people can purchase are truly astounding. This change in the qualitative nature of output is not easily captured using the production function approach to modeling the economy, where the long-run goal is increasing homogeneously measured GDP.

Models allow the economy to be depicted as having an infinite number of sectors, so one could model an economy with n different goods, and could make provisions in the model for new goods $n + 1, n + 2, \dots, n + n$, to be developed, but the modeling of the economy does not capture how these new goods come into being. Within this context one can envision growth as the production of more of what the economy is already producing, or producing additional new goods, but nothing in the model addresses how innovation can take place to bring new goods into production. One way, economists know, is for research and development to produce new goods. How is R&D undertaken? In economic models, it is undertaken in the same way as any other productive activity, by using inputs of K and L to generate R&D output. Modeling economic progress in this way, however, leaves out the process by which economic progress actually takes place. In this type of model, economic progress means increasing K and L to produce more Y , or devoting some K and L to R&D to improve the functional form f so more Y can be produced with a given amount of K and L . The fact that models can incorporate an infinite number of goods does not change the conclusion that national income accounting conventions point policy toward producing a bigger quantity of output rather than changing the qualitative nature of that output. In this framework, improving the performance of the economy means producing more Y , or producing more GDP.

The national income accounts do include hundreds of sectors in the economy, and input-output models show the interrelationships among all these sectors. Nevertheless, when innovations change the qualitative nature of output in a sector, they show up as an increase in the quantity of output. In the 1980s computers moved from character-based user interfaces to graphical user interfaces, but the only way this is reflected in the national income accounts is in the dollar amount of output in that sector. Despite the complexities, from a policy standpoint national income accounting ultimately says that $GDP = f(K, L)$, and that increasing income means producing more GDP by using more K and L inputs, or improving the functional form f to get more output from those inputs. Even if new sectors are added to the national income accounts to include new types of goods, this does not affect the bottom line. National income accounting cannot measure changes in the character of the economy's output. It only measures the amount of output, denominated in dollars.

Growth versus Progress

As defined by the economics profession, economic growth means increasing income, or GDP. This vision of growth is reinforced by the way we measure income, as a homogeneous dollar amount. Measured this way, income was about seven times larger at the end of the

twentieth century than it was at the beginning (Moore and Simon 1999:6). However, simply looking at income this way, as a homogeneous quantity, vastly understates true growth, and ignores the fact that the most significant part of economic growth has not been the greater amount of output produced, but changes in the nature of the output. Life expectancy in the twentieth century United States rose from about 47 years at the beginning of the century to about 77 years at the end. At the end of the century travel by jet aircraft is accessible to a far greater percentage of the population than auto travel was at the beginning. Nobody traveled by aircraft in 1900. At the end of the twentieth century people took for granted having many goods that nobody had at the beginning of the twentieth century, such as radios and televisions, refrigerators, dishwashers, VCRs, microwave ovens, and internet access. Conveniences such as indoor plumbing, electricity, and automobile travel were commonplace at the end of the twentieth century, but inaccessible to most people at the beginning.

Cox and Alm (1999:15) make the point that by many measures, poor Americans in 1994 had a standard of living similar to the average American in 1971. Goods that were unavailable to anyone at one time become available to the wealthy, then to people of average means, and within a few decades to everyone. The change is not primarily quantitative (more income) but rather qualitative (the consumption of different goods that were previously unavailable). And as Cox and Alm (1998) point out, even looking at major categories of goods understates the degree of progress that has been made. For example, while automobile ownership is rising, variety in the types of automobiles available is also rising, giving consumers more choices and a better opportunity to get a vehicle that is more specifically suited to their needs. In 1970 there were 140 different varieties of automobiles available to American consumers, and that number had risen to 260 by 1997 (Cox and Alm 1998:12). The same is true of other goods. By the late 1990s there were almost twice as many new book titles available as in the early 1970s, there were 340 different types of breakfast cereals in the late 90s, compared with 160 in the early 70s, and there were 285 different types of running shoes, compared to only 5 types available before. Of course, some goods, such as personal computers, and internet web sites, were not available at all a few decades earlier.

The point is that while economic progress consists partly of growing output, a more significant component is changes in the nature of output that give consumers new goods and services, and greater variety and better quality in existing goods and services. National income accounting measures growth in income, but it does not measure economic progress. Thus, from a policy standpoint, it creates the incentive to design an economy that can produce more output, not one that can improve the quality of output. Economic policy is distorted by the way that we measure the productivity of the economy.

Entrepreneurship and Economic Progress

The twentieth century goal of economic policy has been to enhance the economic well-being of the population, and national income accounting was developed as a tool to help achieve this goal. The primary way in which economic progress enhances the well-being of people is to create new goods and services for them, to improve the quality of existing goods

and increase the variety of goods, and to find ways to produce output more cheaply. All of these improvements are the results of innovation, where the innovator discovers a different way of doing things, or perceives of a new kind of good or service that can be offered on the market. This type of innovation relies on entrepreneurship, which Kirzner (1973) describes as noticing a profit opportunity that has previously gone unnoticed. Economic progress relies on entrepreneurship, as Holcombe (1998) notes, so public policies designed to enhance economic growth must be policies that foster entrepreneurship.

Throughout much of the twentieth century, central planning was viewed as a better method of organizing an economy to produce economic growth than reliance on the market system. In his best-selling introductory textbook, Nobel Laureate Paul Samuelson (1973:883) argued that although per capita income in the Soviet Union was about half of per capita income in the United States, because of their centrally-planned economy the Soviet Union would grow faster, and per capita income in the Soviet Union would catch up to that in the United States perhaps as early as 1990, but almost surely by 2010. After the Berlin Wall fell in 1989 and the Soviet Union dissolved in 1991, almost everybody agrees that market economies are better suited to producing economic growth than centrally-planned economies. However, policies regarding economic growth continue to be oriented toward increasing the quantity of output rather than fostering progress by advancing the type of output being produced.

Public policies that foster economic growth are those policies that encourage entrepreneurship. Whereas prior to the 1990s most literature on economic growth would have emphasized government policies that directed resources toward their best uses (e.g., government-directed capital investment and public expenditures on education and training), a more recent literature has begun to emphasize the importance of creating an institutional framework that encourages market exchange and fosters entrepreneurial actions. Landes (1998) emphasizes the role of entrepreneurship and the market institutions that foster entrepreneurship in the generation of economic progress, and Gwartney, Lawson, and Holcombe (1999) show empirically that those nations whose policies create an environment that rewards entrepreneurship grow more rapidly, even when taking into account investment in physical and human capital. Hayek (1945) discussed the way in which a market economy makes the best use of the individual knowledge of time and place available to all market participants in order to generate economic progress. The fundamental cause of growth is the incorporation of these ideas that create progress rather than the enhancement of the quantity of homogeneous inputs and outputs.

At the beginning of the twenty-first century, there are two basic views on how government policy can best be used to enhance prosperity. One view is that enhancing a nation's physical and human capital, and developing and using advanced technology, produces economic growth. This policy view is based on the production function view of the economy that looks at output as a function of inputs and technology. The other view is that prosperity is produced by policies that protect property rights and remove impediments to exchange, by reducing government expenditures and regulation, and by creating a stable monetary system. In other words, prosperity is produced by creating an economic environment that is conducive to entrepreneurship. These two views are not necessarily inconsistent, in that policies might be focused on inputs into production and also on the environment within which production takes place, but in practice, as the next section argues, policies focusing

on inputs and technology have often produced an environment in which entrepreneurship has been stifled.

One spectacular example of the failure of the production function approach to economic progress is the former Soviet Union. Soviet economic policy emphasized investment in physical capital, education, and the use of advanced technology: all of the ingredients that the production function approach to growth implies should work; yet the failure of the Soviet economy is what eventually brought the nation to dissolution. As a centrally planned economy, Soviet economic policy replaced entrepreneurship with bureaucratic management. This case clearly illustrates that a focus on creating an environment for entrepreneurship leads to economic progress, whereas a focus on enhancing the inputs into the productive process without the entrepreneurial element does not work.

Of course, the inputs into the productive process are important. However, in an economy that has institutions that are conducive to entrepreneurship, individuals in the economy have the incentive to produce those inputs themselves, without the assistance of government. When investment is profitable, individuals will choose to save and invest without government interference, and when a productive economy creates a return to human capital, people will invest in education on their own, without government subsidization and encouragement. With the right institutional structure, an entrepreneurial economy will produce human and physical capital without government interference, whereas without the right institutional structure, even if government ensures investment in human and physical capital, engages in research and development, and deploys advanced technology, the economy will not develop. The former Soviet Union, and a host of other centrally-planned economies in the twentieth century, strongly make this case. As Landes (1998) notes, in every case where market institutions have been adopted and government interference in the economy minimized, nations have prospered, whereas no nations have prospered without these institutions.

Over the past several centuries, economists have offered many different ideas on how to enhance the wealth of nations. The physiocrats thought that investment in agriculture paved the road to prosperity; the mercantilists thought it was through accumulation of gold stocks. In the twentieth century, the greatest emphasis has been on enhancing a nation's human and physical capital. At the beginning of the twenty-first century, it is becoming increasingly apparent that the real key to prosperity is the creation of an environment that is conducive to entrepreneurship. Entrepreneurship creates economic growth, and while enhanced inputs are necessary to enhancing output, an entrepreneurial economy generates those inputs itself, without government direction.

National Income Accounting and Public Policy

At first glance it might appear that national income accounting could not have had much of an effect on public policy. It is, after all, only a set of conventions for measuring the nation's output and converting it into dollar terms. However, one of the first arguments this paper made is that the way that people measure their goals affects the way that they try to achieve them. National income accounting looks at the production of income in a particular way, and steers public policy toward a specific vision of how income can be increased. National income accounting conceives of income as homogeneous, and conceives

of economic growth as an increase in the quantity of that homogeneous output. The goal of growth is to increase GDP, and $GDP = f(K, L)$, so public policy should be geared toward increasing human and physical capital, and developing better technology. Furthermore, because government expenditures are included in GDP at cost, increases in the size of government make GDP appear to go up, creating an incentive for policy makers to divert resources from the private sector to the public sector. Ideologically, the United States has remained a market economy, but the conception of growth and progress in terms of national income has had a substantial impact even in a primarily market-oriented economy.

The most obvious impact is in the heavy government investment in education and research and development. In the United States, 78 percent of all college students and 89 percent of all elementary and secondary students attend government schools, and 32 percent of total research and development expenditures in the nation are made by government. Interestingly enough, government R&D expenditures have been declining substantially as a percentage of the total over the years; in 1960 government R&D expenditures made up 66 percent of the total.⁶ While the declining percentage of government R&D expenditures (due largely to a decline in military and space-related R&D) offers some reason to believe that policy is turning toward market allocation of resources rather than government planning, government still spends about one-third of the total R&D expenditures in the United States, and government investment in education shows no signs of letting up.

Government in the United States has not had as heavy an involvement in directing investment in physical capital as in most nations, but the regulatory environment of business is designed with the production function approach to income in mind rather than being geared toward encouraging innovation. The regulation of medicine and medicinal drugs has been geared toward maintaining the status quo and producing more of the same type of output rather than innovating and changing the nature of the output, despite the fact that so much innovation has taken place in the industry (Peltzman 1974, Holcombe 1995, chs. 7–9). Similarly, antitrust policy has been geared toward holding back and penalizing those firms that were able to gain an edge in the market through entrepreneurship and innovation (Armentano 1972, 1982, 1986). This was especially apparent in the 1990s when several firms on the cutting edge of technology (e.g., Intel, Microsoft) found themselves facing antitrust enforcement because of the market share their technological advances had given them.

The clear orientation in antitrust and regulation policy in the United States is that welfare is enhanced by ensuring competitive markets to produce more output at the lowest cost. The notion that welfare is enhanced by continual improvement in products, and that market share is a reward for entrepreneurship and innovation, appears to have no impact on policy. This production function approach to policy is readily apparent in the computer and medical industries, which are two industries that have seen the greatest amounts of progress as a result of entrepreneurship and innovation. Yet even here, where one would think that policies encouraging entrepreneurship would win out over policies designed to encourage greater production of “output,” the production function approach to policy has dominated. The way that one measures progress does matter, and the use of national income accounting to measure the health of the economy has pushed policy toward focusing on the production

of more of the same output, rather than on improving the quality of output and producing new types of output.

The first step in solving any problem is recognizing that the problem exists. Without some analysis, it may not be apparent that the way in which a nation accounts for its national income affects the type of economic policy the nation pursues. This analysis shows that the way in which national income is measured in the national income and product accounts makes income appear as a homogeneous product of inputs into a productive process. This biases public policy toward trying to increase income by producing a greater quantity of income rather than focusing on qualitative changes in output, even though the qualitative changes are more important for advancing economic well-being than the quantitative changes. Furthermore, public policy is biased toward trying to enhance the inputs into the productive process and produce technical advances, rather than focusing on the development of an institutional structure that fosters entrepreneurial activity, even though entrepreneurship is more important for advancing economic well-being than attempting to enlarge the nation's productive capacity. In addition, the way in which government expenditures are accounted for biases policy toward the diversion of resources from the private sector toward the public sector.

The bias in public policy is even more apparent when one compares economic policy in the nineteenth century with economic policy in the twentieth. Based on the ideas of Smith (1776) and Ricardo (1817), nineteenth century economic policy focused on reducing trade barriers, limiting government regulation, and creating an environment where entrepreneurship could thrive.⁷ The role of government was to protect property rights and provide stable institutions, and the concept of *laissez faire* described what policy-makers pursued as the most appropriate economic policy. Toward the end of the nineteenth century public policy began turning away from the concept of *laissez faire* in favor of the idea that enlightened government economic policy can be used to engineer the economy to enhance prosperity. But this required a way to measure prosperity, which led to twentieth century national income accounting, and measurement of prosperity in those terms led to policies that have stifled entrepreneurship—the true engine of prosperity.

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Notes

1. Even consumer surplus is not a perfect measure. One problem is that aggregation requires equating a dollar's worth of consumer surplus for one person with a dollar's worth for another person, raising the issue of interpersonal utility comparisons. Another problem is deciding whether total consumer surplus or per capita consumer surplus would be the goal. If one wanted to raise per capita consumer surplus, killing off less productive people would be a way to accomplish that goal. Maximizing total consumer surplus could point toward policies that would immiserate some in order to produce large consumer surplus gains for others. Thus, while a measure of consumer surplus, if it could be calculated, would be a better measure of national income than GDP, it would still leave much to be desired.

2. See Studenski (1958) for a comprehensive history of the development of national income accounting.
3. Even here, some issues arise. Because government often exercises monopoly power in its pricing, it may be that some prices are misstated relative to their market values, but this is a minor point compared to the larger points raised in this section.
4. Home production faces the additional problem that it may be difficult to measure, but if GDP is the market value of final goods and services, the measurement issue is irrelevant. No matter how much utility it brings, if it is not sold it has no market value, and so should not be included. The same argument applies to government. Nice weather and beautiful sunsets provide utility, but are not marketed, so are not included in income even though they generate utility. However, some of the market value of resort hotels is derived from this utility. The point is, if GDP measures market value, home production and government expenditures should be excluded because they are not sold, and measurement problems are irrelevant.
5. To balance the national income accounts, taxes can be subtracted from income, because they constitute a transfer from taxpayers to recipients of government goods and services.
6. These figures from the *Statistical Abstract of the United States*, 1999 edition.
7. In the United States, the Bank of the United States was abolished in 1836, reducing government's role in monetary affairs, and although government did get involved again to a limited degree as a by-product of financing the War Between the States, the nation remained on a gold standard through the end of the century. Starr (1982) reports that while states regulated the medical profession early in the 1800s, this regulation disappeared (only to reappear again late in the century). These two examples are illustrative of a nineteenth century economic policy that was oriented toward fostering entrepreneurship rather than trying to engineer the economy to prosperity.

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